

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

Dated: - 29.06.2023

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

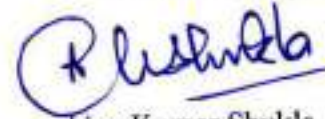
Sub: Half Yearly compliance Report of conditions stipulated in Environmental Clearance of North Karanpura Super Thermal Power Project (3x660MW) for the period October, 2022 to March, 2023.

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 **October 2022 to March 2023** 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,



Ajay Kumar Shukla
GM (O&M)
(NKSTPP)

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. JSPCB, Hazaribagh.

उत्तरी करणपुरा ग्रहण ताप विद्युत परियोजना (3x660मेगावाट) ग्राम: टंडवा, जिला: चतरा, झारखण्ड (825415)
North karanpura Super Thermal Power Project (3x660 MW) Village: Tandwa, Dist: Chatra, Jharkhand (825415)
पंजीकृत कार्यालय: एनटीपीसी भवन, स्कोप कॉम्प्लेक्स, 7 इंस्टीट्यूशनल एरिया, लोधी रोड, नई दिल्ली-110003
Registered Office: NTPC Bhawan, Scope Complex, 7 Institutional Area, Lodhi Road, New Delhi-110003
www.ntpc.co.in



A Maharatna Company

North Karanpura

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

Date-29-06-2023

**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 31.03.2023)
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	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)	<p>Environmental Clearance for Garhi Dam has been accorded by MOEF vide letter dated 09.09.2005.</p> <p>Forest Clearance-NKSTPP Project Area</p> <p>Stage-I Forest Clearance has been accorded by MOEF&CC vide their letter no F.No.8-76/2007-FC dated 08.06.2009.</p> <p>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 (<i>Copy already submitted with Half Yearly EC compliance report vide our letter no NKSTPP/EMG/MoEF&CC/EC/04/271 dated 25.04.2016</i>).</p> <p>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.</p> <p>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.</p>

*Sanjoy Kumar
DGM(EMG)*

*संजय कुमार / Sanjoy Kumar
उप महाप्रबंधक (ई एम जी)
Dy. General Manager (EMG)
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NTPC Limited, North Karanpura-826321*

Sl. No.	Stipulations of conditions	Status (As on 31.03.2023)
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.	<p>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. 316.01 Cr has been disbursed till March' 2023.</p> <p>The Community Development activities are being implemented in consultation with stakeholders. A provision of Rs 56.01 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.</p> <p>Rs 1.48 Cr spent during this period and total cumulative amount of Rs 39.87 Cr has been spent till March 2023.</p>
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 treated as impermeable layer as found by reputed institute like IIT Roorkee 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	<p>Complied.</p> <p>In the design of layout, a minimum distance of 500 m from plant boundary to riverine system has been maintained.</p>
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.

Signature

संजय कुमार/ Sanjoy Kumar
 ज्येष्ठ प्रबंधक (ई एम जी)
 Dy. General Manager (EMG)
 एनटीपीसी लिमिटेड, नार्थ कारापुरा- 825321
 NTPC Limited, North Karanpura- 825321

Sl. No.	Stipulations of conditions	Status (As on 31.03.2023)
	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.	Copy of Coal Linkage attached, as Annexure-II
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.	<p>Three stacks (single flue) of 275 m each are provided with Online Continuous Stack Emission Monitoring System (CSEMS).</p> <p>The exit velocity of 22 m/sec is being maintained during operation.</p> <p>Construction of stacks is in under progress and details are as bellow.</p> <p>Stack of Unit-I, II & III - Shell casting of all the three Chimneys completed. Unit I completed and are under in operation from 1st March, 2023. Work of Unit II and III is under progress.</p>
xi.	Electrostatic Precipitators (ESP) having efficiency of 99.9 % shall be installed to limit SPM emission up to 100 mg/Nm ³ .	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 9 th year from the date of commissioning of the plant.	<p>The quantity of ash generation has been revised as 11000 Tons/day dated 19.02.2014.</p> <p>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.</p>
xiii.	Water requirement shall not exceed 10,100 m ³ /hr. Waste water shall be recycled and reused in the plant.	<p>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.</p> <p>The requirement is being maintained within the final stipulated quantity 2,180 m³/hr instead of 10,100 m³/hr.</p>

Signature

संजय कुमार / Sanjay Kumar
 डाय. प्रशासक (ई. एच. ई.)
 Dy. General Manager (E.H.E.)
 राष्ट्रीय निगम, नॉर्थ नारंपुरा- 826321
 NTPC Limited, North Narnapur- 826321

Sl. No.	Stipulations of conditions	Status (As on 31.03.2023)
		Waste water is treated and recycled & reused in the plant during operation stage. Effluent treatment plant is under operation.
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. Recharge pond (80000 Cum capacity) for rainwater harvesting scheme to be constructed Construction of One recharge pond of about 40000 cum capacity has been completed and slope protection works 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.	Being complied.
xvi.	Noise level shall be limited to 75 dB 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 is undertaken to maintain the designed noise level of 75 dB Leq. Personal protective equipments are provided to all persons working in the area of generator and other high noise areas during the operation stage. Monitoring of noise level inside project area is going on and reports are attached as Annexure-III
xvii.	Greenbelt of 100 m width shall be developed around the plant boundary covering an area of 87 Ha.	Greenbelt is being developed around the plant boundary as mentioned in General Layout Plan. 1. NKSTPP has already planted 32500 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 2000 in which 500 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	Regular monitoring of air quality is started from January, 2021 and reports from October to March, 2023 are attached as Annexure-IV .

Sl. No.	Stipulations of conditions	Status (As on 31.03.2023)
	monthly monitoring report shall be submitted to the ministry.	
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.	<p>Being complied.</p> <p>Half yearly report on the status of implementation of the stipulated conditions and environmental safeguards is being submitted regularly to the following.</p> <ul style="list-style-type: none"> (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. <p>(Last half yearly report already submitted to the above vide through letter no</p>

Sanjoy

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NTPC Limited, North Karagpur- 825321

Sl. No.	Stipulations of conditions	Status (As on 31.03.2023)
		NKSTPP/EMG/MoEF&CC/EC/021 dated 17.02.2023
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 7 th 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. (<i>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</i>). <i>Total expenditure up to March 2023 is Rs. 8524.50 Millions.</i> 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 31 st March 2023.
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 is being extended to the scientists / officers from the Ministry / Regional offices of the ministry at Ranchi / the CPCB / the SPCB during monitoring of the project.


 Dy. General Manager (EMG)
 HTPC Limited, North Karanpura 825321

B. Compliance Report for Additional Conditions Stipulated vide MOEF Letter No. J-13011/26/89-IA-II(T) dated 19.02.2014 **Date: 29.06.2023**

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 31.03.2023
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.	<p>Rooftop solar PV (1500 KWp) of estimated capacity:</p> <p>1. 1100KWp (approx.) has been envisaged inside NKSTPP premises on rooftop of following buildings:</p> <p>(a) Ash Water pump house. (b) CHP MCC – 1B. © O&M Workshop building. (d) Permanent store building. (e) Compressor house building. (f) Fire station building. (g) Fire water PH building. (h) Switchyard control building. (i) Vishvesvaraiya office complex building.</p> <p>Work has been awarded to M/s Solluz Energy Private Limited, N. Delhi. Target completion date: November, 2023.</p>
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.	Being complied.
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.	Shall be complied.

Sanjoy Kumar

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NTPC Limited, North Karanpura- 825321

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 31.03.2023
	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.	
xxxi.	Mercury emissions from stack shall also be monitored on periodic basis.	Complied.
xxxii.	High Efficiency Electrostatic Precipitation (ESPs) shall be installed to ensure that particulate emission from the proposed plant does not exceed 50mg/Nm ³ .	Complied. Installation of High Efficiency Electrostatic Precipitation (ESPs) is in under progress and details are as below. (i). Unit-I – Completed. (ii) Unit-II – 10963 MT/11008 MT (% progress: 99.59 %) (iii). Unit III - 8155 MT/11008 MT (% progress: 74.08 %) 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 m ³ /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 m ³ /hr to 2,180 m ³ /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).



Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 31.03.2023
		Hence this condition no (xxxv) is deleted now.
xxxvi.	No water bodies including natural drainage system in the area shall be disturbed due to activities associated with the setting up/operation of the power plant.	No water bodies are disturbed due to activities associated with the 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 3 rd report is attached as Annexure-V .
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 3 rd report is attached as Annexure-IV .
xxxix	Waste water generated from the plant shall be treated before discharge to comply limits prescribed by the SPCB/CPCB.	Complied. All waste water generated from the plants are treated at ETP and reused at Bottom Ash Slurry tank. ETP at Plant site & STP at enabling township are in operation. Commissioning of STP at plant site is in 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.
xlii.	Fly Ash shall not be used for agricultural purpose. No mine void filling will be	Shall be complied during operation stage.

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 31.03.2023
	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.	Being complied.
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.	North Karanpura STPP envisages High Concentration Slurry Disposal System (HCSD) for Ash Disposal. In HCSD system, the disposed layers of ash is solidified and treated as impermeable layer as found by reputed institute like IIT Roorkee and there is no free water for overflow and leachate or no risk of ash dyke getting breached.
xlvi.	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.	Being complied
xlvii.	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 23500 no. of trees and also donated 2500 no. fruit bearing trees among project affected villages.


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 NTPC Limited, North Karanpura- 825321

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 31.03.2023
		It will be developed in phased manner. This year target of tree plantation is 2000 in which 1000 no. are already planted near township and surrounding area.
xlvi.	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.	Annual adequate budget provision kept for development and management of green cover of the area. In FY22-23 Fund allocated: 1.5 Crore
xlvii.	The project proponent shall also adequately contribute in the development of the neighbouring villages. Special package with implementation schedule for free potable drinking water supply in the nearby villages and schools shall be undertaken in a time bound manner.	<p>Being complied.</p> <p>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.</p> <p>Special package with implementation schedule for free potable drinking water supply in the nearby villages and schools is being undertaken.</p> <p>Existing water supply system has been strengthen.</p> <p>Supply of potable drinking water by water tanker in each Project Affected Villages.</p> <p>Water bottle have been provided to school students.</p> <p>Provision of Solar water system at Project Affected Villages is being done.</p>
xlviii.	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	<p>Being complied.</p> <p>Provision of Rs 56.01 Crs (0.4 % of project cost) has been kept for Community Development activities</p>

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 31.03.2023
	of the capital cost of the CSR budget shall be earmarked for CSR activities per annum till 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	broadly related to Health, Education, Drinking water, Welfare, Infrastructure, etc. Rs 3.5 Cr spent during this period and total cumulative amount of Rs 36.94 Cr has been spent till March 2023. Social audit: Social Audit work has been awarded to M/s KPMG. Report attached as Annexure-VI
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, furniture, 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	An Environmental cell [known as Environmental Management Group(EMG)] is already created at project site and functional.

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 31.03.2023
	implementation of environmental regulations and social impact improvement/mitigation measures.	
iii.	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.	<ul style="list-style-type: none"> ❖ Being complied. ❖ Arrangements has been made that effluents and storm water do not get mixed.
iii.	A sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising greenbelt/plantation.	<ul style="list-style-type: none"> (i) Sewage Treatment Plant having capacity of 300 KLD is in operation at enabling township area. (ii) Commissioning of a Sewage Treatment Plant having capacity of 100 KLD is in 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.	Being complied.
iv.	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.	<p>Complied.</p> <p>Disaster Management Plan is prepared and available at site. Copy of DMP is enclosed as Annexure-VII.</p>
lvi.	First Aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.	<p>Complied.</p> <p>First Aid and sanitation arrangements has been made available to the drivers and contract workers at project site.</p>
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.	Being complied.

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 31.03.2023
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 being done and reports are attached as Annexure-IV .
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.	Being complied.
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.	Being complied.
lxii.	The project authorities shall inform the Regional Office as well as the Ministry	Investment approval for the project has been accorded by the Board of



Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 31.03.2023
	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.	<p>Directors of NTPC on 28.01.2014. The award for main plant has been placed on 28.02.2014.</p> <p>COD of Unit-1 done on 01.03.2023</p> <p>Construction work of Unit-2 & 3 is under progress at project site and date of Commissioning of Units are as below.</p> <p>Unit-II – December'2023</p> <p>Unit-III – July'2024</p>

Signature
 संतोष कुमार / Santosh Kumar
 Dy. General Manager (E&T)
 एनपीसी लिमिटेड, नर्मदा नगर- 491001
 NTPC Limited, Narmada Nagar- 491001

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: 29.06.2023

Sl. No.	Stipulation of Conditions of BSPCB, Letter No. B-1860 dated 31.12.2001	Status (As on 31.03.2023)
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.	CTO has been taken from Jharkhand Pollution Control Board Vide ref. no. JSPCB/HO/RNC/CTO-9389769/2022/122 DTD 01/02/2022.
ii.	The effluent (Domestic & Trade) and emission, if any shall confirm to the standard prescribed by the board.	Being complied.
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.	<p>Height of the stacks (Three stacks single flue) is 275 meters.</p> <p>Online Continuous Stack Emission Monitoring System (CSEMS) is provided in stacks.</p> <p>Construction of stacks is in under progress and details are as bellow.</p> <p>Stack of Unit-I, II & III - Shell casting of all the three Chimneys completed. Unit I completed. Work of Unit II and III are under progress.</p>
iv.	High efficiency ESP shall be provided to achieve standard prescribed by the board.	<p>Installation of High Efficiency Electrostatic Precipitation (ESPs) is in under progress and details are as below.</p> <p>(i). Unit-I – Completed.</p> <p>(ii) Unit-II – 10963 MT/11008 MT (% progress: 99.59 %)</p> <p>(iii). Unit III - 8155 MT/11008 MT (% progress: 74.08 %)</p> <p>Standard prescribed by the board being achieved.</p>

Sl. No.	Stipulation of Conditions of BSPCB, Letter No. B-1860 dated 31.12.2001	Status (As on 31.03.2023)
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 is being suitable stored and treated in ETP and STP respectively to achieve the prescribed standards. Treated effluent is being recycled and reused to the maximum extent. (i) Enabling Township: -Sewage treatment (STP) having capacity of 300 KLD is in operation. (ii) Main Plant Area: - ETP is in operation and STP commissioning is in 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.	Being complied.
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.	Being Complied. Report is attached as Annexure-IV .
ix.	Unit shall submit detailed scheme for management of the ash. The scheme shall include measures taken for manufacturing ash bricks and utilization of ash within one year.	Attached as Annexure-VIII Fly ash/ Pond ash is being offered to bricks manufacturing units, NHAI, Mines etc free of cost for utilization as per GOI notification.
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-	Complied Detail's already submitted to Regional office of MoEF, Bhubaneswar vide our

Sl. No.	Stipulation of Conditions of BSPCB, Letter No. B-1860 dated 31.12.2001	Status (As on 31.03.2023)
	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.	letter no CC:ESE:4100:2005:GEN:02B dated 7 th 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.	Testing from NABL & MOEF accredited Lab is being done.
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. In order to neutralise the adverse impact on the captive colony physical barrier between the captive colony and the plant site shall be made.	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. 1. NKSTPP has already planted 23500 no. of trees and also donated 2500 no. fruit bearing trees among project affected villages. It will be developed in phased manner.

Sl. No.	Stipulation of Conditions of BSPCB, Letter No. B-1860 dated 31.12.2001	Status (As on 31.03.2023)
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	Complied.

Sanjay Kumar
Sanjay Kumar
Sanjay Kumar
 NKSTPP
 Dy. General Manager (EMG)
 North Karanpura, Jharkhand - 828321
 NTPC Limited, North Karanpura - 828321

SAP Contract No.

**MODIFIED-MODEL
COAL SUPPLY AGREEMENT**

BETWEEN

CENTRAL COALFIELDS LIMITED

AND

NTPC LIMITED

FOR

NORTH KARANPURA SUPER THERMAL POWER PLANT
UNIT 1-3 (3x660 MW)

[23/02/2023]



Government of Jharkhand

Receipt of Online Payment of Stamp Duty

NON JUDICIAL

Receipt Number : f8d35f55fd5e79102f39

Receipt Date : 21-Feb-2023 04:45:10 pm

Receipt Amount : 100/-

Amount In Words : One Hundred Rupees Only

Document Type : Agreement or Memorandum of an Agreement

District Name : Ranchi

Stamp Duty Paid By : NTPC LTD

Purpose of stamp duty paid : AGREEMENT

First Party Name : NTPC LTD

Second Party Name : CCL RANCHI

GRN Number : 2315890786

- This stamp paper can be verified in the jharnibandhan site through receipt number :-

Fuel Supply Agreement between CCL & M/s NTPC Ltd for North Karanpura STPP Unit 1 to 3 (3x660 MW)



This Receipt is to be used as proof of payment of stamp duty only for one document. The use of the same receipt as proof of payment of stamp duty in another document through reprint, photo copy or other means is penal offence under section-62 of Indian Stamp Act, 1899

इस रसीद का उपयोग केवल एक ही दस्तावेज पर मुद्रांक शुल्क का भुगतान के प्रमाण हेतु ही किया जा सकता है। पुनः प्रिन्ट कर अथवा फोटो कॉपी आदि द्वारा इसी रसीद का दूसरे दस्तावेज पर मुद्रांक शुल्क का भुगतान के प्रमाण हेतु उपयोग भारतीय मुद्रांक अधिनियम, 1899 की धारा 62 अन्तर्गत दण्डनीय अपराध है।

This Agreement is made on this 23rd day of February, 2023 between **Central Coalfields Limited**, a company registered under the Companies Act, 1956 and having its registered office at Darbhanga House, Ranchi, 834029, Jharkhand hereinafter called the "Seller" (which expression shall unless excluded by or repugnant to the subject or context, include its legal representatives, successors and permitted assigns) of the one part,

AND

M/s NTPC Limited, a company registered under the Companies Act, 1956 and having its registered office at **NTPC Bhawan, SCOPE Complex, 7, Institutional Area, Lodhi Road, New Delhi-110003**, hereinafter called the "Purchaser" (which term shall unless excluded or repugnant to the subject or context include its legal representatives, successors and permitted assigns) of the other part

AND

Whereas the Purchaser or its predecessor-in-interest was issued a Letter of Assurance (LOA) dated **04.02.2023** vide Reference No. **CCL/HQ/C-4/LOA(Power)/2022-23/261** against **3x660 MW plant capacity of the Purchaser's North Karanpura STPP** and the Purchaser has achieved the milestones as set out in the Annexure I of the LOA and fulfilled other conditions as stipulated under the LOA.

OR

Whereas the Purchaser has been granted linkage of Coal by Standing Linkage Committee – Long Term (SLC- LT)

AND

Whereas the Purchaser has requested Seller for execution of FSA and supply of Coal to its **North Karanpura STPP Unit 1-3 (3x660 MW)** located at **Tandwa Town, Distt. Chatra, 825321, Jharkhand** of the Purchaser (as per details contained in Schedule-I to this Agreement) and the Seller has agreed to make such supplies on the terms and conditions set out hereafter.

AND

Whereas the Purchaser has entered into or is yet to enter into long term Power Purchase Agreements (PPA) either directly with Distribution Companies (DISCOMs) or through Power Trading Company (ies) (PTC) who has / have signed back to back PPA(s) (long-term) with DISCOMs and have commissioned or would get commissioned.

AND

Whereas, the Purchaser has not any direct / indirect interest in any manner as associate or group company with any entity who has been allotted coal block in India for end use as stipulated in clause 3.2 with further reinforcement by Schedule-I in accordance with guidelines/policies of the Government of India relating to Letter of Assurance/ Allocation of coal on tapering basis.

AND

Whereas, the Purchaser gives a self-declaration that no coal block(s) has/have been allotted for the Power Plant(s) covered under this Agreement and even if coal block(s) has/have been allotted, such coal block(s) has/have not been allotted as source(s) of coal supplies for the power plant(s) covered under this Agreement. Whereas, The Purchaser further declares that there has been no change in the ownership pattern of the Purchaser since the time of issue of Letter of Assurance (LoA) till the time of signing of this Agreement.

AND

Whereas, in a meeting held on June 20, 2013 in Kolkata pending differences between the Seller and the Purchaser were resolved and it was decided that a copy of the signed minutes of the meeting and copies of Annexure -III to V referred therein shall form a part of the FSA and shall be applicable to NTPC and JV power plants.(Ref. CIL letter no. CIL:S&M:CMO:47252(New Pol) :465 dated June 29, 2013

Now, therefore, in consideration of the agreement and covenants hereafter set forth and intending to be legally enforceable, the Seller and the Purchaser (each individually a Party hereto and collectively the Parties) hereby covenant and agree as follows:

1. DEFINITIONS & RULES OF INTERPRETATION:

1.1 DEFINITIONS:

- a. **"Agreement"** means this Coal supply agreement including all its Schedules, Annexure and attachments and subsequent amendments as may be issued in accordance with the terms and conditions hereof and it shall supersede and exclude any previous arrangement, understanding or commitment that the Seller may have had with the Purchaser.
- b. **"Annual Contracted Quantity"** or **"ACQ"** shall have the meaning as ascribed to it in Clause 3.1
- c. **"Applicable Laws"** means all laws, brought into force and effect by the Government of India ("GoI") or the State Government including rules, regulations and notifications made thereunder, and judgments, decrees, injunctions, writs and orders of any court of record, applicable to either Seller/CIL or the Purchaser, their obligations or this Agreement from time to time.
- d. **"As Delivered Price of Coal"** shall have the meaning ascribed to it in Clause 8.
- e. **"Base Price"** shall mean, in relation to a Declared Grade [as defined at 1.1(i)] of Coal produced by Seller, the Pithead price notified from time to time by CIL or Seller; and in relation to Imported Coal, wherever applicable, shall mean its landed cost till the Delivery Point and service charges intimated by CIL or the Seller, as the case may be. In the event the Sellers supply coal from sources, notified by Seller on cost plus basis, cost plus basis prices shall be applicable

- f. **"Business Day"** shall mean each Monday, Tuesday, Wednesday, Thursday, Friday and Saturday that is not declared a holiday in the State of **Jharkhand** under the Negotiable Instruments Act, 1981.
- g. **"Coal"** means non-coking as well as coking coal, produced domestically and categorized into different classes, GCV bands, grades and sizes, as per the notification/order issued for such purpose by Government of India(GoI)/CIL/ Seller and shall, where the context so requires, include Imported Coal. For the avoidance of any doubt, Coal shall also include the middlings arising out of washing of coking and non-coking coal.
- h. **"Condition Precedent Period"** shall have meaning ascribed to it under Clause 2.8.3.1
- i. **"CIL"** means Coal India Limited, the holding company of the Seller, having its registered office at Coal Bhawan, Premise No-04 MAR, Plot No-AF-III, Action Area-1A, Newtown, Rajarhat, Kolkata-700156, India, and having authorities to enter into any agreement/side agreements, supplementary to this agreement for ensuring supply of coal from import of coal or other alternative sources.
- j. **"Coal Distribution System"** of the Seller would include any distribution system in force including directions thereon from the Government issued from time to time.
- k. **"Colliery Loading Point"** shall mean
- (i) Silo, or
 - (ii) Mid point for wharf wall loading at the colliery, or
 - (iii) Truck loading point, or
 - (iv) Ropeways loading point, or
 - (v) Transfer point to the customer's belt conveyor etc, as the case may be.
- l. **"Declared Grade"** means the particular grade(s) under different categories [as defined at 1.1(s)] of Coal mined from any seam or section of a seam in the Seller's collieries as declared by CIL or the Seller from which Coal is produced and supplied under this Agreement, as declared by CIL or the Seller.
- m. **"Delivery Point"** means any of the colliery sidings or Colliery Loading Points, as the case may be, in the designated Coal mine of the Seller as per Schedule I, and/ or the location(s)/ port(s) identified by the Seller at which the Seller delivers Imported Coal in accordance with the terms of this Agreement.
- n. **"DISCOM"** means the "Distribution Licensee" who is authorized to operate and maintain a distribution system for selling electricity to the consumers in his area of supply at tariffs regulated by the State / Central Regulatory Authority, whichever is applicable.
- o. **"Effective Date"** shall mean the date of occurrence of the last of the events specified under clause 2.8.3.2 or 2.8.3.3



- p. **"First Delivery Date"** shall have the meaning ascribed to it in Clause 2.9
- q. **"Equilibrated Basis"** means determination/computation of various quality parameters such as but not limited to ash, volatile matter, fixed carbon, Gross Calorific Value etc. expressed at Equilibrated Moisture level determined at 60% relative humidity (RH) and 40 degree Celsius (°C).
- r. **"Equilibrated Moisture"** means moisture content, as determined after equilibrating at 60% relative humidity (RH) and 40 degree Celsius as per the relevant provisions (relating to determination of equilibrated moisture at 60% RH and 40 degree Celsius) of BIS 1350 of 1959 or amendment thereof.
- s. **"Grade"** means the grade / class in which the coking and non-coking Coal is categorised and/or to be categorised in terms and in accordance with the relevant notification issued by the Seller and/or by Govt. of India and published in the public domain and/or the Gazette of India, as applicable. The basis of grading for different categories of coal are as under:
- i. Non Coking Coal : based on GCV bands
 - ii. Coking Coal : based on Ash percentage
 - iii. Semi Coking Coal : based on (Ash + Moisture) percentage
- t. **"Imported Coal"** shall mean non-coking as well as coking coal, sourced internationally.
- u. **"Independent Engineer"** shall mean a consulting engineering firm or group, acceptable to the Seller, having necessary expertise to undertake the services or activities as mentioned under Clause 2.8.2.2
- v. **Importing Agency:** It may be the holding company of the Seller i.e. CIL or any other agency(ies) appointed for supply of imported coal on behalf of the Seller.
- w. **"IS"** means the standard specifications issued by the Bureau of Indian Standards (BIS)
- x. **"Kilo Calorie"** shall mean the amount of heat required to raise the temperature of one kilogram (1 Kg.) of pure water at fifteen degrees Celsius (15°C), by one degree Celsius (1°C)
- y. **"Level of Delivery"** shall have the meaning ascribed to it in Clause 3.7.
- z. **"Level of Lifting"** shall have the meaning ascribed to it in Clause 3.8.
- aa. **"Merry Go Round" or MGR** shall mean the Purchaser's captive rail transportation system for transportation of Coal
- bb. **"Month"** shall mean a calendar month.




- cc. **"Party"** means either the Seller or the Purchaser, and **"Parties"** mean a joint reference to the Seller and the Purchaser
- dd. **"Interest Rate"** shall mean the repo rate of Reserve Bank of India (RBI) as applicable on the due date of payment by the Purchaser plus 3% (three).
- ee. **"Performance Incentive"** shall have the meaning ascribed to it in Clause 3.12.
- ff. **"Pithead"** shall mean any of the following as the context may admit:

In case of an underground Coalmine, Pithead shall mean the point of entry into the mine on the surface of coal mine at the ground level and would be a place or point distinct from Delivery Point

In case of an open-cast Coalmine, Pithead shall mean the exit point of Coal on surface (mouth/entry of the main access trench or an auxiliary access trench). In case of open-cast mines with more than one exit points of Coal, there will be as many 'Pitheads' and will apply respectively to the amount of Coal egressing from a particular exit point.

The distance of transportation on surface from the Pithead (mouth of the main access trench or an auxiliary access trench) to the Colliery Loading Point shall be measured along the route of Coal transportation.


- gg. **"PPA" (Long Term)** means the Power Purchase Agreement between the Power Generating Source and the power procurer(s), i.e. DISCOM(s) directly or through PTC(s) who has/ have signed back to back PPA(s) with DISCOMs for a period of 7 years and above. However, the same shall not be applicable for the portion which is sold under market driven price.
- hh. **"Purchaser's Container"** means the Railway wagons and/or trucks placed for and on behalf of the Purchaser and/or receiving hopper, bunker, transfer point owned by the Purchaser from where Coal is moved by the Purchaser directly to its Power Station by belt conveyor.
- ii. **"Quarterly Quantity" or "QQ"** shall have the meaning ascribed to it in Clause 3.4.
- jj. **"Seller's Financial Closure"** shall mean the date on which execution of all the loan agreements, notes, indentures, security agreements, letters of credit and any other documents relating to the financing of the coal block have become effective and the Seller has immediate access to such funding with respect to development and operation of the coal block identified in Schedule I to this Agreement.
- kk. **"Signature Date"** shall mean the Date of signing of this Agreement by both Parties.



- ll. **"Surface Moisture"** means the moisture content present in Coal that is derived as the difference between Total Moisture and Equilibrated Moisture, and expressed in percentage terms.
- mm. **"Total Moisture"** means the total moisture content (including surface moisture) expressed as percentage present in Coal and determined on as delivered basis in pursuance to IS.
- nn. **"Unloading Point"** means the place/point at the Purchaser's Power Station end at which Coal from/through the Purchaser's Container is received/ unloaded.
- oo. **"Gross Calorific Value" or "GCV"** means the heat value determined in any calibrated combustion Bomb Calorimeter, in accordance with the procedure laid down in IS: 1350 (Part-II) 1970 dated April 1971 or any subsequent revision thereof and result reported on equilibrated basis at 40 Degree Celsius and 60% Relative Humidity.
- pp. **"Weights and Measures Standards"** mean the standards, as prescribed under the Standards of Weights and Measures Act, 1976 and amendments thereof.
- qq. **"Year"** means the financial year of the Seller, commencing on April 1st and ending on the following March 31st and **"Quarter"** means the respective three-monthly periods, namely April to June, July to September, and so on.
- rr. **"Power Trading Company (PTC)"**: A Power Trading Company is a trading licensee under the Electricity Act 2003 and having Trading License approved by the State Electricity Regulatory Commission under Section 86(1)(b) of the Electricity Act 2003
- ss. **"Third Party"** : The agency appointed for collection, preparation and analysis of coal samples at loading points and relevant documentation

1.2 RULES OF INTERPRETATION:

- a) A reference to this Agreement includes all schedules and annexures to this Agreement;
- b) A reference to any legislation or legislative provision includes any statutory modification or re-enactment of, or legislative provision substituted for, and any subordinated legislation issued under, that legislation or legislative provision;
- c) Headings do not affect the interpretation of this Agreement;
- d) A reference to Rs., INR or Rupees is to the lawful currency of the Republic of India unless specified otherwise;



- e) A reference to an agreement, deed, instrument or other document include the same as amended, novated, supplemented, varied or replaced from time to time; and
- f) The expressions "including", "includes" and "include" have the meaning as if followed by "without limitation".
- g) Words imparting the singular only also include plural and vice-versa where the context so requires;
- h) The expression "writing" or "written" shall include communications by facsimile and letter;
- i) If any definition in Clause 1.1 is a substantive provision conferring a right or imposing an obligation on any Party, effect shall be given to it as if it were a substantive provision in the body of this Agreement.

2. **PERIOD OF AGREEMENT:**

- 2.1 This Agreement shall come into force on the **Effective Date**
- 2.2 This Agreement shall, unless terminated in accordance with the terms hereof, remain in force till the end of **twenty (20) years** from the Effective Date or the Life of the Power plant whichever is earlier.
- 2.3 After completion of five (5) years from the First Delivery Date, either Party may, by prior written notice to the other Party for a period not less than thirty (30) days, seek a review of this Agreement.
- 2.4 Notwithstanding the provisions of Clause 2.2 above, in the event of any change in the Grade structure of Coal, such changed Grade structure shall be binding and complied with by both the Parties. The Seller shall within fifteen (15) days of introduction of such change provide a written notice to the Purchaser calling for a joint review of such provisions of this Agreement on which such change in the Grade structure has a bearing, and upon such joint review, this Agreement shall be duly amended in writing to bring it in full conformity with such change.
- 2.5 In the event, the Parties are unable to arrive at a mutually agreed position with respect to the subject matter of review in terms of Clause 2.3 within a period of three (3) months from expiry of each five (5) year term, the Parties shall refer the matter to the Govt. of India and until a decision from the Government of India is received, the Agreement shall continue to be in force. The decision of the Govt. of India on the subject matter shall be final and binding on both the Parties.
- 2.6 (i) In the event of any material change in the Coal distribution system of the Seller due to a Government directive/ notification, at any time after the execution of this Agreement, the Seller shall within seven (7) days of introduction of such change provide a written notice to the Purchaser calling for a joint review. If the Parties

are unable to arrive at a mutually agreed position with respect to the subject matter of review, within a period of thirty (30) days from the date of notice the Parties shall refer the matter to the Govt. of India for a decision.

(ii) In terms of the Presidential Directives dated 17-7-2013 the Seller shall have the right to refer the FSA to the Ministry of Coal, Govt. of India for review of the actual supply schedule as and when FSA for 60,000 MW of plant capacity in aggregate becomes eligible for drawing coal as per FSA

(iii) Notwithstanding the provision contained in any other clauses of this agreement, the FSA shall not be effective if the Plant is not commissioned by March, 2020.

2.7 On completion of twenty (20) years from the Effective Date, or earlier in case of life of the Plant is less than twenty years this Agreement shall expire unless both the Parties mutually agree in writing to extend the Agreement, on the same or such terms as may be agreed upon by the Parties.

2.8 Condition Precedent (CP)

The rights and obligations of the Parties under this Agreement are subject to the satisfaction in full of the Conditions Precedent provided under Clause 2.8.1 and Clause 2.8.2 within the Condition Precedent Period unless the same have been waived in accordance with this Agreement.

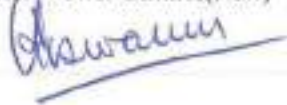
2.8.1 Seller's Condition Precedent :

2.8.1.1 In respect of supply of Imported Coal: the Seller shall have (i) acquired a definitive right under a coal import agreement with its supplier of imported coal; and (ii) made all necessary arrangements for import of Coal including the necessary shipping and port arrangements for delivery of Imported Coal in accordance with the terms of this Agreement

2.8.1.2 In respect of supply of domestic Coal (Applicable only for a Purchaser for whom any coal block has been identified for supply of coal): the Seller shall have (i) obtained from the lawful authority all requisite sanctions, approvals, licenses and consents including those related to land acquisition, environment and forest clearance for development and operation of the coal block identified in Schedule I to this Agreement; and (ii) achieved Seller's Financial Closure with respect to development and operation of the block identified in Schedule I to this Agreement.

2.8.2 Purchaser's Condition Precedent

2.8.2.1 The Purchaser shall have obtained from the lawful authority all necessary clearances, authorizations, approvals and permissions required for, construction, commissioning, operation and maintenance of the Plant



2.8.2.2 The Purchaser shall have completed the construction and the completion of such construction along with readiness of the power plant for lighting up has been certified by an Independent Engineer within the Condition Precedent Period.

2.8.2.3 Applicable to Purchaser who has signed FSA without entering into long-term PPA: The Purchaser shall have to furnish the long term Power Purchase Agreements (PPA) either directly with Distribution Companies (DISCOMs) or through Power Trading Company(ies) (PTC) who has / have signed back to back PPA(s) (long-term) with DISCOMs within the Condition Precedent (CP) period as per clause 2.8.3.1.

2.8.3 Satisfaction of Condition Precedent

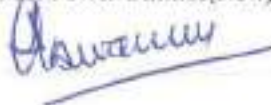
2.8.3.1 The Conditions Precedents shall be fulfilled/ achieved within a period of twenty four (24) months from the Signature Date or such further period (upto a maximum of 180 days) as may be extended on account of Force Majeure under Clause 17 of this Agreement ("**Condition Precedent Period**")

The CPs set out in Clause 2.8.1 above shall be fulfilled to the satisfaction of Seller or waived by the Seller at its sole discretion in accordance with the option to be exercised by the Purchaser in the letter as per Schedule VII with regard to acceptance / surrender of supply of imported coal without affecting in any way the Seller's obligations under this agreement. Within fifteen (15) days of achieving or waiving the CPs set out in Clause 2.8.1 as the case may be, the Seller shall issue a notice of satisfaction and notify to the Purchaser in writing. The Purchaser within fifteen (15) days from receipt of such notification shall issue a letter accepting the same.

2.8.3.2 The CPs set out in Clause 2.8.2 above shall be fulfilled to the satisfaction of the Seller or waived jointly by both the Parties in writing, as the case may be. Within fifteen (15) days of completion of achieving the CPs set out in Clause 2.8.2 the Purchaser shall issue a written notice of satisfaction and notify to Seller. The Seller within fifteen (15) days from receipt of such notification by Purchaser shall issue a letter accepting the same.

2.8.3.3 Notwithstanding the provisions of clause 2.8.3.1 above, at the request of the Purchaser, CIL may at its sole discretion extend the Condition Precedent Period.

2.8.3.4 If within the Condition Precedent Period, the Purchaser does not fulfill the Condition Precedent set out in clause 2.8.2 due to any reasons other than Force Majeure, or the said Condition Precedents in clause 2.8.2 have not been jointly waived by the parties in writing, the Seller shall have the right to forfeit the Security Deposit amount submitted by the Purchaser without any further notice to Purchaser. In case of FSAs applicable for more than 1 unit of a power plant, Security Deposit shall be forfeited in proportion to the number of units failed to achieve condition precedent.



2.9 First Delivery Date

2.9.1.1 Not later than 5 days from Effective Date, both parties shall determine a mutually agreeable 3 Month period within a time period of 18 month from the Effective Date for commencement of coal supplies ("Target Start Period"). In the event that the Parties are not able to agree on such 3-Month period then later of the 3 month period suggested by the either party shall be the Target Start Period. The actual date of coal delivery at the Delivery Point by the Seller within the Target Start Period shall be the **First Delivery Date**. In case there is no coal supply by the Seller at the Delivery Point during Target Start Period owing to reasons other than Force Majeure the last date of Target Start Period shall be deemed to be the **First Delivery Date**.

2.9.2 The Target Start Period may be extended on account of Force Majeure in accordance with Clause 17, subject to a maximum of 180 days

2.10 Build – Up Period

2.10.1 Build-Up Period shall be the period of 6 months commencing on the First Delivery Date. In case CIL decides at its sole discretion to import, Build-up period shall be extended for a further period of six months for commencing supply of imported coal During the Build-Up Period any compensation arising on account of short supply or short lifting, as per Clause -3.6 of this Agreement, shall not be payable by either Party. Supply of coal by Seller shall start only after the Purchaser's power plant becoming ready to start lighting up the boilers, to be confirmed by the Purchaser to the Seller in writing with documentary evidence.

2.10.2 The indicative Coal quantities to be supplied by the Seller and to be oftaken by the Purchaser during the Build- up Period are shown below. For avoidance of doubt, it is clarified that the quantities mentioned are indicative and the actual scheduled quantities may exceed or be lower compared to the quantities indicated below. The quantities shall however not exceed the pro-rated contracted quantities under this Agreement

Build Up Period	Indicative Coal Requirement (in Tonnes)
Build-Up Period [A period of 6 /12 months from First Delivery Date as the case may be]	Not Applicable

2.11 Security Deposit (SD)

2.11.1 On signing of this agreement the Commitment Guarantee (CG) provided by the Purchaser prior to issue of Letter of Assurance (LOA) shall stand converted into the Security Deposit amount as determined under Clause 2.11.2 Accordingly, a sum of Rs. 49,53,07,008/- (Indian Rupees Forty Nine Crore Fifty Three Lakh Seven Thousand Eight Only) is deemed to have been deposited by the Purchaser towards the Security Deposit amount stipulated in Clause 2.11.2. In the event the

Commitment Guarantee amount provided by Purchaser is more than the Security Deposit amount as determined under Clause 2.11.2, Seller shall return such balance amount within three (3) months from the date of signing of this Agreement. In an event the Security Deposit amount as determined under Clause 2.11.2 is more than the Commitment Guarantee amount, the Purchaser shall deposit such balance amount within three (3) months from the date of signing of this agreement. Failure to submit the balance amount by the Purchaser within three (3) months from the date of signing of this agreement, as aforementioned, shall entitle the Seller to adjust the ACQ such that it is commensurate with the Security Deposit required to be submitted by the Purchaser under clause 2.11.2

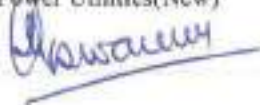
Notes: Purchaser directly entering into this Agreement who have been granted coal linkage by Standing Linkage Committee – Long Term (SLC- LT) and have not been issued Letter of Assurance (LOA) by Seller or any Purchaser who have been issued LOA without depositing of Commitment Guarantee as stipulated under the LOA shall deposit the Security Deposit amount as determined under Clause 2.11.2 before the Signature Date. [In such case delete Clause 2.11.1]

- 2.11.2** The Purchaser shall deposit with the Seller a sum of Rs. 49,53,07,008/- (Indian Rupees Forty Nine Crore Fifty Three Lakh Seven Thousand Eight Only) equivalent to six percent (6%) of the Base Price of such Grade of Coal, as described in Schedule-III to this Agreement, prevalent on the date of deposit multiplied by ACQ, as Security Deposit (SD), in cash / Bank Guarantee on or before the signing of this Agreement. In case of multiple Grades indicated in Schedule-III, the simple average base price of grades of coal mentioned in the Schedule-III shall be considered for the purpose of calculation of SD without any commitment whatsoever to supply such Grade of Coal. Such Security Deposit shall be non-interest bearing. Accordingly, the Purchaser has furnished Rs. 49,53,07,008/- (Indian Rupees Forty Nine Crore Fifty Three Lakh Seven Thousand Eight Only)* towards the Security Deposit amount.

[In case the SD is in the form of a bank guarantee the same shall be provided in the enclosed format ("SD Bank Guarantee") with this Agreement at Schedule-II.]

** The CG/ACG submitted by NTPC for an amount of Rs. 81,75,48,000/- against the LOA have been converted into SD for FSA.*

- 2.11.3** The SD Bank Guarantee submitted by the Purchaser, as per Clause 2.11.2 above, shall remain valid till thirty (30) days from the First Delivery Date under this Agreement. Purchaser shall extend the SD Bank Guarantee and submit such letter of extension/ extended SD Bank Guarantee to the Seller one month in advance of the expiry date thereof, failing which the Seller shall have the right to terminate this Agreement. In case of multiple units of a Power plant, thirty (30) days from FDD of the last unit.
- 2.11.4** The value of the Security Deposit shall be suitably increased / decreased to match the changes in the Base Price notified by the Seller from time to time. In the event of failure of the Purchaser to provide such increased value within thirty (30) days from the date of notification of such change in Base Price, the Seller shall have



the right to terminate the Agreement. If additional SD due to such increase in the Base Price of Coal is submitted by way of additional bank guarantee, the period of validity of such bank guarantee shall be the same as that of the initial SD Bank Guarantee furnished in terms of Clauses 2.11.1 to 2.11.3 above. Alternatively, the amount of the initial SD Bank Guarantee may be increased by an amendment so as to cover the increased value of SD resulting from the change in the Base Price.

- 2.11.5** The Security Deposit shall be refundable to the Purchaser at the end of 30 days from the First Delivery Date. In case of multiple units of a Power plant, thirty (30) days from FDD of the last unit.

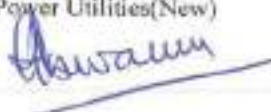
3. QUANTITY:

3.1 Annual Contracted Quantity (ACQ):

- 3.1.1** The Annual Contracted Quantity of Coal agreed to be supplied by the Seller and undertaken to be purchased by the Purchaser, shall be **84.72 lakh tonnes per Year** from the Seller's mines and/ or from import, as per Schedule I. For part of Year, the ACQ shall be prorated accordingly. The ACQ shall be in the proportion of the percentage of Generation covered under long term Power Purchase Agreement(s) executed by the Purchaser with the DISCOMs either directly or through PTC(s) who has/have signed back to back long term PPA(s) with DISCOMs. Whenever, there is any change in the percentage of PPA(s), corresponding change in ACQ shall be effected through a side agreement. Such changes shall be allowed to be made only once in a year and shall be made effective only from the beginning of the next quarter. However, in no case ACQ should exceed the LOA quantity as mentioned in Schedule-I.
- 3.1.2** The Purchaser shall in advance under the Schedule I provide firm annual coal requirement for the initial years required for phasing of the Power Plant after the completion of Build-Up Period, quantities subject to maximum of Annual Contract Quantity mentioned under Clause 3.1.1. Such quantities shall be considered binding and deemed to be Annual Contract Quantities for the respective years and be used for provisions under this Agreement.
- 3.1.3** It is expressly clarified that the Annual Contracted Quantity (ACQ) shall be valid for each Power Station separately, as mentioned in Schedule I, and all the provisions of this Agreement related to ACQ shall be applicable mutatis mutandis.

3.2 End-use of Coal

The total quantity of Coal supplied pursuant to this Agreement is meant for use at the **North Karanpura STPP Unit 1 to 3 (3x660 MW), Tandwa Town, Distt. Chatra, 825321, Jharkhand** as listed in Schedule I. The Purchaser shall not sell/divert and/or transfer the Coal to any third party for any purpose whatsoever and the same shall be treated as material breach of Agreement, for which the Purchaser shall be fully responsible and such act shall warrant suspension of coal supplies by the Seller.



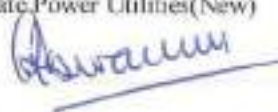
However, interplant transfer of coal may be considered provided:

- a) Transfer of coal shall be allowed only between the power plants wholly owned by the Purchaser or its wholly owned subsidiary. No transfer of coal shall be allowed for a Joint Venture (JV) company of the Purchaser. The supply of coal, shall for all commercial purpose under the FSA remain unchanged and on account of the original Power Plant.
- b) Both the Power Plants should have executed FSA in the modified FSA Model applicable for new power plants and not having any supplies linked to coal blocks. In case of IPPs both the plants must have valid long term PPAs with DISCOMS.
- c) Transfer of coal will not be allowed to those plants who are allotted coal blocks under this arrangement.
- d) In case of change in the ownership and no environmental clearance of the plant this facility shall stand withdrawn, and
- e) Penalty/Incentive under this arrangement would be considered in terms of (a) above.

Note: In addition to the above conditions, the transferee plant would also require to provide an affidavit to CIL (Supplying Coal Company) affirming that the additional coal supply beyond the ACQ shall only be used for generating power for distribution under long term PPAs with DISCOMS.

3.3 Sources of Supply

- 3.3.1 The Seller shall endeavor to supply Coal from own sources as mentioned in Schedule I. In case the Seller is not in a position to supply the Scheduled Quantity (SQ) of Coal from such sources as indicated in Schedule I, the Seller shall have the option to supply the balance quantity of Coal through import which shall not, unless otherwise agreed between the parties, exceed 15% of the ACQ in the year 2012-13, 13-14 and 14-15, 13% of ACQ in the year 2015-16 and 5% of the ACQ for the year 2016-17 and onwards. Seller may at its discretion, make such arrangement for supply of imported coal through CIL, and /or other enterprises. Accordingly, the Purchaser has to enter into a 'Side Agreement' with CIL and/or the Seller, as the case may be, in addition to this Agreement. The 'Side Agreement' dealing with the terms and conditions for supply of imported coal would be an integral part of this Agreement.
- 3.3.2 For supply of coal through import as stated in clause 3.3.1 above, the Purchaser shall agree to have back to back arrangements, if so required, with the Importing agency(ies) to be notified by the Seller/CIL and deposit 100% of payable amount in advance. The commercial terms and conditions for such supply shall be regulated as per the Side Agreement.
- 3.3.3 The Seller may also offer coal from loading points / coal stocks to be lifted by the Purchaser by his/ their own transport arrangement by road / road-cum-rail or any other mode up to 5 % of the ACQ. The provision shall however be applicable for



supplies of coal under the Agreement from collieries of three coal producing subsidiaries of CIL viz. SECL, MCL and CCL. Further the provision shall continue till such time three major railway lines in these coal companies are constructed and made operational.

- 3.3.4 CIL reserves the right to transfer part of the ACQ from the Seller to another coal producing company (Subsidiary of CIL) based on the proposal received from the Seller, which would be binding on the Purchaser.

3.4 Quarterly Quantity (QQ)

The Annual Contracted Quantities, from indigenous sources, for the Year, as per Clause 3.1 shall be divided into Quarterly Quantities (QQ), expressed in tonnes, as follows:

I st Quarter (Apr-Jun.)	25% of ACQ
II nd Quarter (Jul-Sep)	22% of ACQ
III rd Quarter (Oct-Dec)	25% of ACQ
IV th Quarter (Jan-Mar)	28% of ACQ

3.5 Scheduled Quantity (SQ):

- 3.5.1 The monthly Scheduled Quantity (SQ) shall be one third ($1/3^{rd}$) of the QQ.

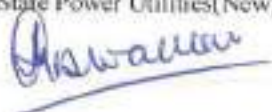
- 3.5.2 Either the Purchaser or the Seller by serving a written Notice at least thirty (30) days prior to the commencement of a month, may revise the SQ to be supplied by the Seller in that month, provided that the increase/ decrease resulting from such revision shall not be in excess of 5% of the SQ and the Purchaser shall seek any such increase in SQ for the months of July, August and September of any Year only with the prior written consent of the Seller.

- 3.5.3 Seller shall have the right to make good the short supplies in a particular month in the succeeding month(s) of the same Quarter to the extent of 5% of the SQ. Similarly, Purchaser shall have the right to make good the short lifting in a particular month in the succeeding months of the same Quarter to the extent of 5% of the SQ.

- 3.5.4 Total variation in any Month pursuant to clauses 3.5.2 and 3.5.3 shall in no case exceed 10% of the SQ.

- 3.5.5 Normally variation shall not be permitted in respect of QQ either by Purchaser or Seller pursuant to 3.5.2, 3.5.3 and 3.5.4 except with mutual consent of the Purchaser and the Seller. However, variation in QQ with corresponding variation in the SQs of the quarter concerned over and above permitted under sub clause 3.5.2, 3.5.3 and 3.5.4 can be made with mutual consent of the Purchaser & the Seller expressed in writing.

- 3.5.6 Not used



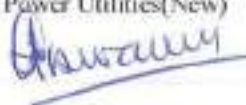
3.5.7 The above schedule of supply is in respect of supply of coal from indigenous sources. Supply of imported coal shall be made as per its availability, which is depending upon many uncontrollable factors and hence no restrictions shall be applicable for quarterly distribution

3.6 Compensation for short delivery/lifting

3.6.1 If for a Year, the Level of Delivery by the Seller, or the Level of Lifting by the Purchaser falls below ACQ with respect to that Year, the defaulting Party shall be liable to pay compensation to the other Party for such shortfall in Level of Delivery or Level of Lifting, as the case may be ("Failed Quantity") in terms of the following

Source	Level of Delivery / Lifting of Coal in a Year	Percentage of Penalty for the failed quantity (at the rate of weighted average of Base Prices of Grades of coal supplied)		
		2012-13,2013-14 & 2014-15	2015-16	2016-17 onwards
Imported + Domestic Qty	Below 100% but up to 80% of ACQ	NIL	NIL	NIL
Applicable for Imported Coal Only	Below 80% but up to 75% of ACQ	0 - 1.5	0 - 1.5	0 - 1.5
	Below 75% but up to 67% of ACQ			-
	Below 67% but up to 65% of ACQ		-	-

Source	Level of Delivery / Lifting of Coal in a Year	Percentage of Penalty for the failed quantity (at the rate of weighted average of Base Prices of Grades of coal supplied)		
		2012-13,2013-14 & 2014-15	2015-16	2016-17 onwards
Applicable for Domestic Coal	Below 75% but up to 70% of ACQ	-	-	0 - 5
	Below 70% but up to 67% of ACQ	-	-	5 - 10
	Below 67% but up to 65% of ACQ	-	0-2	




Below 65% but up to 60% of ACQ	0 - 5	-2-7	10 - 20
Below 60% but up to 55% of ACQ	5 - 10	7 - 20	20 - 40
Below 55% but up to 50% of ACQ	10 - 20	20 - 40	
Below 50% of ACQ	20 - 40		

3.6.2 The penalty payable shall be computed in the same manner as done slab-wise for computation of income-tax. However, unlike income tax, the percentage of compensation shall grow on linear basis within each slab

** Note: For the phasing period the annual coal requirements shall be based on the quantities mentioned by the Purchaser for the initial years under Schedule I of this agreement*

Note: The Purchaser has to give unconditional acceptance of imported coal and pricing mechanism thereof as would be decided by CIL., by signing the Schedule VII of this agreement. Unless such acceptance is accorded, the penal provision for supply below 80% and up to 65% of ACQ for the years 2012-13, 2013-14 and 2014-15 and below 80% and up to 67% of ACQ for the year 2015-16 shall not be applicable. The penal provision for supply below 75% shall be applicable from the year 2016-17 and onwards. The terms of import and the pricing mechanism shall be as per the provisions of the side agreement.

3.6.3 Agreements made earlier under the 'Coal Distribution System' as defined at clause 1.1(j) shall take precedence over the commitments made under this agreement

3.6.4 The Seller shall be entitled to modify/amend the penalty levels as specified at clause 3.6.1 pursuant to review undertaken by MOC in terms of the clause 2.6(ii)

3.7 Level of Delivery:

Level of Delivery with respect to a Year shall be calculated in the form of percentage as per the following formula:

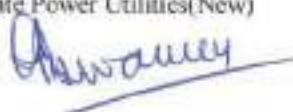
$$\text{Level of Delivery (LD)} = \frac{(DQ+DDQ+FM+RF)}{ACQ} \times 100$$

Where:

LD = Level of Delivery of Coal by the Seller during the Year.

DQ = Delivered Quantity, namely, aggregate actual quantities of Coal delivered by the Seller during the Year

DDQ = Deemed Delivered Quantity, reckoned in the manner stated in Clause 3.11




FM = Proportionate quantity of Coal which could not be delivered by the Seller in a Year due to occurrence of Force Majeure event affecting the Seller and / or the Purchaser, calculated as under:

$$FM = \frac{ACQ \times \text{Number of days lost under applicable Force Majeure event}}{365}$$

Note: For the purpose of calculation of 'Number of days lost under applicable Force Majeure event', affecting both the Parties shall be counted only once.

RF = Quantity of Coal that could not be supplied by the Seller during the Year owing to the Railways not allotting wagons or not placing wagons for loading, in spite of specific valid indent/offer submitted by the Seller to the Railways against valid program(s) submitted by the Purchaser for the purpose.

3.8 Level of Lifting:

Level of Lifting with respect to a Year shall be calculated in the form of percentage as per the following formula:

$$\text{Level of Lifting (LL)} = \frac{(ACQ - DDQ) \times 100}{ACQ}$$

Where:

LL = Level of Lifting of Coal by the Purchaser during the Year.

DDQ shall have the same meaning as given in Clause 3.11.

- 3.9 For the purpose of computing DDQ and RF, the weight per rake will be as per the extant Railway rules, which shall be used for calculation of compensation from either the Purchaser or Seller.

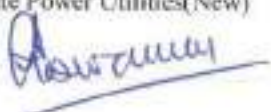
3.10 (Deleted – Not Used)

3.11 Deemed Delivered Quantity:

For the purpose of this Agreement, the aggregate of the following items provided under Clause 3.11.1 to 3.11.2 shall constitute the Deemed Delivered Quantity with respect to a Year.

3.11.1 For supply of Coal by rail:

- (i) The quantity of Coal not supplied by the Seller owing to omission or failure on the part of Purchaser to submit in advance the designated rail programme (s) to the Seller as per agreed time-table with respect to the Scheduled Quantity.
- (ii) The quantity of Coal not supplied by the Seller owing to cancellation, withdrawal or modification of the rail programme(s) by the Purchaser after its submission whether before or after allotment of wagon(s) by Railways.



- (iii) The quantity of Coal not supplied by the Seller owing to Purchaser's failure to pay and/or submit / maintain IRLC, as applicable, in accordance with Clause 11.1.2.
- (iv) The quantity of Coal not supplied by the Seller owing to Seller exercising the right of suspension of supplies in terms of Clause 14.
- (v) The quantity of Coal offered by Seller from domestic and/or imported coal in terms of Clause 3.3.1 and 3.3.2 not accepted by the Purchaser.

3.11.2 For Supply of Coal by road/ ropeways/MGR/belt conveyor:

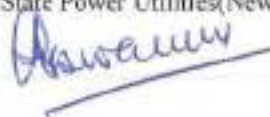
- (i) The quantity of Coal not supplied by the Seller owing to Purchaser's failure to pay and/or submit IRLC, as applicable, in accordance with Clause 11.1.2.
- (ii) The quantity of Coal not supplied by the Seller owing to Seller exercising the right of suspension of supplies in terms of Clause 14.
- (iii) The quantity of Coal not supplied by the Seller owing to Purchaser's failure to place the requisite number / type of transport at the Delivery Point for delivery of Coal within the validity period of the sale order/delivery order.
- (iv) The quantity of Coal offered by Seller from domestic and/or imported coal in terms of Clause 3.3.1 and 3.3.2 not accepted by the Purchaser.

3.11.3 Deemed Delivered Quantity in terms of Clause 3.11.1 and 3.11.2 shall be calculated on cumulated monthly basis during a Year.

3.12 Performance Incentive:

3.12.1 If the Seller delivers Coal to the Purchaser in excess of ninety (90%) of the ACQ in a particular Year, The Purchaser shall pay the Seller an incentive ("Performance Incentive") for the excess coal supplied:

Percentage of Actual deliveries	Percentage of Incentive at the rate of weighted average Base Price of grades of coal supplied		
	2012-13, 2013-14 & 2014-15	2015-16	2016-17 onwards
Above 90% but up to 95% of ACQ	0 - 10	0 - 10	0 - 10
Above 95% but up to 100% of ACQ	10 - 20	10 - 20	10 - 20
Above 100% of ACQ	40 (Fixed)	40 (Fixed)	40 (Fixed)




Actual Deliveries = Actual Quantity [in tonnes] of Coal delivered by the Seller in the relevant Year.

3.12.2 The incentive payable shall be calculated in the same manner as done slab-wise for computation of income-tax. However, unlike income tax, the percentage of incentive shall grow on linear basis within each slab

3.12.3 With respect to part of Year in which term of this Agreement begins or ends, the relevant quantities in Clause 3.12.1, shall apply pro-rata.

3.12.4 Deleted

3.12.5 Supply of coal in excess of ACQ shall be with mutual consent

3.13 Incentive/compensation adjustment for supply below 3100 Kcal/kg

3.13.1 Coal supplied below 3100 Kcal/Kg (earlier below 'G' grade under UHV system) will be accounted for separately to work out the percentage contribution of below 3100Kcal/kg of the overall supply.

3.13.2 The quantity qualifying for incentive/compensation shall be proportionately divided into two parts in the same ratio as indicated in 3.13.1 above.

3.13.3 25% of the proportionate quantity worked out as supply below 3100Kcal/Kg, as at 3.13.2 above, would be considered for incentive/compensation.

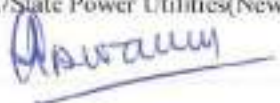
3.13.4 The proportionate quantity worked out as supply above 3100Kcal/Kg, as at 3.13.2 and the adjusted quantity of supply below 3100Kcal/kg, as at 3.13.3 above will be added to ascertain the qualifying quantity for incentive/compensation

4. QUALITY:

4.1 The quality of Coal delivered / to be delivered shall conform to the specifications given in Schedule III.

4.2 The Seller shall make adequate arrangements to assess the quality and monitor the same to endeavour that un-graded Coal (GCV of less than 1500 Kcal/Kg for Non-coking coal) is not loaded into the Purchaser's Containers. If the Seller sends any quantity of such Coal, the Purchaser shall limit the payment of cost of Coal to Re.1/- (Rupee one only) per tonne. Royalty, cess, sales tax, etc. shall however be paid as per the Declared Grade. Railway freight shall be borne by the Purchaser.

4.3 The Seller shall deliver sized Coal with size conforming to specifications laid in Schedule III. The Seller shall make reasonable efforts to remove stones from Coal.



- 4.4 The Seller shall use magnetic separators and metal detectors, at its Coal handling/loading system at the Delivery Point, where the same are already installed.

4.5 Declaration of Common Grade/ Re-declaration of Grade by the Seller:

- (i) The Seller shall declare one common Grade for Coal seam or seams from which Coal is being despatched through the same Delivery Point, wherever applicable.
- (ii) If the Grade analysed pursuant Clause 4.7 shows variation from the Declared Grade, consistently over a period of three (3) months, the Purchaser shall request the Seller for re-declaration of Grade, which shall be duly considered by the Seller.

4.6 Oversized Coal / stones

4.6.1 Oversized Coal:

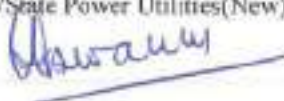
The Purchaser shall inform the Seller all incidents of receipt/presence of oversized Coal, in terms of specifications laid down in Schedule III, in any specific consignment(s), immediately on its detection at the Delivery Point and/or Unloading Point and the Seller shall take all reasonable steps to prevent such ingress at his end.

4.6.2 Stones

The Purchaser shall inform the Seller all incidents of receipt / presence of stones in any specific consignment(s) by rail, immediately on its detection at the Delivery Point and/or Unloading Point. The Seller shall, immediately take all reasonable steps to prevent such ingress at his end. The stones segregated by the Purchaser at the Power Station end shall be assessed jointly by the representative of the Seller and the Purchaser at the Power Station end for adjustments pursuant to Clause 9.1.

4.6.3 Modalities for assessment of stones:

- a) The Purchaser shall endeavor to segregate and stack separately all oversized stones of size more than 250 mm received along with Coal from the Seller's supplies by rail/MGR at the Power Station end, during the month, at a mutually agreed place identified for the purpose within the Power Station premises, for the purpose of joint assessment pursuant to Clause 4.6.2 as per the procedure laid down in Schedule VI of this Agreement for compensation pursuant to Clause 9.1.
- b) The Seller shall depute its representative at the Power Station end between fourth (4th) day to tenth (10th) day of the following month, for joint assessment of the quantity of stones of size more than 250 mm received by rail/MGR in the preceding month and the Parties shall prepare a jointly signed statement of quantity of stones. The Purchaser shall extend full co-operation and facilitate



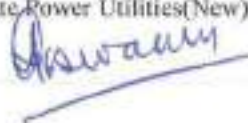
deputation of such representative of the Seller failing which the Seller shall not agree to the claim raised by the Purchaser in this regard.

- c) In case the Seller's representative fails to be present at the Power Station end, within the period stipulated at Clause 4.6.3 (b) for the assessment of the quantity of oversized stones in compliance to 4.6.3 (a), the quantity of oversized stones assessed by the Purchaser shall be intimated to the Seller, by the fifteenth (15th) day of such following month and the same shall be taken as final and binding on the Seller for the purpose of adjustments under Clause 9.1. Thereafter, the Purchaser shall dispose off / remove such stones by the end of such month under intimation to the Seller and the Purchaser shall not be under any obligation to preserve such material beyond the day(s) stipulated herein above. However, the Purchaser shall maintain all records/ documents for example work order, running account bills, payment document etc for such disposal and present the same along with audited records for scrutiny of the Seller, if required.
- d) Quantity of stones attributable to the Seller shall be worked out by pro rata apportionment on the basis of proportionate receipt of Coal by rail/MGR from Seller out of the total Coal received by the rail/MGR at the concerned Power Station during a month. For such apportionment, the Purchaser shall provide certified monthly figures of quantity of Coal received by rail as per Coal bill at the concerned Power Station from the Seller as well as from all sources other than the Seller.
- e) Compensation for oversized stones shall be payable by the Seller to the Purchaser month-wise, Power-station wise, in terms of weighted average Base Price of the analysed Grade of indigenous Coal for the equivalent quantity of stones actually verified/ removed, as above for such coal supplied progressively in a Year by the Seller from the CIL sources to the concerned Power Station by rail/ MGR after accounting for the weight reduction towards destination end, weightment in terms of Clause 5.2 and moisture compensation in terms of Clause 9.2. However, such total quantity of oversized stones actually verified/removed shall be restricted up to a ceiling of 0.75% of the total quantity of indigenous coal supplied during the year for the purpose of compensation if supply of indigenous coal during the year has also been made from any other source(s) including captive block besides CIL sources

- 4.6.4 Without prejudice to provisions at Clause 4.6.3, if, in the Purchaser's reasonable determination, the presence of oversized Coal and/or stones is causing operating or maintenance problems at the Power Station, then, upon the request of the Purchaser, the Purchaser and the Seller shall meet and prepare a mutually acceptable plan for effectiveness of the Seller's efforts at removing oversized stones from the Coal.

4.7 Assessment of Quality of Coal

4.7.1 Sample collection:



- i) Samples of Coal shall be collected jointly by the Third Parties of the Seller and the Purchaser either manually or through any suitable mechanical sampling arrangement including Augur Sampling method if physically operationable, at each of the Delivery Points for determining the quality of Coal in presence of representatives of Seller and Purchaser
- ii) For the purpose of sampling each rake (source wise, grade wise and plant wise) of Coal supplied from one Delivery Point shall be considered as a lot.
- iii) Each day's supply from a source shall be considered as one lot for the purpose of sampling in case of Coal supplies by road, ropeways, belt and Merry-Go-Round (MGR) rail system. However, in case of Coal supplies by Railways, each rake from a source shall be considered for the purpose of sampling.

4.7.2 Detailed modalities for collection, handling, storage and preparation of samples by *Third Parties* shall be as per Schedule V to this Agreement.

4.7.3 **Sample preparation & analysis:**

(i) **Total Moisture**

Sample for determination of Total Moisture shall be segregated from the sample collected at the Delivery Point by the *Third Parties* jointly, and prepared and analyzed, as per procedure given in Schedule-V.

(ii) **Daily Gross Sample**

- a) The Gross Sample collected as per clause 4.7.1(i) for determination of moisture, ash & GCV on equilibrated basis shall be reduced into laboratory sample on the date immediately following the date of collection. The final laboratory samples will be divided into three parts viz. Set – I, Set – II and Set-III as follows;

- Set – I shall be taken by the Purchaser for analysis at their end to determine the ash, moisture and GCV. .
- Set – II shall be analyzed by the Seller to determine the ash, moisture and GCV.
- Set-III shall be kept under joint seal of the Seller, Purchaser and the Third Parties as referee sample in the joint custody at the loading end for a period of fourteen (14) days or until the analysis results of Set – I and Set-II are accepted without dispute, whichever is earlier.

- b) The sample in Set -I and Set-II shall be analysed for ash, moisture and GCV on equilibrated basis {wherever required in accordance with IS: 1350 (Part -I) – 1984 and IS: 1350 (Part – II) – 1970}.

- c) Set-I and Set-II of the laboratory sample as prepared shall be analyzed by the Third Parties of Seller and Purchaser in their respective laboratories as per relevant part of IS: 1350 (Part -I) – 1984 and IS: 1350 (Part – II) – 1970 within three-four (3-4) days from the date of preparation and distribution of laboratory sample for analysis of ash, moisture and GCV



- d) In the event of any dispute (which shall be raised not later than forty-eight (48) hours after analysis), the referee sample as in Set- II shall be referred for analysis within seventy two (72) hours of the dispute but not later than eight (8) days of the collection of samples at any mutually agreed NABL Accredited /Government laboratory.

The cost incurred for the analysis of the Referee sample including cost of transportation to the Mutually Agreed Laboratory shall be borne total by the Party raising the dispute

- e) The procedure for storage of referee sample shall be mutually agreed upon by both the Parties.

- 4.7.4 Each sample shall be assigned with a code number and will be identified by such code only and no other particulars will be indicated or written on the tag attached with the relevant bag containing the sample.

- 4.7.5 All tools, tackles required for collection of samples, its preparation and all laboratory facilities for the purpose of analysis of samples - at the loading end be arranged by the Seller as per the provision of this Agreement.

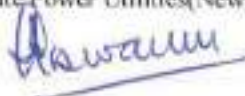
- 4.7.6 (a) In the event of any reason whatsoever third Party sampling & analysis could not be conducted, joint sampling & analysis shall be carried out by the Seller in presence of the Purchaser at the loading end.

(b) In the event that no sample is collected either by the Third Parties or Seller and Purchaser jointly as mentioned at (a) above from dispatches by a rake or on any day, as the case may be, from a source for any reason, the weighted average of the most recent results available in any preceding month against respective Source and Grade shall be adopted for such dispatches for which samples were not collected.

- 4.7.7 In the event the Third Party appointed by the Purchaser fails /declines to participate in the process of sampling and analysis mentioned at clause 4.7.1(i), such failure/refusal shall not be considered as ground for disputing the result submitted by the Third party of the seller which will be binding on both the Parties.

5.0 WEIGHMENT OF COAL

- 5.1 For dispatch of Coal by Rail, all the wagons loaded for the Purchaser shall be weighed at the loading end at the electronic weighbridge of Seller and electronic print out of actual weight recorded shall be provided. Such weighment shall be final and binding for determination of the quantity delivered. The Purchaser shall have the right to witness the weighment of the wagons at the weighbridge, if desired. The Seller shall hand-over copies of jointly signed or in the absence of the Purchaser's representative(s), signed by the Seller, print-outs of the weighment to the Purchaser immediately after weighment of each consignment, besides a





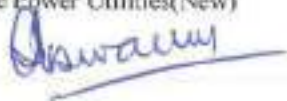
copy of such signed printouts shall also be annexed along with the bill(s) raised by the Seller

- 5.2 Only in the absence of weighment of Coal on electronic weighbridge at the loading end, the weight recorded at the Purchaser's electronic weighbridge with an electronic print-out facility at the Unloading Point, if in proper working order, shall be taken as final. In respect of unweighed consignments/ wagons at the Delivery Point on electronic weighbridge and weighed on electronic weighbridge at the Purchaser's end, the Purchaser shall submit the associated electronic printout to the Seller for such consignments/ wagons within thirty (30) days from the date of Railway Receipt, beyond which time the weight of the consignment shall be considered on Railway Receipt basis.
- 5.3 If both the weighbridges installed by the Seller as well as the Purchaser are defective,/ not available for recording weight of the consignments of Coal , weighted average quantity of Coal per wagon (to be determined separately for respective types of wagons in the circuit), as per the actual weighment over a continuous period of immediately preceding seven (7) days shall form the basis for determining the quantity of Coal from that source at that Delivery Point, till such time any one of the weighbridges is corrected and put back into operation. If the weighbridges at both the Seller's and the Purchaser's end are not available for recording weight of coal and actual weighment over a continuous period of immediately preceding seven (7) days is also not available then weight of Coal for such unweighed wagons shall be taken as per the weight indicated in the Railway Receipts (RRs).
- 5.4 The Seller and the Purchaser shall permit access to and make facilities available at its weighbridge, for representatives of either Party to witness and note the weight for the consignment. In case the representative of any Party fails to be present, at the time of such weighment, the weight recorded by the representative of the other Party in accordance with Clause 5.1 and 5.2, shall be final and binding.
- 5.5 The weighbridges both at the Seller's end and at the Purchaser's end shall be calibrated as per the Weights and Measures Standards and also whenever required. Both the Seller and the Purchaser shall have right to witness the calibration of the weighbridge at each other's end. Coal bills of consignment, which are weighed as per the provisions of clause 5.1, shall bear the rubber stamp indicating electronic printout has been enclosed. If the electronic printout with Coal bill is not received by the Purchaser despite rubber stamp, such bills shall be returned to the Seller for re-submission along with electronic printout within twenty (20) days.

5.6 Operation and Maintenance of Weighment System

The Parties shall at their respective costs,

- a) Operate and maintain their weighbridges in good working order and in accordance with the Weights and Measures Standards and other applicable laws



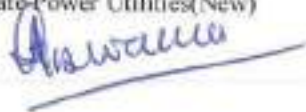
- b) Cause the weighbridge to be inspected, tested and certified by the statutory agencies in accordance with and at the intervals required by the Weights and Measures Standards and the Parties shall, at their cost, extend / make available all requisite facilities required for the purpose of testing and/or calibrating the weighbridge.
- 5.7 For dispatch of Coal by road, the weight recorded at the electronic weighbridge of the Seller at the loading end shall be final for the purpose of billing and payment. The Purchaser shall have the right to witness the weighment at the colliery, if desired. The weighbridge shall be calibrated as per the provisions of the Standards of Weights & Measures Act 1976. The Purchaser shall have right to witness such calibration.
- 5.8 For dispatch of Coal by belt conveyor, a weightometer shall be installed at the colliery/ washery end of the Seller and weight recorded by the weightometer shall be the weight of Coal supplied. The weightometer shall be kept under joint seal and will be repaired / recalibrated in the presence of the representatives of the both the Parties, wherever necessary.
- 5.9 For dispatch of Coal by MGR system, weight recorded at the loading end through electronic weighment system shall form the basis for determining the quantities of Coal delivered.

6. METHOD OF ORDER BOOKING AND DELIVERY OF COAL:

The Purchaser shall submit monthly programme(s) mode-wise for off-take of Coal against the monthly mode-wise Coal allocation made by the Seller. Notwithstanding, Clause 6.1 and Clause 6.2 shall be applicable in case of Coal off-take by rail and road respectively.

6.1 Order Booking by Rail:

- 6.1.1 At least seven (7) working days prior to the commencement of the month concerned, the Purchaser shall submit a programme in writing to the Seller, as per the applicable Railway rules and the Seller's notified procedures. Thereafter, the Seller shall process for issuance of the consent of the programme. The sanction of the consented rail programme shall be obtained accordingly. The validity period of the monthly programme for movement by rail for seeking allotment shall be till the last day of the month concerned. The consent of the programme to be issued by the Seller shall not remain valid after the above period. Once the rake is allotted, it shall remain valid for supply as per the prevailing Railways rules.
- 6.1.2 Subject to fulfillment of payment obligations pursuant to Clause 11.1.2 by the Purchaser, the Seller shall thereupon submit specific indent/offer based on the valid rail programme(s) to the Railways as per the extant Railway rules for the allotment and placement of wagons during the concerned month in conveniently spaced intervals.



- 6.1.3 The wagons shall be booked on "freight to pay" or "freight pre paid" basis, as applicable based on the arrangements made by the Purchaser with Railways in this regard.
- 6.1.4 In case of formation of rakes with wagons loaded from different Delivery Points, the Seller shall make best efforts to complete documentation formalities as per Railway rules so as to enable the Purchaser to avail a trainload freight rate.
- 6.1.5 In the event rail movement is declared / considered not feasible by Railways, review will be made jointly in the matter of mode of transport

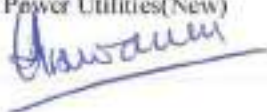
6.2 Order Booking by Road:

- 6.2.1 The Seller shall intimate the Purchaser about the monthly Coal allocation for order booking seven (7) working days prior to the commencement of the month concerned.
- 6.2.2 Based on the monthly colliery wise allocation done by the Seller in terms of Clause 6.2.1, the Purchaser shall place orders with the Seller for the Scheduled Quantity.
- 6.2.3 Subject to fulfillment of payment obligations pursuant to Clause 11.1.2 by the Purchaser, the Seller shall arrange to issue sale order(s)/delivery order(s) separately for each colliery and issue necessary loading programme / schedule from time to time. The Purchaser shall arrange to place the required number / type of trucks to lift the Coal as per such loading programme / schedule. The Seller shall ensure that the sale order / delivery order in favour of the Purchaser reaches the concerned colliery/weigh bridge within five (5) working days of the last day of the period notified by the Seller for booking orders in terms of Clause 6.2.1.
- 6.2.4 The Seller shall ensure delivery and the Purchaser shall ensure lifting of Coal against sale order / delivery order of any month within the validity period, as mentioned in the sale order.
- 6.2.5 In the event of any quantity remaining undelivered / unlifted, the Purchaser shall be entitled to receive, once the validity period of the sale order/ delivery order expires, the refund of the proportionate value of such quantity.

7. TRANSFER OF TITLE TO GOODS:

Once delivery of Coal have been effected at the Delivery Point by the Seller, the property / title and risk of Coal so delivered shall stand transferred to the Purchaser in terms of this Agreement. Thereafter the Seller shall in no way be responsible or liable for the security or safeguard of the Coal so transferred. Seller shall have no liability, including towards increased freight or transportation costs, as regards missing/diversion of wagons / rakes or road transport en-route, for whatever causes, by Railways, or road transporter or any other agency.

8.0 PRICE OF COAL:



The "As Delivered Price of Coal" for the Coal supplies pursuant to this Agreement shall be the sum of Base Price, Other Charges and Statutory Charges, as applicable at the time of delivery of Coal.

8.1 Base Price

The Purchaser shall pay the Base Price of Coal in accordance with the provisions of this Agreement. It is expressly clarified that the Base Price in relation to the Indigenous coal and Imported coal shall be notified/declared by the Seller/ CIL, as the case may be from time to time.

8.2 Other Charges:

8.2.1 Transportation charges:

Where Coal is transported by the Seller from Pithead to the Delivery Point, the Purchaser shall pay transportation charges, as notified by CIL / Seller from time to time.

8.2.2 Sizing/Crushing charges:

Where Coal is crushed by mechanical means for limiting the top-size to 250mm, or any other lower size, the Purchaser shall pay sizing/crushing charges, as applicable and notified by CIL / Seller from time to time.

8.2.3 Rapid Loading Charges:

Where Coal is loaded through rapid loading system, the Purchaser shall pay rapid loading charges notified by CIL / Seller from time to time.

8.2.4 Any other applicable charges:

Any other applicable charges as notified by CIL/ Seller from time to time including additional charges and service charges arising out of supply of imported coal, as may be applicable. The Service Charges shall be 2% of Landed Price of Imported Coal (CIF Prices) plus applicable taxes and levies for supply of Imported Coal, till any further revision in the rate.

8.3 Statutory Charges:

The statutory charges shall comprise royalties, cesses, duties, taxes, levies etc., if any, payable under relevant statute but not included in the Base Price and/or other charges pursuant to Clause 8.2, shall be payable by the Purchaser. These levies/charges shall become effective from the date as notified by the Government/ statutory authority.

8.4 In all cases, the entire freight charges, irrespective of the mode of transportation of the Coal supplied, shall be borne by the Purchaser.

9.0 COMPENSATION:

9.1 Oversized Stones:

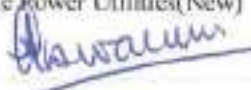
The Seller shall adjust through regular credit notes to the Purchaser amounting to hundred percent (100%) of the weighted average Base Price, as per the analysed Grade of Coal applicable for the month in which such supplies were made by the Seller and Other Charges pursuant to Clause 8.2 but excluding statutory charges pursuant to Clause 8.3, if any, and railway freight for the quantity of oversized stones received by the Purchaser along with the Coal supplies during the month as per the jointly assessed signed statement or as intimated by the Purchaser to the Seller pursuant to Clause 4.6.3(b) or 4.6.3(c) respectively.

9.2 Excess Surface Moisture

- (i) In the event that monthly weighted average Surface Moisture in Coal exceeds seven percent (7%) during the months from October to May and nine percent (9%) during the months from June to September, the Coal quantities delivered to the Purchaser during such month shall be adjusted for the resultant excess Surface Moisture, which shall be calculated in percentage by which the Surface Moisture exceeds the foregoing limits.
- (ii) The seller shall give regular credit note on account of excess Surface moisture, as per clause 9.2(i) above, calculated at the rate of Base Price of Analyzed Grade of coal and other charges, pursuant to clause 8.2 but excluding statutory charges pursuant to clause 8.3, if any, and railway freight for the quantity of excess Surface Moisture.
- (iii) Sampling/ analysis and determination of Surface Moisture for compensation shall be done as per the procedure given in Schedule V.

10. OVERLOADING AND UNDER LOADING:

- 10.1 Any penal freight for overloading charged by the Railways for any consignment shall be payable by the Purchaser. However, if overloading is detected from any particular colliery, consistently during three (3) continuous months, on due intimation from the Purchaser to this effect, the Seller undertakes to take remedial measures.
- 10.2 For Non coking coal of GCV exceeding 5800 Kcal/Kg and coking coal of Steel Grade I, Steel Grade II, Washery Grade I, Washery Grade II, Semi-coking Grade I, Semi-coking Grade II and washed Coal; any idle freight for under-loading below the stenciled carrying capacity, as shown on the wagon or carrying capacity based on the actual tare weight or permissible carrying capacity as notified by the Railways (route-wise) for any particular type of wagon from time to time, in which case the stenciled carrying capacity as shown on the wagon is more than the permissible carrying capacity, as the case may be, shall be borne by the Seller. For all other Grades of Coal, any idle freight for under-loading below the stenciled carrying capacity, as shown on the wagon or carrying capacity based on the actual tare weight, as the case may be, plus two (2) tonnes shall be borne by the Seller. However, in the cases where permissible carrying capacity is less than



the stenciled carrying capacity, as mentioned above, the idle freight shall be borne by the Seller only up to the permissible carrying capacity

10.3 Idle freight resulting from under loading of wagon, as per Clause 10.2, shall be adjusted in the bills. Idle freight shall be reckoned as:

- (i) For Non coking coal of GCV exceeding 5800 Kcal/Kg and coking coal of Steel Grade I, Steel Grade II, Washery Grade I, Washery Grade II, Semi-coking Grade I, Semi-coking Grade II and washed Coal, the difference between the freight charges applicable for the stenciled carrying capacity, as shown on the wagon or carrying capacity based on the actual tare weight or permissible carrying capacity as notified by the Railways (route-wise) for any particular type of wagon from time to time, in which case the stenciled carrying capacity as shown on the wagon is more than the permissible carrying capacity, as the case may be, and the freight payable as per actual recorded weight of Coal loaded in the wagon; and/or
- (ii) For all other Grades of Coal, the difference between the freight charges applicable for the stenciled carrying capacity, as shown on the wagon or carrying capacity based on the actual tare weight, as the case may be, plus two (2) tonnes less the freight payable as per actual recorded weight of Coal loaded in the wagon. However, in the cases where permissible carrying capacity is less than the stenciled carrying capacity, as mentioned above, the difference shall be reckoned between the freight applicable for permissible carrying capacity and the freight payable as per the actual recorded weight of coal loaded in the wagon

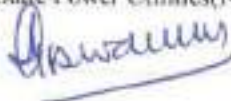
11.0 MODALITIES FOR BILLING, CLAIMS & PAYMENT

11.1 Bills on Declared Grade basis

11.1.1 The Seller shall raise source-wise bills for the Coal supplied to the Purchaser on Declared Grade basis. The Seller shall raise such bills on rake-to-rake basis for delivery of Coal by rail and on daily basis for delivery of Coal by road and other modes of transport. Such bills shall be raised within seven (7) days of delivery.

11.1.2 The Purchaser shall pay in accordance with either of the following payment mechanisms –

- (a) The Purchaser shall make advance payment for a month in three (3) installments for availing Coal supplies from the Seller – first (1st) installment on the first (1st) day of the month, second (2nd) installment on the eleventh (11th) day of the month and the third (3rd) installment on the twenty first (21st) day of the month. Each of these payment installments shall cover the As Delivered Price of Coal for the Coal quantities that is one-ninth (1/9th) of the QQ concerned, as per Clause 3.4. Further, each of these installments shall take into account the weighted average of Base Prices of Grades mentioned in Schedule III based on actual supplies of immediately available previous month. However, the third (3rd) installment shall also include the adjustment amount with regard to the actual quantity of Coal delivered pursuant to Clause 5 and the quality of Coal analysed pursuant to Clause 11.2 vis-à-vis the advance payment made for the previous month. For the



avoidance of any doubt, such adjustment amount shall also include the quantity adjustment calculated pursuant to Clause 9.1 & 9.2.

- (b) The Purchaser shall maintain with the Seller an Irrevocable Revolving Letter of Credit (IRLC) issued by a bank acceptable to the Seller and in the format acceptable to the Seller and fully conforming to the conditions stipulated in Schedule III for an amount equivalent to As Delivered Price of Coal for the Coal quantities that is one-ninth ($1/9^{\text{th}}$) of the QQ concerned, as per Clause 3.4. The As Delivered Price of Coal in this context shall take into account the highest of Base Prices of Grades mentioned in Schedule III. The IRLC shall be maintained throughout the term of this Agreement. The amount of IRLC shall be suitably changed whenever there is a change in any component of the As Delivered Price of Coal. In addition to the IRLC, the Purchaser shall pay advance amount equivalent to seven (7) days Coal value by way of Demand Draft/ Banker's cheque/ Electronic Fund Transfer (EFT).

11.1.3 All the payments shall be made through Demand Draft / Banker's cheque/ Electronic Fund Transfer payable at **Ranchi** (to be stated by the Seller). In the event of non-payment within the aforesaid stipulated period, the Purchaser shall be liable to pay interest in accordance with Clause 12.

11.1.4 Advance payment made by the Purchaser shall be non-interest bearing, and it shall change in accordance with change in the As Delivered Price of Coal.

11.2 Adjustment for analyzed quality/ Grade

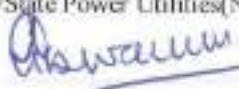
11.2.1 The bills with regard to adjustment for quality, as determined under Clause 4.7, shall be supported by relevant documents in respect of the analysis carried out of the following parameters:

- a) Total Moisture (%)
- b) Equilibrated Moisture (%)
- c) Ash (%)
- d) GCV (Kcal/Kg)

(a) In the event for any reason whatsoever third Party sampling & analysis by the agency of Seller & purchaser could not be conducted, joint sampling & analysis shall be carried out by the Seller and the Purchaser at the loading end

(b) In the event no sample is collected either by the Third Parties or Seller and the Purchaser jointly as mentioned at (a) above from dispatches by a rake or on any day, as the case may be, from a source for any reason, the weighted average of the most recent results available in any preceding month against respective Source and Grade shall be adopted for such dispatches for which samples were not collected.

11.2.2. The Seller shall give regular credit note on account of Grade slippage to the extent of difference in the Base Price of Declared Grade and analysed Grade of Coal. In case of analysed Grade being higher than the Declared Grade, bonus bill/ claim



shall be raised by the Seller. The credit note on Grade slippage shall be issued by the Seller within seven (7) days of acceptance of results under joint signature.

- 11.2.3 The amount arising out of final settlement of any bill pursuant to Clause 11.2.1 that is disputed by the Purchaser shall be paid for, as part of the third (3rd) installment pursuant to Clause 11.1.2(a) that is due for payment in the same month or in the immediately succeeding month to the month in which such settlement takes place.

11.3 Bills of Miscellaneous Claims:

- 11.3.1 The Seller shall, within seven (7) days of the receipt of claim pursuant to Clause 9.1 raised by the Purchaser, issue credit note, which shall be adjusted as part of the third (3rd) installment pursuant to Clause 11.1.2. (a).

- 11.3.2 The bills towards interest charges pursuant to Clause 12 shall be raised by the parties on monthly basis by the tenth (10th) day of the following month and the payment shall be made by fifteenth (15th) day of the same month.

- 11.3.3 Compensation for short supply/lifting, as calculated in accordance with Clause 3.6, shall be payable by the defaulting Party to the other Party within a period of ninety (90) days from the date of receipt of claim failing which it will attract interest in terms of Clause 12.

- 11.3.4 After expiry of the Year, the Seller shall submit an invoice to the Purchaser with respect to the Performance Incentive payable in terms of Clause 3.12.1 and the Purchaser shall pay the amount so due within thirty (30) days of the receipt of the invoice failing which it will attract interest in terms of Clause 12.

11.4 Diverted rakes/ missing wagons

In case of diversion of rakes en-route or missing wagons, bills shall be paid to the Seller by the original consignee.

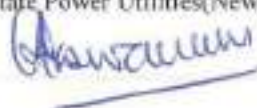
11.5 Annual Reconciliation / Adjustments:

The Parties shall jointly reconcile all payments made for the monthly Coal supplies during the Year by end of April of the following Year. The Parties shall, forthwith, give credit/debit for the amount falling due, if any, as assessed during such joint reconciliation. The annual reconciliation statement shall be jointly signed by the authorised representative of the Seller and the Purchaser which shall be final and binding.

- 11.6 In the event of due date of any payment obligation under this Agreement falling on Sunday or a gazetted holiday or Nationwide strike affecting banking services, the next first working day shall be the effective due date for the purpose.

12.0 INTEREST ON DELAYED PAYMENT

In the event of delay in payment/adjustment of any amount payable/recoverable pursuant to the provisions of this Agreement, the Seller/the Purchaser shall be entitled to charge interest on such sum remaining outstanding for the period after



the due date till such time the payment is made. The interest charged by the Seller/ Purchaser pursuant to this Clause shall be at the Interest Rate, as per Clause 1.1(dd).

13.0 (Deleted – Not Used)

14.0 SUSPENSION OF COAL SUPPLIES

14.1 In the event any payment due under this Agreement is not made by the Purchaser by the due date, the Seller shall be entitled to regulate and/or suspend further delivery of Coal till such day the payment as due along with the interest amount is received by the Seller. The quantity of Coal not delivered by the Seller pursuant to such regulation and/or suspension of delivery of Coal shall be the Regulated Quantity Not Supplied (RQNS) and Deemed Delivered Quantity (DDQ) of Coal shall accrue to the Seller for the quantity equal to RQNS.

14.2 In the event the Seller suspends the Coal supplies pursuant to Clause 14.1, during such period that the Coal supplies remain suspended, while the Seller shall be relieved of his obligations under this Agreement, the obligations of the Purchaser under this Agreement shall be deemed to remain in full force.

14.3 The Seller shall resume the Coal supplies within three (3) days of payment of the outstanding amount together with interest.

14.4 Not used

15.0 SETTLEMENT OF DISPUTES:

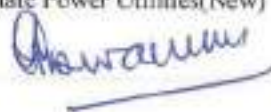
15.1 All differences or disputes between the Parties shall be settled/ resolved amicably. If amicable settlement is not possible, then the unresolved disputes or differences shall be settled through the process below.

15.2 *"In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract (s) between Central Public Sector Enterprises (CPSEs) / Port Trusts inter se and also between CPSEs and Government Departments / Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), shall be taken up by either party for its resolution through AMRCD as mentioned in DPE OM No. 05/0003/2019-FTS-10937 dated 14.12.2022".*

16. TERMINATION OF CONTRACT/AGREEMENT:

16.1 This Agreement may be terminated in the following events and in the manner specified hereunder:

16.1.1 In the event that either Party is rendered wholly or partially unable to perform its obligations under this Agreement ("Affected Party") because of a Force Majeure Act, as described in Clause 17 below, and such inability to perform lasts for not less than a total of nine (9) months in continuous form or of twelve (12) months in



discontinuous form in a period of two (2) Years, and in the considered assessment of the other Party ("Non-Affected Party") there is no reasonable likelihood of the Force Majeure Act coming to an end in the near future, such Party shall have the right to terminate this Agreement, by giving at least ninety (90) days prior written notice to the Affected Party of the intention to so terminate this Agreement. In such event, the termination shall take effect on expiry of the notice period or ninety (90) days whichever is later, and the Parties shall be absolved of all rights/obligations under this Agreement, save those that had already accrued as on the effective date of termination.

16.1.2 In the event that the Purchaser is prevented /disabled under law from using Coal, for reasons beyond their control, owing to changes in applicable environmental and/or statutory norms, howsoever brought into force; the Purchaser shall have the right to terminate this Agreement, subject to a prior written notice to the Seller of thirty (30) days.

16.1.3 Not used.

16.1.4 In the event that the Level of Delivery (LD) falls below thirty percent (30%) or the Level of Lifting (LL) falls below thirty percent (30%), the Purchaser or the Seller as the case may be, shall have the right to terminate this Agreement, within sixty (60) days of the end of the relevant Year after providing the other Party with prior written notice of thirty (30) days.

16.1.5 In the event that either Party suffers insolvency, appointment of liquidator (provisional or final), appointment of receiver of any of material assets, levy of any order of attachment of the material assets, or any order or injunction restraining the Party from dealing with or disposing of its assets and such order having been passed is not vacated within sixty (60) days, the other Party shall be entitled to terminate this Agreement

16.1.6 Not Used

16.1.7 In the event that any Party commits a material breach of term or condition of this Agreement ("Defaulting Party") not otherwise specified under this clause 16.1, the other Party ("Non-Defaulting Party"), shall have the right to terminate this Agreement after providing the Defaulting Party thirty (30) days prior notice and the material breach has not been cured or rectified to the satisfaction of the Non-Defaulting Party within the said period of thirty (30) days.

16.2 Accrued rights to survive termination

Termination of this Agreement shall be without prejudice to the accrued rights and obligations of either Party as at immediately prior to the termination.

17. FORCE MAJEURE:

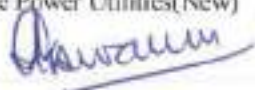
17.1 "Force Majeure Act" means any act, circumstance or event or a combination of acts, circumstances and events which wholly or partially prevents or delays the performance of obligations arising under this Agreement by any Party ("Affected

Party") and if such act, circumstance or event is not reasonably within the control of and not caused by the fault or negligence of the affected Party, and provided that such act, circumstance or event is in one or more of the following categories:

- a) Flood, inundation of mine, drought, lightening, cyclone, storm, earthquake adverse geo-mining conditions, eruption of gases, subsidence and such natural occurrences.
- b) Explosion, Mine fire and other fire, contamination of atmosphere by radio active or hazardous substances.
- c) Civil disturbance such as riot, terrorism etc.
- d) Industry wise /nation-wide strikes.
- e) Any law, ordinance or order of the Central or State Government, or any direction of a statutory regulatory authority that restricts performance of the obligations hereunder;
- f) Epidemic;
- g) The enactment, promulgation, amendment, suspension or repeal of any Applicable Laws after the date hereof;
- h) Any delay or direction or order on the part of the Government of India or relevant State Government or denial or refusal to grant or renew, or any revocation, or modification of any required permit or mining lease or governmental approvals including those related to land acquisition or environment/ forest clearance provided that such delay, modification, denial, refusal or revocation was not due to a cause attributable to the Affected Party;
- i) Global shortage of Imported Coal or delays caused by supplier or no response to enquiries for supply of coal or logistics constraints in transportation of Imported Coal;
- j) Any law and order problems affecting coal production and transportation of coal.
- k) Failure of supply of Power from Power Supplier(s)
- l) The events under Force Majeure for supply of coal through import shall be in accordance with the provisions under the side agreement for supply of imported coal as per clause 3.3.1 and 3.3.2.

17.2 Burden of Proof:

In the event the Parties are unable to agree in good faith that a Force Majeure Act has occurred; the Parties shall resolve the dispute in accordance with the provisions of this Agreement. The burden of proof as to whether a Force Majeure



Act has occurred shall be upon the Party claiming the occurrence or existence of such Force Majeure Act.

17.3 Effect of Force Majeure:

If either Party is rendered wholly or partially unable to perform its obligations under this Agreement because of a Force Majeure Act, that Party shall be excused from whatever performance is affected by the Force Majeure Act to the extent so affected, provided that:

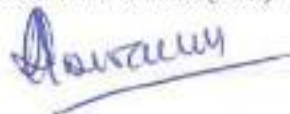
- a) Within five (5) Business Days after the occurrence of the inability to perform due to a Force Majeure Act, the Affected Party provides a written notice to the other Party of the particulars of the occurrence, including an estimation of its expected duration and probable impact on the performance of its obligations hereunder, and continues to furnish periodic reports with respect thereto, every seven (7) days, during the period of Force Majeure,
- b) The Affected Party shall use all reasonable efforts to continue to perform its obligations hereunder and to correct or cure as soon as possible the Force Majeure Act,
- c) The suspension of performance shall be of no greater scope and duration no longer than is reasonably necessitated by the Force Majeure Act,
- d) The Affected Party shall provide the other Party with prompt notice of the cessation of the Force Majeure Act giving rise to the excuse from performance and shall thereupon resume normal performance of obligations under this Agreement with utmost promptitude,
- e) The non-performance of any obligation of either Party that was required to be performed prior to the occurrence of a Force Majeure Act shall not be excused as a result of such subsequent Force Majeure Act,
- f) The occurrence of a Force Majeure Act shall not relieve either Party from its obligations to make any payment hereunder for performance rendered prior to the occurrence of Force Majeure Act or for partial performance hereunder during period of subsistence of Force Majeure Act; and
- g) The Force Majeure Act shall not relieve either Party from its obligation to comply with Applicable Laws. The Affected Party shall exercise all reasonable efforts to mitigate or limit damages to the other Party.

18 SCHEDULES / ANNEXURES:

The Schedules detailed below shall form part of this Agreement.

Schedule - I - Annual Contracted Quantity (ACQ)

Schedule - II - Bank Guarantee Format for the Security Deposit Submission



- Schedule - III - Quality of Coal
 Schedule - IV - IRLC stipulations
 Schedule- V - Detailed modalities for Third Party sampling
 Schedule - VI - Procedure for segregation and separate stacking of stones of +250 mm size at the Power Station and its joint assessment by the Purchaser and the Seller
 Schedule-VII - Option letter for acceptance / surrender of coal supplies to be made through import of coal

19.0 MISCELLANEOUS:

- 19.1 Notice: Any notice to be given under this Agreement shall be in writing and shall be deemed to have been duly and properly served upon the Parties hereto if delivered against acknowledgement or by registered mail with acknowledgement due, addressed to the signatories or the authorised representatives of the signatories nominated in accordance with the provisions of this Agreement at the following addresses:

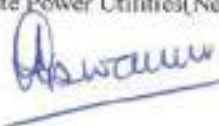
1) Seller's address

Name: Ajit Singh, GM (M&S)
 Address: Central Coalfields Limited,
 Darbhanga House, Ranchi -834001
 Telephone: 0651-2360369
 email: gmsnm.ccl@coalindia.in

2) Purchaser's address

Name: Ashim Kumar Goswami, RED (ER-II)
 Address: NKSTPP, Tandwa Town,
 Distt. Chatra, 825321, Jharkhand
 Telephone: 06546-270007
 email: reder2@ntpc.co.in

- 19.2 Amendment: This Agreement cannot be amended or modified except by prior written agreement between the Parties.
- 19.3 Severability and Renegotiation: In the event any part or provision of this Agreement becomes, for any reason, unenforceable or is declared invalid by a competent court of law or tribunal, the rest of this Agreement shall remain in full force and effect as if the unenforceable or invalid portions had not been part of this Agreement, and in such eventuality the Parties agree to negotiate with a view to amend or modify this Agreement for achieving the original intent of the Parties.
- 19.4 Governing Law: This Agreement, and the rights and obligations hereunder shall be interpreted, construed and governed by the laws of India. The courts of **Ranchi, Jharkhand** shall have exclusive jurisdiction in all matters under this Agreement.
- 19.5 Entirety: This Agreement together with any documents referred to in it, supersedes any and all oral and written agreements, drafts, undertakings, representations, warranties and understandings heretofore made relating to the subject matter hereof and constitutes the entire Agreement and understanding of the Parties relating to the subject matter hereof. It is expressly agreed that this Agreement shall supersede all previous discussions and meetings held and correspondence exchanged between the Seller & the Purchaser in respect of this Agreement and any decisions arrived at therein in the past and before coming into force of this Agreement shall have no relevance with reference to this Agreement and no reference of such discussions or meetings or past correspondence shall be




entertained either by the Seller or the Purchaser for interpreting this Agreement or its implementation.

- 19.6 Counterpart: This Agreement may be executed in any number of counterparts and each counterpart shall have the same force and effect as the original instrument.
- 19.7 In the event there is any change in constitution of the Purchaser company due to amalgamation, merger, de-merger, takeover, court order or change in ownership/shareholding pattern, the Purchaser shall inform the Seller of the same within 30 days of the said change taking effect and thereafter, a fresh Coal Supply Agreement shall be entered into between the Seller and the resultant company as Purchaser after the Seller is satisfied that all the terms and conditions mentioned in the Office Memorandum of the Ministry of Coal, Government of India dated 7th April, 2015 have been satisfied in full by the resultant company.
- 19.8 Assignment: Except as provided in Clause 19.7 above, the Purchaser shall not, without the express prior written consent of the Seller, assign to any third party this Agreement or any part thereof, or any right, benefit, obligation or interest therein or there under
- 19.9 Limitation of Liability: The Parties agree that except as otherwise expressly agreed in this Agreement, neither Party shall have any right or entitlement to any consequential losses, costs or damages, loss of profit or market, as a result of a breach by the other Party of this Agreement

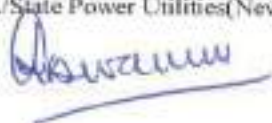
20.0 IMPLEMENTATION OF THE AGREEMENT

- 20.1 The respective Head of the Power Station or his nominated representative shall be authorised to act for and on behalf of the Purchaser.
- 20.2 GM (M&S) or any representative duly authorized by the Seller shall act for and on behalf of the Seller.
- 20.3 Any other nomination of authorised representative shall be informed in writing, by the Seller and the Purchaser, as the case be, within one month of signing of this Agreement or by giving 30 (thirty) days' notice.

It shall be the responsibility of the Parties to ensure that any change in the address for service or in the particulars of the designated representative is notified to the other Party and all other concerned, before effecting a change and in any case within two (2) Business Days of such change.

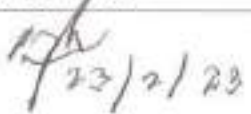


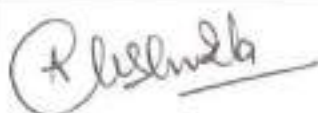

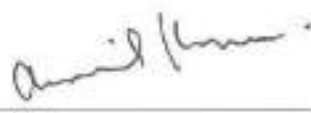
21.0 SAVINGS

Notwithstanding anything contained herein, this FSA shall not be applicable to purchaser(s) having/seeking tapering linkage(s) and/or Purchaser(s) having PPA(s) of whatever duration permitting sale/supply of electricity at non-regulated rate or market driven price.



[Note: For consumers of Western Coalfields Limited (WCL), relevant amendments to Clauses 3.7, 3.11.1 and 6.1 would need to be made to bring into effect the different practices followed by WCL with respect to these clauses].

Signed in presence of the witness /witnesses under mentioned on 23rd day of February, 2023.

For Central Coalfields Limited		M/s NTPC Limited	
Signature:		Signature:	
Name:	Ajit Singh	Name:	Ashim Kumar Goswami
Designation:	GM(M&S)	Designation:	Regional Director (ER-II)
Address:	CCL, Darbhanga House Ranchi-834029	Address:	3 Regional Director (ER-II) Building, NTPC Limited Bhubaneswar, 751012
Telephone:	0651-2360369	Mobile:	9416212442
E-mail	gmsnm.ccl@coalindia.in	E-mail:	reder2@ntpc.co.in
1. Witness:		1. Witness:	
Signature:		Signature:	
Name:	Nishant Kr. Virmani	Name:	Ajay Kumar Shukla
Designation:	Manager (M&S)	Designation:	GM (O&M)
Address:	CCL, Darbhanga House Ranchi-834029	Address:	NKSTPP, Tandwa, Chatra, 825321, Jharkhand
2. Witness:		2. Witness:	
Signature:		Signature:	
Name:	Abhisek Kumar Singh	Name:	Anil Kumar
Designation:	Dy. Manager (F/M&S)	Designation:	DGM (CCFM)
Address:	CCL, Darbhanga House Ranchi-834029	Address:	EOC, Sec-24A, Noida, 201301, UP

Schedule-I

Annual Contracted Quantity (Refer Clause 3.1)

Annual Contracted Quantity

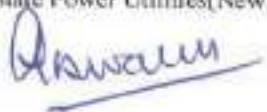
SAP Contract No.	Name & location of the Power Plant owned by Purchaser	Unit wise Installed Capacity of the Power Station (in MW)	Balance life** of plant/unit in Years (w.e.f. COD)	Name of Rake Fit Station	Original LOA Quantity (Lakh Tonnes)	Annual Contracted Quantity (Lakh Tonnes)	Mode of Transport	Source Coal field of the Seller*
	North Karanpura STPP Unit 1-3 (3x660 MW), Tandwa Town, Distt. Chatra, 825321, Jharkhand	Unit# 1 to 3 (3x660 MW)	25 yrs. from the date of COD	NA	84.72	84.72	Rail/ Road/ Captive	All operative mines of CCL

* Details of Imported Coal shall be furnished by the Seller to the Purchaser from time to time as and when such Coal is offered.

** Balance life of the Plant/Unit shall be as determined by appropriate authority forgot. of India / as declared by way of "Self-declaration" by the authorized signatory of the Purchaser as per prescribed format of CIL.

Buyer to provide annual coal requirements for the initial years also

**LOA Quantity means the quantity mentioned in the Letter of Assurance (LOA) issued by the Seller to the Purchaser.





Schedule-II

BANK GUARANTEE FORMAT FOR SECURITY DEPOSIT (Refer Clause 2.11)

On Rs. 50/- Non judicial Stamp Paper

Date of Issue: _____

Effective Date¹: _____

Expiry Date: _____

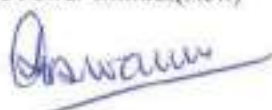
Value of B.G: _____

1. [The Chairman – cum- Managing Director,
Coal India Limited,
10, Netaji Subhash Road, Kolkata – 700 001]
2. [The Chairman-cum-Managing Director,
(name and address of the subsidiary Company)]
3. _____

In consideration of Coal India Limited of 10, Netaji Subhash Road, Kolkata – 700 001/ _____ (name of the subsidiary Company) having its Registered Office at _____ (regd. address of the subsidiary Company) and Sales Office at _____ (address of the sales office of the subsidiary Company) (hereinafter referred to as 'Seller', which expression shall unless excluded by or repugnant to the subject or context, include its legal representatives, successors and permitted assigns) having agreed to supply Coal/Imported Coal to _____ (Name of the Company/ Partnership firm/ Proprietor) having its registered office at _____ (address of the Company/ Partnership firm/ Proprietor) (hereinafter referred to as the 'Purchaser', which term shall unless excluded or repugnant to the subject or context include its legal representatives, successors and permitted assigns in case of Company) and, the Purchaser being required to furnish the Security Deposit as per the terms of the Fuel Supply Agreement (FSA)

We, _____ (Name and address of the Bank), having its Head Office at _____ (Address of the Head Office of the Bank) (hereinafter called the Guarantor, which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) do hereby irrevocably and unconditionally guarantee and undertake to

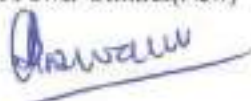
¹The Bank Guarantee Effective Date for Security Deposit corresponds to the Signature Date of this agreement



pay Seller or such other place or places as may be directed by the Seller all amounts payable by the Purchaser to the extent of Rs. _____/- (Indian Rupees _____) at any time upto² _____ subject to the following terms and conditions :-

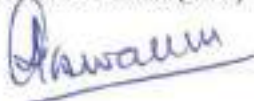
- 1) The Guarantor shall pay to the Seller on demand and without any demur, reservation, contest, recourse or protest and/ or without any reference to the Purchaser. As to whether the occasion or ground has arisen for such demand, the decision of the Seller shall be final.
- 2) The Seller shall have the fullest liberty without reference to the Guarantor and without affecting this guarantee to postpone at any time or from time to time the exercise of all or any of its powers and rights under arrangement made with the Purchaser, and the Guarantor shall not be released from this guarantee by any arrangement between the Seller and the Purchaser or any alteration thereof made with or without the consent of the Guarantor or by exercise or non-exercise by the Seller of all or any of its powers and rights against the Purchaser, or any other forbearance, act of omission on the part of the Seller or indulgence granted by or on behalf of the Seller to the Purchaser, which under the law relating to surety ship would but for this provision have the effect of releasing the Bank as Guarantor from their obligations under this guarantee.
- 3) The guarantee herein contained shall not be determined or affected by the winding up or insolvency of the Purchaser, but shall in all respects and for all purpose be binding and operative until all monies due to the Seller in respect of all liability or liabilities of the Purchaser are fully paid.
- 4) It is also agreed that Seller will be entitled at its option to enforce this guarantee against the Guarantor as principal debtor in the instance notwithstanding any other security or guarantee that the Seller may have in relation to the Purchaser's liability.
- 5) The Guarantee will remain valid for a period of sixty-four (64) months from the date hereof and to such further period, as may be required and agreed by the Parties and agreed by the Guarantor before the expiry of the aforesaid validity.
- 6) The Guarantee shall cover all claims or demand of Seller to the extent of the amount guaranteed.
- 7) Notwithstanding anything contained, the liability of the Guarantor under this Agreement is restricted to Rs. _____/- (Indian Rupees _____), and the same shall be kept operative and valid by the Purchaser upto and including the day of _____ (date that is sixty-four (64) months from the issue of the Bank Guarantee) and to such further period, as may be required and agreed by the Parties and agreed by the Guarantor before the expiry of the aforesaid validity.

²The Bank Guarantee should be valid till 30 days after the First Delivery Date



- 8) This guarantee can be enforced by Seller any number of times for their claims or demand to the total extent of Rs. _____/- (Indian Rupees _____), as long as it remains in force.
- 9) Unless a demand or claim under this guarantee is received by the Guarantor in writing within the period mentioned in clause 5 and 7 hereof, all rights of the Seller shall be forfeited and the Guarantor shall be relived or discharged from all liabilities.
- 10) The guarantee is operative at our _____ (name and address of the branch) Branch, _____ (Place).

Signature of the Bankers
With date & Rubber Stamp

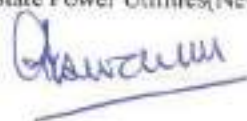


Schedule-III

**Quality of Coal
(Refer Clause 4.1)**

S.No.	Name & Location of the Power Plant owned by the Purchaser	Top-size of Coal (mm)	Kcal/Kg Corresponding GCV of coal	Grades of Coal in terms of GCV
1	North Karanpura STPP Unit 1-3 (3x660 MW), Tandwa Town, Distt. Chatra, 825321, Jharkhand	(-) 100 mm	G9 to G13	G9 to G13

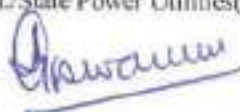
* Details of Imported Coal shall be furnished by the Seller to the Purchaser from time to time as and when such Coal is offered.




**IRLC Stipulations
(Refer Clause 11.1.2(b))**

In the event the Purchaser opts to submit IRLC, as per the payment provisions laid down in Clause 11.1.2 (b), the IRLC shall conform to the following conditions:

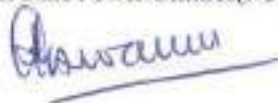
1. The underlying amount of IRLC shall be equivalent to As Delivered Price of Coal for the Coal quantities that is one-ninth ($1/9^{\text{th}}$) of the QQ concerned, as per Clause 3.4. Further, the As Delivered Price of Coal in this context shall take into account the highest of the Base Prices of the Grades mentioned in Schedule III.
2. The underlying amount of IRLC shall be suitably changed whenever there is a change in any component of the As Delivered Price of Coal.
3. The term of the IRLC shall be for a minimum period of one year, and the same shall be renewed one month prior to its expiry so as to remain valid throughout the term of the Agreement.
4. 100% payment shall be released in favour of the Seller against the bills/ invoices duly signed and submitted by the Seller.
5. IRLC shall be automatic without any reinstatement clause; accordingly the amount of each drawl shall be automatically reinstated.
6. IRLC shall be issued by a bank acceptable to the Seller
7. All IRLC charges including those related to opening, establishment, negotiation, re-instatement, amendment or any other incidental charges shall be borne by the Purchaser
8. All documents drawn under this IRLC shall be in English language only.
9. All amounts under this IRLC shall be payable at [] to be mentioned by the Seller].
10. There shall be no restriction for the number of drawls in a month.



SCHEDULE -V

Detailed modalities for Third Party sampling

- 1.0 Modalities for collection, handling, storage and preparation of third party samples:
- 1.1 General
- a) Sample shall be collected source wise, grade wise and Power station wise.
- b) Samples shall be collected, packed and transported in such a manner so as to make these tamper proof to the satisfaction of Seller and Purchaser for which detailed procedure may be worked out at sampling sites jointly by representatives /Third parties of Seller and, Purchaser
- c) Name the colliery / siding / Power Station, date of collection and other identification details (eg. Rake no. in case of rail supply) shall be maintained in a register and a proper code number shall be assigned for each sample for identification and reconciliation of results.
- d) Laboratory samples prepared shall be in the size of 12.5mm for Total Moisture and for ash, moisture and GCV analysis 212 micron IS Sieve. Precaution shall be taken so that before analysis, in test laboratory, further sieving or pulverizing is not required.
- e) Proper analysis records shall be maintained at the laboratories where the samples are analysed.
- f) Samples collected at the loading end shall be analysed as per BIS Standards (IS: 1350 Part I – 1984) for determination of ash and moisture content and as per (IS: 1350Part-II-1970) for
- g) Monthly statements containing the details of each and every analysis result finalized during a month based on Third party/ referee analysis, as the case may be, shall be prepared indicating inter-alia the quantity of Coal covered by the respective analysis results. The respective analysis results shall be applied to the corresponding quality of Coal for billing/ commercial purpose. Copy of the monthly statement / report shall be submitted to the GM (QC)/Director In charge of the Seller by the Third Party
- h) The final pulverized sample shall be divided into three equal parts, Set-I, Set-II, Set-III. Set-I shall be taken by the Purchaser for analysis at their end and the Set-II of the sample shall be taken by the Seller for analysis at the loading end and the Set-III (Referee Sample) to be retained by the third parties jointly in double sealed condition duly signed by the representative of Seller, Purchaser and the Third Parties and kept in safe custody at the loading end by the Third Parties.



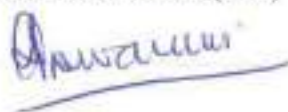
- i) Sample drawn at loading ends shall be analyzed by the Third Party of Seller and Purchaser in laboratories of their respective end
- j) The samples shall be identified at the time of analysis in the laboratories by the code number already assigned as per clause 1.1(c).

1.2 COLLECTION OF SAMPLES FROM WAGONS:

- a) In case of dispatch by Rail each rake (source wise, grade wise and Power Station wise) of Coal supplied from one Delivery Point shall be considered as a Lot for the purpose of sampling.
- b) In case of Coal dispatches through MGR the sample collected from each rake (source wise, grade wise and Power Station wise) loaded from the respective Delivery Point during the day shall be pooled together and shall be considered as a lot for the purpose of sampling.
- c) Each rake shall be divided into sub-lots in a manner that the quantity of Coal/number of wagons in such sub-lots is more or less equal. The number of sub lots shall be determined as under :

No. of wagons in the rake	Number of sub lots
Up to 30 wagons	4
>30 wagons up to 50 wagons	5
>50 wagons and above	6

- d) From each of the sub lots one wagon each shall be selected as per random table in IS: 436 (Part I/Section I) 1964 or its latest version for collection of increments.
- e) In each wagon selected for sampling, the sample will be drawn from the spot in a manner so that if in one wagon the sample is collected at one end, in the next wagon the spot will be in the middle of the wagon and in the third wagon at the other end and this sampling procedure will be repeated for subsequent wagons.
- f) Before collecting the samples, the spot will be leveled and at least 25 cm of Coal surface shall be removed/scrapped from the top and the place will be leveled for an area of 50 cm by 50 cm.
- g) About 50 kg of sample shall be collected from each selected wagon in the rake of a source by drawing 10 increments of approx. 5 kg each with the help of shovel/scoop.
- h) Any stone/shale of size more than that indicated in Schedule-II shall be removed/discarded, however all stones/ shale of size in terms of Schedule II shall form part of the sample collected.
- i) Source wise, grade wise and Power Station wise Samples collected from all the selected wagons in a rake shall be mixed (grade wise/source wise/Power Station wise) separately to form Gross Sample accordingly.



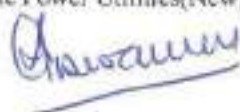

- j) Item (d) to (g) above shall be applicable for Coal supplied in box wagons as well as BOBR wagons where there is no live overhead traction line.
- k) In case of having live overhead traction line, the parties shall ensure that the power supply in the over head traction is switched off to facilitate collection of joint samples from BOX / BOBR wagons pursuant to points (d) to (g) above.

1.3 COLLECTION OF SAMPLES OF COAL DESPATCHES BY ROAD

- a) Sample shall be collected colliery wise / grade wise on daily basis during a day i.e. 6.00 Hr to 18.00 Hr
- b) The first truck for Third party sampling on a day shall be selected randomly from the first eight trucks placed for loading by the Purchaser. Every eighth (8th) truck there after shall be subjected to the Third Party Sampling.
- c) The spot at the top of the truck will be leveled and at least 25 cm of Coal surface shall be removed/scrapped from the top and the place will be leveled for an area of 50 cm by 50 cm for collection of sample.
- d) About 30 kg of sample shall be collected from each truck by drawing 6 increments of approx. 5 kg each with the help of shovel/scoop.
- e) All the samples collected from every eighth truck shall be mixed together grade wise to form a Gross Sample.
- f) Any stone/shale of size more than that indicated in Schedule-II shall be removed/discarded, however all stone / shale of size as mentioned in Schedule II shall form the part of the sample collected.

1.4 COLLECTION OF SAMPLES FROM CONVEYOR BELT/ROPEWAYS/ PIPELINE

- a) In case of supply by conveyer belt sample shall be collected in increments of full cross section and thickness of the stream in one operation in a regular interval of time as mutually decided by both Seller and Purchaser and lot shall consist of samples so collected during a day i.e. 0.00 Hr to 0.00 Hr. of the following day.
- b) Before collecting the increments, the speed of the conveyer and quantum of material passing a certain point in a given time shall be ascertained so that an appropriate spacing of time between increments may be arranged over the whole of the lot.
- c) If it is practicable to stop the belt periodically, increment may be collected from the whole cross section of the stream by sweeping the whole of the Coal lying between the sides of a suitable frame placed across the belt. The frame should be inserted in the Coal until it is in contact with the belt across its full width.
- d) Minimum 150 kgs of samples to be collected for daily Gross Sample.




1.5 COLLECTION OF SAMPLES FROM STOCKPILE

- a) For the purpose of sampling, the quantity of Coal in the stock pile shall be divided into a suitable manner of sub-lots as specified in the following table:

Weight of the lot (MT)	No. of Sub-lots
Up to 500	2
501 to 1000	3
1001 to 2000	4
2001 to 3000	5
Over 3000	6

- b) The surface of each sub-lot shall be leveled and one point for approximately every 250 MT of material in the sub-lots shall be chosen at random for taking gross sample as per the following procedure:
- In case height of the stock pile is not more than 1.5 metre, the material shall be collected at every selected point by taking the whole section of Coal from top to bottom over the area of a circle of 30 cm diameter.
 - In case the height of the stock pile is more than 1.5 metre, the sample shall be collected at every selected point by taking the material over an area of a circle of 30 cm diameter and up to a depth of 1.5 metre.

1.6 PREPARATION OF COLLECTED SAMPLES:

- 1.6.1 The Gross Sample collected at the loading end jointly by the representative/ Third parties of the Seller and the Purchaser will be divided into two portions. One portion (one fourth of the Gross Sample) called Part-I will be used for analysis of Total Moisture and the other portion (three fourth of the Gross Sample) called Part-2 for determination of ash, moisture and GCV on Equilibrated basis.

- 1.6.2 The Part-2 Sample shall be jointly reduced into laboratory sample on the date immediately following the date of collection. The final laboratory samples will be divided into three parts viz. Set – I, Set – II and Set-III

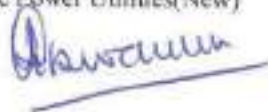
- Set – I shall be used for analysis of ash, moisture and GCV at Purchaser's end as per BIS standard (IS 1350 Part I-1984 and IS 1350 Part-II-1970 as applicable)
- Set – II shall be used for analysis of ash, moisture and GCV at Seller's end as per BIS standards IS 1350 Part I-1984 and IS 1350 Part-II-1970 as applicable
- Set – III shall be kept under joint seal of the Seller, Purchaser and the Third Party as referee sample in the safe custody of Third Parties at the loading end for a period of fourteen days or until the analysis results are accepted without dispute, whichever is earlier. The referee sample i.e. Set-III shall be destroyed after fourteen (14) days from the date of analysis of Set-II if no complaint is received.

- The Gross Samples for each Delivery Point shall be separately crushed to (-) 5 cm by mechanical means, mixed thoroughly, coned and quartered.
- Two opposite quarters shall be retained and the rest rejected.

- c) The retained material shall be further mixed, halved and one half retained.
- d) Material so obtained shall be crushed to 12.5 mm by a Jaw Crusher and then to 3.3 mm by a palmar type of reduction mill/ or jaw crusher.
- e) The crushed material shall be reduced either by coning and quartering or by riffing to 2 kgs.
- f) The sample so reduced shall be finally ground to pass through 212 micron IS sieve using a Raymond mini mill.
- g) From the final sample passing through 212 micron IS sieve, 1.5 Kg shall be taken, which shall constitute the laboratory sample.
- h) Such laboratory sample shall be divided into three equal i.e. Set-I, Set-II and Set-III as mentioned at 1.1(h). The sample shall be kept in glass or polythene container.
- i) All tools and tackles, plastic bags, sealing compound and other items required for collection, preparation, storage and analysis of the sample shall be arranged by the Seller.

2.0 PREPARATION OF TOTAL MOISTURE SAMPLE AND DETERMINATION OF TOTAL MOISTURE:

- a) Part – I Sample shall be analyzed by the *Third Parties* for determination of Total Moisture as per IS: 1350(Part –I) - 1984.
- b) For rail supplies, rake wise Surface Moisture shall be determined. For supplies by modes other than rail, Surface Moisture shall be determined by the Third Parties on daily basis.
- c) The samples shall be divided into three parts and shall be sealed in three previously weighed air tight plastic containers duly labeled and coded as Set-ITM Set-IITM and Set-IIITM (the weight shall include any sealing material to be used also) immediately. Weight of each part of such sample shall be minimum 5 kg. The third set Set-IIITM of Coal samples shall be set aside as referee sample. All the containers shall be sealed at the time of sample collection in such a manner that there is no loss of moisture. All the containers, after the collection of the sample and sealing, shall be individually weighed. All the weights, before and after the collection of samples shall be recorded by the Third parties.
- d) An empty tray measuring 1000 cm² (1 ft x 1 ft-approx) shall be weighed. The sample for analysis shall be spread in this tray. The weight of Coal of the tray shall be recorded.
- e) This tray containing the sample shall be kept under joint lock in a room/laboratory furnished with either sealing fans or with exhaust fan for drying the sample for 24




hours. If the sample is not reasonably dry the period of drying may be extended to further periods of 24 hours, till the sample is dry.

- f) The tray shall be weighed again and weight noted. Again the sample shall be kept for drying for about 2 hours and again weighed and this process shall be repeated till constant weight is achieved. This would normally take 2-4 hours. The final weight shall be taken and loss in weight that is W_1 in the 1st stage of air drying shall be recorded.
- g) This sample shall now be crushed to -12.5 mm size in a crusher. Coning and quartering shall be done to reduce the sample quantity to 5 kg.
- h) This sample of -12.5 mm of approximately 5 kg shall be weighed and kept in an oven at ambient temperature of 38°C for about 2 hours. Again weight shall be taken and the process of heating cooling and weighing shall be continued till constant weight is reached.
- i) The loss in weight shall be recorded as W_2 that is the loss of weight after 2nd stage drying.
- j) This sample of approximately 5 kg after the 2nd stage of drying shall be crushed to -3.35 mm size and the same shall be reduced to half Kg. by quartering and coning.
- k) Out of the half kg of sample 10 gms of Coal sample shall be taken in a weighed glass dish and kept in the drying oven at $108 \pm 2^{\circ}\text{C}$ for about 90 minutes.
- l) The dish shall be cooled and weighed. Heating, cooling and weighing shall continue till constant weight is reached.
- m) The loss of weight shall be recorded as W_3 that is the weight loss in 3rd stage drying.
- n) Based on the above procedure, the Total Moisture shall be computed by the *Third Party*.
- o) All tools and tackles, plastic bags, sealing compounds and other items required for collection, preparation, storage and analysis of the sample shall be *arranged* by the Seller.

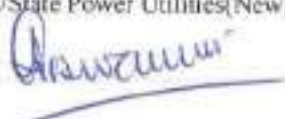


SCHEDULE – VI

Procedure for segregation and separate stacking of stones of +250 mm size at the Power Station and its joint assessment by the Purchaser and the Seller

- 1) The stones segregated from Coal supplies received from Seller during a month at the power plant end shall be collected and stacked separately by Purchaser at a suitable location identified mutually by the Purchaser and Seller.
- 2) Such materials will be stacked in a manner that the same can be measured properly for volume.
- 3) (a) Such material collected and stacked during a month shall be loaded into trucks and weighed at nearest weighbridge to determine weight of such material received during the month.

(b) In the event entire stock of such material cannot be weighed as per 3 (a) of the schedule, at least 5 trucks of such material loaded from the heap on random basis shall be weighed at the nearest weighbridge to determine the volumetric conversion ratio of such material, i.e. weight per unit of volume. The same conversion ratio will be applied for determining total weight of the heap of such material. The heap containing the entire stock in such cases shall be measured for volume prior to loading in the trucks and the same recorded jointly.
- 4) Two trucks of such material weighed as above will be randomly selected and unloaded at an identified place near the heap and material of +250 mm size will be manually segregated. After such segregation, the same will be weighed at the nearest weighbridge to establish the percentage of material +250mm size in the sample. This percentage will be applied to the total weight of heap determined as per 3(b) to find the weight of material +250 mm size in the heap.
- 5) After determination of weight pursuant to Clause 3 of this Schedule, the stones shall be disposed off by the Purchaser at a suitable place.
- 6) All infra-structural arrangements including for tools, tackles, equipments, trucks and manpower shall be arranged and provided by Purchaser at their own cost.
- 7) The Purchaser shall provide access to the Seller for examination of all documents / records pertaining to the above claim, if the Seller so desires.



SCHEDULE-VII

Option letter for confirming acceptance /surrender of coal supply to be made through import in terms of clause 2.8.3.1 of the Modified Model FSA applicable for New SEB/State GenCo Power Utilities.

To

M/s.....
.....

Dear Sir,

Sub: Acceptance / Surrender of Coal through import.

This has reference to the Letter of Assurance issued to you vide letter No..... for supply of Coal subject to fulfillment of the conditions as stipulated in the said letter.

Clause 3.3 of the FSA provides that the Seller shall have the option to supply the balance quantity of coal through import not exceeding, unless otherwise agreed between the parties, 15% of the ACQ in the year 2012-13, 13-14 and 14-15, 13% of ACQ in the year 2015-16 and 5% of the ACQ for the year 2016-17 and onwards after meeting the quantity available from domestic production.

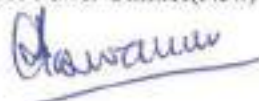
The percentage of imported coal proposed to be supplied in a year to meet the minimum contractual obligation shall be determined and declared by the Seller on year to year basis.

Accordingly, the imported coal likely to be supplied during..... (year) is% of the ACQ.

In order to enable the Seller to make firm arrangement for sourcing coal through import, the Purchaser is required to opt for either of the following two options.

Option-A: Confirmation for acceptance of coal through import:

- i) The Purchaser agrees unconditionally to accept supply of coal through import at a price, specification and source as may be decided and offered by the Seller/CIL from time to time.
- ii) The Purchaser would indicate acceptance for either the full quantity or a part of the offered quantity to be supplied through import to be expressed in terms of percentage of ACQ. In case of Purchaser giving consent for supply a part of the offered quantity, the part quantity not accepted shall be considered as Deemed Delivered quantity as per clause 3.11.1(v) and 3.11.2(iv).
- iii) The Build-up-Period as per clause 2.10 of the FSA which is at present for a period of six months from the Effective Date shall stand extended for a further period of six months for supply through import to enable the Seller arranging the same after obtaining firm commitment from the Purchaser.



- iv) The Purchaser giving this option shall have to enter into a Side Agreement separately for covering the commercial terms and payment modalities for the supply through import. The Side Agreement shall form an integral part of this Agreement and legally enforceable.

Option-B: Confirmation for Surrender of coal through import

- i) The Purchaser unconditionally surrenders the component of ACQ offered by the Seller through import.
- i) The Quantity of imported coal surrendered by the Purchaser shall stand as Deemed Delivered Quantity as per clause 3.11.1(v) and 3.11.2(iv).
- ii) The penal provision for supply below 80% and up to 65% of ACQ for the years 2012-13, 2013-14 and 2014-15 and below 80% and up to 67% of ACQ for the year 2015-16 shall not be applicable. The penal provision for supply below 75% shall be applicable from the year 2016-17 and onwards.

The Purchaser may request for a change of the option exercised by him earlier, but such request has to be made by him at least three months in advance.

Either of the above two options is required to be exercised before or at the time of signing of the FSA by endorsing the format appended below.

You are therefore requested to confirm acceptance of either of the above options by endorsing the copy of the letter in the following manner,

Yours faithfully
(CGM/GM-Sales)

We, hereby confirm that we have read and understood the above including the terms of FSA dated.....and accordingly exercise our unconditional acceptance for the Option A/B (strike out whichever is not acceptable) and request you to take necessary further action.

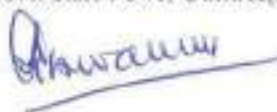
(In case of exercising option A)

The supply intended to be taken in terms of the percentage of ACQ through import:

.....

Signature
Name of the Authorised Signatory
(Purchaser)
SEAL

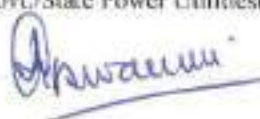
Date:



Modifications in the FSA Models (Since Dec' 2012)

S. No	Ref: CIL Board	Modification Regarding	Letter No.	Date of communication
1	292 (12/12/12)	Period of the Agreement, Security Deposit, Modalities for Assessment of Stone & 5% RCR	CILS&M:NewPol(47252):871	28/12/2012
2	-	Corrigendum regarding , Modalities for Assessment of Stone	CILS&M:NewPol(47252):938	31/12/2012
3	296 (25/03/13)	Minor Modifications in FSA provisions	CIL:CMO:S&M:NewPol(47252):266	02/04/2013
4	297 (20/05/13)	Regarding requirement of Long term PPA (without PPA signing)	CIL:CMO:S&M:NewPol(47252):384	27/05/2013
5	298 (27/05/13)	Regarding interplant transfer of Coal	CIL:CMO:S&M:NewPol(47252):445	19/06/2013
6	299 (28/06/13)	Regarding Incentive/ Compensation for Supply of coal	CIL:CMO:S&M:NewPol(47252):465	29/06/2013
7	300 (03/08/13)	Regarding Presidential Directive	CIL:CMO:S&M:NewPol(47252):626	08/08/2013
8	300 (03/08/13)	Third Party Sampling and Analysis provisions	Uploaded in the Website	
9	322 (13/11/15)	Enabling name change of the company due to amalgamation, takeover, change in ownership/shareholding pattern	CIL/S&M/New Po.(47252)/105	11.02.2016
10	332 (13/09/16)	Interplant transfer of coal beyond ceiling of ACQ	CIL/S&M/New Po.(47252)/1117	5.10.2016
11	-	Pricing of Raw coal having GCV from 1500Kcal/Kg to 2200 Kcal/Kg	CIL/M&S/417	02.09.2022
12	-	Introduction of a new commercial dispute resolution mechanism (AMRCD)	CIL/CMO/FSA modification/65	06.02.2023

DISCLAIMER: The model FSA of November 2012 has been updated incorporating subsequent modifications undertaken/communicated vide above communication, after approval of the competent authority. Although utmost care has been taken to ensure that all modifications are properly incorporated but minor discrepancies due to any clerical errors or other-wise may not be ruled out, in such events the provision of the circulation of the above communication will prevail.






Government of Jharkhand

Receipt of Online Payment of Stamp Duty

NON JUDICIAL

Receipt Number : 764486647de70d66b414

Receipt Date : 21-Feb-2023 04:38:02 pm

Receipt Amount : 100/-

Amount In Words : One Hundred Rupees Only

Document Type : Agreement or Memorandum of an Agreement

District Name : Ranchi

Stamp Duty Paid By : NTPC LTD

Purpose of stamp duty paid : AGREEMENT

First Party Name : NTPC LTD

Second Party Name : CCL RANCHI

GRN Number : 2315890560

:- This stamp paper can be verified in the jharnibandhan site through receipt number :-

SIDE AGREEMENT b/w CCL & NTPC



This Receipt is to be used as proof of payment of stamp duty only for one document. The use of the same receipt as proof of payment of stamp duty in another document through reprint, photo copy or other means is penal offence under section-62 of Indian Stamp Act, 1899

इस रसीद का उपयोग केवल एक ही दस्तावेज पर मुद्रांक शुल्क का भुगतान के प्रमाण हेतु ही किया जा सकता है। पुनः प्रिन्ट कर अथवा फोटो कॉपी आदि द्वारा इसी रसीद का दूसरे दस्तावेज पर मुद्रांक शुल्क का भुगतान के प्रमाण हेतु उपयोग भारतीय मुद्रांक अधिनियम, 1899 की धारा 62 अन्तर्गत दण्डनीय अपराध है।

(Signature)

(Signature)

THIS SIDE AGREEMENT executed on this **23rd day of February'2023** between **M/s Central Coalfields Limited**, a Subsidiary of **Coal India Limited** and a Company incorporated under the Companies Act, 1956 and having its registered office at **Darbhangra House, Ranchi 834001 Jharkhand**, (hereinafter referred to as 'SELLER' which expression unless excluded by or repugnant to the context shall mean and include its successors, assigns) of the ONE PART.

AND

M/s NTPC Limited, a company registered under the Companies Act, 1956 and having its registered office at **NTPC Bhawan, SCOPE Complex, 7, Institutional Area, Lodhi Road, New Delhi-110003**, hereinafter called the "Purchaser" (which term shall unless excluded or repugnant to the subject or context include its legal representatives, successors and permitted assigns) of the other part

AND

Whereas the Purchaser or its predecessor-in-interest was issued a Letter of Assurance (LOA) dated **04.02.2023** from CCL vide reference no. **CCL/HQ/C-4/LOA(Power)/2022-23/261** against **3x660 MW plant capacity of the Purchaser's North Karanpura STPP Unit 1 to 3 (3x660)** located at **Tandwa Town, Distt. Chatra, 825321, Jharkhand** and the Purchaser has achieved the milestones as set out in the Annexure 1 of the LOA and fulfilled other conditions as stipulated under the LOA.

AND

WHEREAS the PURCHASER has entered into the **FUEL SUPPLY AGREEMENT** (in short FSA) vide dated **23.02.2023** in the existing FSA Format.

AND

WHEREAS the SELLER requires this SIDE AGREEMENT as per terms and conditions under relevant clauses of the **SHAKTI** Policy of Ministry of Coal, vide no. **23011/15/2016-CPD/CLD** dated **22nd May 2017** for the existing Letter of Assurance Holder and CIL Letter no. **CIL:M&S:Power:358** dated **21st September 2017**.

AND

WHEREAS the **SHAKTI** Policy of Ministry of Coal, vide no. **23011/15/2016-CPD/CLD** dated **22nd May 2017** and CIL Letter no. **CIL: M&S: Power: 358** dated **21st September 2017** shall be the part and parcel of this SIDE AGREEMENT.

AND

WHEREAS the PURCHASER has agreed to sign the Fuel Supply Agreement (FSA) with the following terms and conditions:

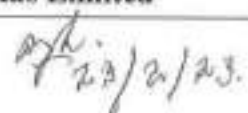
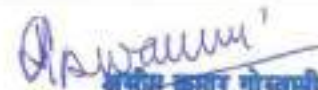


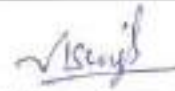
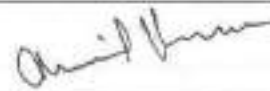
1. Condition Precedents for supply of imported coal shall not be applicable and Schedule VII of the FSA dated **23.02.2023** shall not be required to be executed.





2. The Minimum Level of Delivery / Lifting Commitment shall be 75% of the ACQ from Domestic Coal, failing which compensation shall be paid as per the terms and conditions of the FSA dated **23.02.2023** by the defaulting party.
3. The provisions of Third Party Sampling of coal shall be as per the existing modalities through signing of Tripartite Agreement with the designated / notified Agency.
4. As and when the existing FSA Format will be revised or modified for the applicable category of Power Plants, the FSA dated **23.02.2023** shall accordingly be modified/ revised.
5. As long as the existing FSA Format is not revised this SIDE AGREEMENT shall remain as an integral part of the FSA dated **23.02.2023**.
6. That disputes if any; arising out of this SIDE AGREEMENT shall be subject to the exclusive jurisdiction of the competent Court in **Ranchi, Jharkhand** only to the exclusion of all other concurrent courts.

IN WITNESS WHEREOF the SELLER and PURCHASER herein have set their hands and seal on the date, month and the year above first written.

For Central Coalfields Limited		M/s NTPC Ltd.	
Signature:		Signature:	
Name:	Ajit Singh	Name:	Ashim Kumar Goswami
Designation:	HOD (M&S)	Designation:	Regional Executive Director (ER-II)
Address:	CCL, Darbhanga House Ranchi-834029	Address:	3 rd & 4 th Floor, OLC Building, N-17/2, Bhubaneswar, 751012
Telephone:	0651-2360369	Mob:	9416212442
Fax:	0651-2360369	Fax:	reder2@ntpc.co.in
email	gmsnm.ccl@coalindia.in	email:	Ashim Kumar Goswami
1. Witness:		1. Witness:	
Signature:		Signature:	
Name:	Nishant Kr. Virmani	Name:	Ajay Kumar Shukla
Designation:	Manager (M&S)	Designation:	GM (O&M)
Address:	CCL, Darbhanga House Ranchi-834029	Address:	NKSTPP, Tandwa, Chatra, 825321, Jharkhand
2. Witness:		2. Witness:	
Signature:		Signature:	
Name:	Abhisek Kumar Singh	Name:	Anil Kumar
Designation:	Dy. Manager (F/M&S)	Designation:	DGM (CCFM)
Address:	CCL, Darbhanga House Ranchi-834029	Address:	EOC, Sec-24A, Noida, 201301, UP



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TEST REPORT

Ref. No. <i>STH/TR/22-23/2943</i> Dt : <i>13.10.2022</i> Your Work Order No. <i>4000285067-037-1019</i> Dt : <i>31.07.2022</i>				
[a]	Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321	
[b]	Sampling Environmental Condition	Temp. (°C)	32	Humidity (%) 59
[c]	Details of Sample		Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra	
[d]	Monitored by		SHIVA TEST HOUSE on 01.10.22	
[e]	Whether any specific Method of Test has been suggested by the party		No	
	Sampling Location	Unit	TWA of Noise Level (Day Time)	
	1. Near Time Office	dB(A)	65.1	
	2. Near Switch Yard	dB(A)	41.3	
	3. Near DM Plant	dB(A)	62.8	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.			

Sanjay Kumar
Dy. General Manager (EMG)
KTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2022.11.11 11:56:17 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.11.11 12:01:58 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. <i>STH/IR/22-23/3459</i> Dt: <i>16.11.2022</i> Your Work Order No. <i>4000285067-037-1019</i> Dt: <i>31.07.2022</i>			
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%) 68
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 19.10.22		
[e] Whether any specific Method of Test has been suggested by the party	No		
Sampling Location		Unit	TWA of Noise Level (Day Time)
1. Near at the top of Time Office (Main Plant)		dB(A)	55.7
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar / Sanjoy Kumar
उप निदेशक (ई एम जी)
DY. General Manager (EMG)
राजदीप सिटी, नई करणपुरा- 825321
NTPC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.17
15:00:07 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.17
16:18:32 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3465 Dt : 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt : 31.07.2022			
[a]	Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321	
[b]	Sampling Environmental Condition	Temp. (°C)	29 Humidity (%) 68
[c]	Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra	
[d]	Monitored by	SHIVA TEST HOUSE on 20.10.22	
[e]	Whether any specific Method of Test has been suggested by the party	No	
	Sampling Location	Unit	TWA of Noise Level (Day Time)
	1. Near Tejasvi Building	dB(A)	56.4
	2. Near Switch Yard	dB(A)	54.3
	3. Near DM Plant	dB(A)	58.1
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar
 संजय कुमार / Sanjay Kumar
 Dy. General Manager (E.M.G.)
 नेशनल पॉलिश, नॉर्थ कारनपुरा- 825321
 NTPC Unad, North Karanpura- 825321

SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2022.11.17 16:24:51 +05'30'



Shreyasee Prasad
 Digitally signed by Shreyasee Prasad
 Date: 2022.11.17 16:18:32 +05'30'

Verified by :
 Technical Manager

Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. *STH/TR/22-23/3518* Dt : *16.11.2022* Your Work Order No. *4000285067-037-1019* Dt : *31.07.2022*

[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Sampling Environmental Condition		Temp. (°C)	29	Humidity (%)	68
[c] Details of Sample		Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d] Monitored by		SHIVA TEST HOUSE on 27.10.22			
[e] Whether any specific Method of Test has been suggested by the party		No			
Sampling Location		Unit	TWA of Noise Level (Day Time)		
1.	Near Time Office	dB(A)	61.2		
2.	Near Switch Yard	dB(A)	55.6		
3.	Near DM Plant	dB(A)	58.7		
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.				

Sanjay Kumar
 संजय कुमार / Sanjay Kumar
 Dy. General Manager (EMG)
 नॉर्थ कारपुरा सुपर थर्मल पावर प्रोजेक्ट
 NTPC Limited, North Karanpura- 825321

SHIBESHW
 AR PRASAD

Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2022.11.16
 13:45:02 +05'30'

Verified by :
 Technical Manager



Shreyasee
 Prasad

Digitally signed by
 Shreyasee Prasad
 Date: 2022.11.16
 13:50:02 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. *STH/TR/22-23/3523* Dt: *16.11.2022* Your Work Order No. *4000285067-037-1019* Dt: *31.07.2022*

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%) 68
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 28.10.22		
[e] Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Time Office	dB(A)	62.7	
2. Near Switch Yard	dB(A)	47.3	
3. Near DM Plant	dB(A)	59.4	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Kumar
 Dy. General Manager (EMG)
 Patna
 Mobile: 98551 82321
 Email: kumar@shivatest.com

SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2022.11.16 13:47:55 +05'30'

Verified by :
 Technical Manager



Shreyasee Prasad

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 Date: 2022.11.16 13:55:18 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3555(B) Dt : 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt : 31.07.2022			
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%) 68
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 01.11.22		
[e] Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Time Office	dB(A)	62.5	
2. Near Switch Yard	dB(A)	54.6	
3. Near DM Plant	dB(A)	59.8	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Signature
Sriyash Kumar / Sanjay Kumar
Dy. General Manager (E. & W. Cell)
Dy. General Manager (EMG)
Mobile: 98360 825321
98360 825321

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
15:18:35 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
15:22:39 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. *STH/TR/22-23/3574* Dt: *16.11.2022* Your Work Order No. *4000285067-037-1019* Dt: *31.07.2022*

[a]	Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Sampling Environmental Condition	Temp. (°C)	27	Humidity (%)	69
[c]	Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d]	Monitored by	SHIVA TEST HOUSE on 02.11.22			
[e]	Whether any specific Method of Test has been suggested by the party	No			
	Sampling Location	Unit	TWA of Noise Level (Day Time)		
	1. Near Township Area	dB(A)	61.4		
	2. Near Plant Gate	dB(A)	59.7		
	3. Near Office Building	dB(A)	58.4		
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.				

Signature
संजय कुमार/ Sanjay Kumar
उप महाप्रबंधक (सं. प्र. वि.)
By General Manager (EMG)
परीक्षा भवन, नं. १
NTPC Limited, North Karanpura 825321

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
15:20:37 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
15:27:18 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. <i>STH/TR/22-23/3826</i> Dt : <i>06.12.2022</i> Your Work Order No. <i>4000285067-037-1019</i> Dt : <i>31.07.2022</i>			
[a]	Name and address of the Customer North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b]	Sampling Environmental Condition	Temp. (°C)	25 Humidity (%) 67
[c]	Details of Sample <i>Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra</i>		
[d]	Monitored by SHIVA TEST HOUSE on <i>08.11.22</i>		
	Whether any specific Method of Test has been suggested by the party No		
	Sampling Location	Unit	TWA of Noise Level (Day Time)
	1. Near Township Area	dB(A)	60.8
	2. Near Plant Gate	dB(A)	60.1
	3. Near Office Building	dB(A)	59.8
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar
 संजय कुमार / Sanjay Kumar
 Dy. General Manager (EMG)
 एम्प्लॉयमेंट मैनेजर (ईएमजी)
 NTPC Limited, North Karanpura-825321

SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2022.12.07 15:31:02 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.12.07 15:37:25 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. <i>STH/TR/22-23/3831</i> Dt: <i>06.12.2022</i> Your Work Order No. <i>4000285067-037-1019</i> Dt: <i>31.07.2022</i>			
[a]	Name and address of the Customer North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b]	Sampling Environmental Condition	Temp. (°C)	29 Humidity (%) 66
[c]	Details of Sample Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d]	Monitored by SHIVA TEST HOUSE on 09.11.22		
	Whether any specific Method of Test has been suggested by the party No		
	Sampling Location	Unit	TWA of Noise Level (Day Time)
1.	Near Plant Gate	dB(A)	58.1
2.	Near Office Building	dB(A)	53.8
3.	Near Township Area	dB(A)	56.2
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Signature
संजय कुमार / Sanjay Kumar
उप महाप्रबंधक (ए एम जी)
Dy. General Manager (EMG)
फ़ोन: 825321 - 77 825321
NTPC Limited, North Karanpura-825321

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.07
15:32:53 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:44:23 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3884 Dt : 06.12.2022 Your Work Order No. 4000285067-037-1019 Dt : 31.07.2022			
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321	
[b] Sampling Environmental Condition		Temp. (°C)	26 Humidity (%) 62
[c] Details of Sample		Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra	
[d] Monitored by		SHIVA TEST HOUSE on 15.11.22	
Whether any specific Method of Test has been suggested by the party		No	
Sampling Location		Unit	TWA of Noise Level (Day Time)
1. Near Plant Gate		dB(A)	62.0
2. Near Office Building		dB(A)	53.6
3. Near Township Area		dB(A)	61.3
N.B.: The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.			

Sanjay Kumar
 (ई एच सी)
 (E) (H) (S)
 (E) (H) (S)
 (E) (H) (S)

SHIBESHW
AR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.07
15:47:02 +05'30'

Verified by :
Technical Manager

Shreyase
e Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:51:18 +05'30'
Authorized Signatory
Quality Manager

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Website: www.shivatest.com; www.shivatestshouse.com



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TEST REPORT

Ref. No. STH/TR/22-23/3908 Dt: 06.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022			
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321	
[b] Sampling Environmental Condition		Temp. (°C)	26 Humidity (%) 68
[c] Details of Sample		Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra	
[d] Monitored by		SHIVA TEST HOUSE on 16.11.22	
Whether any specific Method of Test has been suggested by the party		No	
Sampling Location		Unit	
1. Near Township Area		dB(A)	
2. Near Plant Gate		dB(A)	
3. Near Office Building		dB(A)	
		TWA of Noise Level (Day Time)	
		61.2	
		58.5	
		59.1	
N.B.: The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.			

Sanjay Kumar / Sanjay Kumar
 उप महाप्रबन्धक (ई. एस. जी.)
 डी. गो. - 81
 पत्रिका सं. 2
 दिनांक: 16.11.22

SHIBESHWAR PRASAD

Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2022.12.07
 15:49:00 +05'30'

Verified by :
 Technical Manager



Shreyasee Prasad

Digitally signed by
 Shreyasee Prasad
 Date: 2022.12.07
 15:53:48 +05'30'

Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. <i>STH/TR/22-23/4283</i>	Dt: 06.12.2022	Your Work Order No. <i>4000285067-037-1019</i>	Dt: 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	25	Humidity (%) 70
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 26.11.22		
Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Plant Gate	dB(A)	64.1	
2. Near Office Building	dB(A)	54.0	
3. Near Township Area	dB(A)	60.5	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Signature
संजय कुमार / Sanjay Kumar
उप महाप्रबंधक (ई एम जी)
Dy. General Manager (EMG)
राजकीय नहरों का विभाग
NAPC Ltd. - Patna - 800 013

SHIBESHW
AR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.07
15:56:40 +05'30'

Verified by :
Technical Manager



Shreyasee
Prasad

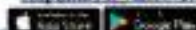
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Shreyasee Prasad
Date: 2022.12.07
16:01:00 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4303(B)		Dt: 06.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Sampling Environmental Condition		Temp. (°C)	26	Humidity (%)	63		
[c] Details of Sample		Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra					
[d] Monitored by		SHIVA TEST HOUSE on 27.11.22					
Whether any specific Method of Test has been suggested by the party		No					
Sampling Location		Unit	TWA of Noise Level (Day Time)				
1. Near Township Area		dB(A)	63.8				
2. Near Plant Gate		dB(A)	55.1				
3. Near Office Building		dB(A)	59.7				
<p>N.B.: The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.</p>							

Signature
Sanjay Kumar
 Dy. General Manager (EMG)
 NTPC Limited, Patna-825321



SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2022.12.07 15:58:55 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad
 Digitally signed by Shreyasee Prasad
 Date: 2022.12.07 16:05:34 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. <i>STH/TR/22-23/5157</i> Dt: <i>03.01.2023</i>		Your Work Order No. <i>4000285067-037-1019</i>		Dt: <i>31.07.2022</i>	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Sampling Environmental Condition		Temp. (°C)	18	Humidity (%)	72
[c] Details of Sample		Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d] Monitored by		SHIVA TEST HOUSE on 30.12.22			
Whether any specific Method of Test has been suggested by the party		No			
Sampling Location		Unit	TWA of Noise Level (Day Time)		
1. Near Township Area		dB(A)	63.9		
2. Near Plant Gate		dB(A)	64.7		
3. Near Office Building		dB(A)	63.1		
<p>N.B.: The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.</p>					

Sanjay Kumar
 संजय कुमार / Sanjay Kumar
 डी. जनरल मैनेजर (EMG)
 डी. जनरल मैनेजर (EMG)
 एन.टी.पी. लिमिटेड, नार्थ कारनपुरा- 825321
 NTPC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2023.01.03 16:57:22 +05'30'

Verified by:
 Technical Manager

Shreyasee Prasad
 Digitally signed by Shreyasee Prasad
 Date: 2023.01.03 17:02:31 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5140		Dt: 03.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Sampling Environmental Condition			Temp. (°C)	18	Humidity (%)	73
[c]	Details of Sample			Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d]	Monitored by			SHIVA TEST HOUSE on 29.12.22			
	Whether any specific Method of Test has been suggested by the party			No			
	Sampling Location		Unit	TWA of Noise Level (Day Time)			
	1. Near Plant Gate		dB(A)	63.8			
	2. Near Office Building		dB(A)	60.7			
	3. Near Township Area		dB(A)	62.4			
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.						

Sanjay Kumar
संजय कुमार / Sanjay Kumar
उप महाप्रबंधक (ई एम जी)
Dy. General Manager (EMG)
इलाहाबाद जिला, पटना-825321
NTPC Limited, North Karanpura-825321

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.01.03 16:55:26 +05'30'
Verified by:
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.01.03 16:59:38 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4858		Dt: 31.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	72
[c] Details of Sample				Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d] Monitored by				SHIVA TEST HOUSE on 21.12.22			
Whether any specific Method of Test has been suggested by the party				No			
Sampling Location		Unit		TWA of Noise Level (Day Time)			
1. Near Township Area		dB(A)		64.1			
2. Near Plant Gate		dB(A)		65.3			
3. Near Office Building		dB(A)		62.8			
<p>N.B.: The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.</p>							

Signature
 संजय कुमार/ Sanjay Kumar
 जे.ए.ए. प्रबंधक (ई.एम.जी.)
 Dy. General Manager (E.M.G.)
 राष्ट्रीय निदेश, नई दिल्ली- 825321
 NTPC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2023.01.03
 16:17:43 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad
 Digitally signed by Shreyasee Prasad
 Date: 2023.01.03
 16:23:12 +05'30'
 Authorized Signatory
 Quality Manager

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 Website: www.shivatest.com ; www.shivatesthouse.com



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TEST REPORT

Ref. No. STH/TR/22-23/4810		Dt: 30.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	71
[c] Details of Sample				Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d] Monitored by				SHIVA TEST HOUSE on 20.12.22			
Whether any specific Method of Test has been suggested by the party				No			
Sampling Location		Unit		TWA of Noise Level (Day Time)			
1. Near Plant Gate		dB(A)		64.2			
2. Near Office Building		dB(A)		61.6			
3. Near Township Area		dB(A)		64.1			
<p>N.B.: The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.</p>							

Sanjay Kumar
 संजय कुमार / Sanjay Kumar
 उप महाप्रबंधक (ई एम पी)
 Dy. General Manager (EMG)
 राष्ट्रीय निगम, नर्मदा परियोजना- 825321
 NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2023.01.03 15:22:25 +05'30'

Verified by:
 Technical Manager

Shreyasee Prasad

Digitally signed by Shreyasee Prasad
 Date: 2023.01.03 16:28:47 +05'30'

Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4655	Dt : 30.12.2022	Your Work Order No. 4000285067-037-1019	Dt : 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	24	Humidity (%) 72
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 15.12.22		
Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Township Area	dB(A)	62.9	
2. Near Plant Gate	dB(A)	63.5	
3. Near Office Building	dB(A)	61.7	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar
Sanjay Kumar / Sanjoy Kumar
जय महाप्रबोधन (ई एम जी)
DY. General Manager (EMG)
एनपीसी लिमिटेड, नॉर्थ कारनपुरा- 825321
NTPC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.01.03 15:14:12 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.01.03 15:18:50 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



TC-10582

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TEST REPORT

Ref. No. STH/TR/22-23/4650		Dt: 30.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Sampling Environmental Condition			Temp. (°C)	24	Humidity (%)	73
[c]	Details of Sample			Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d]	Monitored by			SHIVA TEST HOUSE on 14.12.22			
	Whether any specific Method of Test has been suggested by the party			No			
	Sampling Location		Unit	TWA of Noise Level (Day Time)			
	1. Near Plant Gate		dB(A)	67.2			
	2. Near Office Building		dB(A)	60.1			
	3. Near Township Area		dB(A)	62.3			
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.						

Signature
 सत्य कुमार (Genl. Manager)
 Dy. Genl. Manager (EMG)
 सत्य कुमार
 NTPC Limited, North Karanpura-825321

SHIBESHW
AR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
15:11:08 +05'30'

Verified by :
Technical Manager

Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
15:16:09 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4551		Dt : 21.12.2022		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	71
[c]	Details of Sample			Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d]	Monitored by			SHIVA TEST HOUSE on 10.12.22			
[e]	Whether any specific Method of Test has been suggested by the party			No			
		Sampling Location	Unit	TWA of Noise Level (Day Time)			
		1. Near Township Area	dB(A)	64.8			
		2. Near Plant Gate	dB(A)	56.9			
		3. Near Office Building	dB(A)	60.2			
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.						

Signature
 संजय कुमार / Sanjay Kumar
 उप महा-निरीक्षक (एम जी)
 Dy. Dir. (E) - 800013 Patna (EMG)
 राष्ट्रीय निरीक्षण, नॉर्थ कारनपुरा-825321
 NTPC Limited, North Karanpura-825321

SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2022.12.27 11:41:55 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.12.27 11:48:09 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4493		Dt : 21.12.2022		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Sampling Environmental Condition		Temp. (°C)	26	Humidity (%)	67		
[c] Details of Sample		Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra					
[d] Monitored by		SHIVA TEST HOUSE on 09.12.22					
Whether any specific Method of Test has been suggested by the party		No					
Sampling Location		Unit	TWA of Noise Level (Day Time)				
1. Near Plant Gate		dB(A)	65.1				
2. Near Office Building		dB(A)	57.0				
3. Near Township Area		dB(A)	61.3				
<p>N.B.: The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.</p>							

Signature
 Dr. Shreyasee Prasad / Senior Kumar
 Dy. General Manager (EMG)
 NTPC Limited, North Karanpura-825321

SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2022.12.27 11:40:10 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad
 Digitally signed by Shreyasee Prasad
 Date: 2022.12.27 11:45:28 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. <i>STH/TR/22-23/5252</i> Dt: <i>13.01.2023</i>		Your Work Order No. <i>4000285067-037-1019</i> Dt: <i>31.07.2022</i>	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	15	Humidity (%) 75
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 05.01.23		
Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Plant Gate	dB(A)	64.1	
2. Near Office Building	dB(A)	62.3	
3. Near Township Area	dB(A)	63.5	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar
 संजय कुमार / Sanjay Kumar
 ज्य. महाप्रबंधक (ई एम जी)
 Dy. General Manager (EMG)
 राष्ट्रीय निष्ठा, नई कालपुरा- 825321
 NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2023.01.13 13:33:43 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.01.13 13:38:21 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5280 Dt: 13.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Sampling Environmental Condition		Temp. (°C)	18	Humidity (%)	72
[c] Details of Sample		Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d] Monitored by		SHIVA TEST HOUSE on 06.01.23			
Whether any specific Method of Test has been suggested by the party		No			
Sampling Location		Unit	TWA of Noise Level (Day Time)		
1. Near Township Area		dB(A)	64.2		
2. Near Plant Gate		dB(A)	61.0		
3. Near Office Building		dB(A)	63.4		
N.B.: The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.					

Signature
 Sanjay Kumar / Sanjay Kumar
 Dy. General Manager (EMG)
 NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2023.01.13 13:35:35 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.01.13 13:43:40 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5400		Dt: 21.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Sampling Environmental Condition		Temp. (°C)	14	Humidity (%)	75		
[c] Details of Sample		Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra					
[d] Monitored by		SHIVA TEST HOUSE on 11.01.23					
Whether any specific Method of Test has been suggested by the party		No					
Sampling Location		Unit	TWA of Noise Level (Day Time)				
1. Near Plant Gate		dB(A)	63.8				
2. Near Office Building		dB(A)	61.6				
3. Near Township Area		dB(A)	63.2				
N.B.: The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.							

Sanjay Kumar
 संजय कुमार / Sanjay Kumar
 जय्य सहायक (ई एम जी)
 Dy. General Manager (EMG)
 बिहार बिजली, नॉर्थ कार्नापुरा- 825321
 NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD

Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2023.01.21
 16:59:14 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad

Digitally signed by
 Shreyasee Prasad
 Date: 2023.01.21
 17:12:56 +05'30'

Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5440		Dt: 21.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Sampling Environmental Condition			Temp. (°C)	17	Humidity (%)	73
[c]	Details of Sample			Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d]	Monitored by			SHIVA TEST HOUSE on 13.01.23			
[e]	Whether any specific Method of Test has been suggested by the party			No			
		Sampling Location	Unit	TWA of Noise Level (Day Time)			
		1. Near Plant Gate	dB(A)	63.5			
		2. Near Office Building	dB(A)	62.5			
		3. Near Township Area	dB(A)	63.0			
N.B.:		The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.					

Signature
Sanjay Kumar
 Joint General Manager (EMG)
 Patna
 NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD

Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2023.01.21
 17:01:15 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad

Digitally signed by
 Shreyasee Prasad
 Date: 2023.01.21
 17:14:57 +05'30'

Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5889		Dt : 02.02.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Sampling Environmental Condition				Temp. (°C)	19	Humidity (%)	71
[c] Details of Sample				Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d] Monitored by				SHIVA TEST HOUSE on 25.01.23			
Whether any specific Method of Test has been suggested by the party				No			
Sampling Location			Unit	TWA of Noise Level (Day Time)			
1. Near Plant Gate			dB(A)	65.2			
2. Near Office Building			dB(A)	63.5			
3. Near Township Area			dB(A)	64.1			
N.B.: The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.							

Sanjoy Kumar
 संजय कुमार / Sanjoy Kumar
 Dy. General Manager (EMG)
 नए कारपुरा, नए कारपुरा- 825321
 NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD

Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2023.02.02
 15:06:34 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad

Digitally signed by
 Shreyasee Prasad
 Date: 2023.02.02
 15:17:19 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5894	Dt : 02.02.2023	Your Work Order No. 4000285067-037-1019	Dt : 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	19	Humidity (%) 70
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 27.01.23		
Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Township Area	dB(A)	65.0	
2. Near Plant Gate	dB(A)	63.0	
3. Near Office Building	dB(A)	64.5	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar
Sanjay Kumar / Sanjoy Kumar
Dy. General Manager (EMG)
NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.02 15:08:37 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.02 15:20:50 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/5932		Dt: 04.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Sampling Environmental Condition		Temp. (°C)	19	Humidity (%)	71		
[c] Details of Sample		Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra					
[d] Monitored by		SHIVA TEST HOUSE on 30.01.23					
[e] Whether any specific Method of Test has been suggested by the party		No					
Sampling Location		Unit		TWA of Noise Level (Day Time)			
1. Near Plant Gate		dB(A)		64.9			
2. Near Office Building		dB(A)		63.8			
3. Near Township Area		dB(A)		64.5			
N.B.:		The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.					

Sanjay Kumar
संजय कुमार / Sanjay Kumar
उप महाप्रबन्धक (ई एम जी)
Dy. General Manager (EMG)
राष्ट्रीय जलिय, नॉर्थ कारनपुरा- 825321
NTPC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.04
13:30:28 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.04
13:49:29 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5937	Dt : 04.02.2023	Your Work Order No. 4000285067-037-1019	Dt : 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	19	Humidity (%) 70
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 31.01.23		
[e] Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Township Area	dB(A)	64.8	
2. Near Plant Gate	dB(A)	63.2	
3. Near Office Building	dB(A)	63.9	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar
संजय कुमार / Sanjay Kumar
डि. जनरल मैनेजर (ई.एम.जी.)
D. General Manager (EMG)
एन.टी.सी. कार्यालय, नार्थ कारनपुरा- 825321
NTPC Office, North Karanpura- 825321

SHIBESHWAR PRASAD
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Date: 2023.02.04 13:32:43 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

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Date: 2023.02.04 13:53:14 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6567		Dt : 27.02.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Sampling Environmental Condition			Temp. (°C)	24	Humidity (%)	66	
[c] Details of Sample			Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra				
[d] Monitored by			SHIVA TEST HOUSE on 22.02.23				
 Whether any specific Method of Test has been suggested by the party			No				
Sampling Location			Unit	TWA of Noise Level (Day Time)			
1. Near Township Area			dB(A)	66.0			
2. Near Plant Gate			dB(A)	65.4			
3. Near Office Building			dB(A)	64.3			
N.B.:							The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.

Sanjoy Kumar
General Manager (E & E)
General Manager (EMG)
NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD

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Date: 2023.03.03 18:17:14 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6411	Dt : 23.02.2023	Your Work Order No. 4000285067-037-1019	Dt : 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	24	Humidity (%) 66
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 15.02.23		
Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Township Area	dB(A)	65.2	
2. Near Plant Gate	dB(A)	65.0	
3. Near Office Building	dB(A)	64.8	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Signature
Sanjay Kumar / Sanjay Kumar
 जय महाप्रबंधक (ई एम जी)
 Dy. General Manager (EMG)
 एनकेपी लिमिटेड, नया चरणपुरा- 825321
 NTPC Limited, New Karanpura- 825321



SHIBESHWAR PRASAD
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Verified by :
 Technical Manager

Shreyasee Prasad
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 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6384	Dt : 23.02.2023	Your Work Order No. 4000285067-037-1019	Dt : 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	22	Humidity (%) 68
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 14.02.23		
Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Plant Gate	dB(A)	65.1	
2. Near Office Building	dB(A)	64.7	
3. Near Township Area	dB(A)	64.2	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar
Sanjay Kumar / Sanjay Kumar
जय महाप्रबंधक (ई एम जी)
Gen. Manager (EMG)
प्लान्ट मॉनिटर, आई कार्गु- 825321
SHIVA Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
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Date: 2023.02.23 16:35:09 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad
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Date: 2023.02.23 16:45:46 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6270	Dt : 22.02.2023	Your Work Order No. 4000285067-037-1019	Dt : 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Sampling Environmental Condition	Temp. (°C)	23	Humidity (%)	68
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d] Monitored by	SHIVA TEST HOUSE on 11.02.23			
Whether any specific Method of Test has been suggested by the party	No			
Sampling Location	Unit	TWA of Noise Level (Day Time)		
1. Near Township Area	dB(A)	64.7		
2. Near Plant Gate	dB(A)	64.2		
3. Near Office Building	dB(A)	62.8		
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.			

Signature
Sanjay Kumar / Sanjay Kumar
Dy General Manager (EMG)
NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.23 15:46:16 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.02.23 16:00:40 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6203	Dt: 22.02.2023	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	23	Humidity (%) 66
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 09.02.23		
Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Plant Gate	dB(A)	64.8	
2. Near Office Building	dB(A)	64.1	
3. Near Township Area	dB(A)	63.5	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar
संजय कुमार / Sanjay Kumar
जय महाप्रबंधक (ई एम जी)
Jy. General Manager (EMG)
राजकीय बिस्लेर, जय कानपुरा- 825321
NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
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Date: 2023.02.23 15:43:56 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad
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Date: 2023.02.23 15:58:18 +05'30'
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Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5961	Dt : 10.02.2023	Your Work Order No. 4000285067-037-1019	Dt : 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	22	Humidity (%) 68
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 02.02.23		
Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Township Area	dB(A)	65.3	
2. Near Plant Gate	dB(A)	64.3	
3. Near Office Building	dB(A)	63.6	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjoy Kumar
संजय कुमार / Sanjoy Kumar
उप महाप्रबंधक (ई एम जी)
P.O. General Manager (EMG)
राष्ट्रीय निगम, नर्मदा नगर- 825321
NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
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Date: 2023.02.10 15:48:49 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad
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Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5949	Dt : 10.02.2023	Your Work Order No. 4000285067-037-1019	Dt : 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	22	Humidity (%) 67
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 01.02.23		
Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Plant Gate	dB(A)	65.6	
2. Near Office Building	dB(A)	64.8	
3. Near Township Area	dB(A)	63.8	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Signature
Dr. Sanjay Kumar
उप महाप्रबंधक (ई एम जी)
Dr. General Manager (EMG)
स्टेशनरी विभिन्ने, नार्वे कलानपुर- 825321
NTPC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD

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15:46:48 +05'30'

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Technical Manager



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16:26:41 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6919		Dt : 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Sampling Environmental Condition			Temp. (°C)	25	Humidity (%)	54	
[c] Details of Sample			Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra				
[d] Monitored by			SHIVA TEST HOUSE on 02.03.23				
[e] Whether any specific Method of Test has been suggested by the party			No				
Sampling Location			Unit	TWA of Noise Level (Day Time)			
1. Near Plant Gate			dB(A)	66.5			
2. Near Office Building			dB(A)	65.6			
3. Near Township Area			dB(A)	63.5			
N.B.:		The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.					

Signature

संजय कुमार / Sanjoy Kumar
जय परामर्शदायक (ई एम जी)
Dy. General Manager (EMG)
नैनी इन्डिया, सर्व कार्यालय- 825321
NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.21 15:56:37 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.03.21 16:09:32 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6981		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Sampling Environmental Condition				Temp. (°C)	26	Humidity (%)	52
[c] Details of Sample				Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d] Monitored by				SHIVA TEST HOUSE on 03.03.23			
[e] Whether any specific Method of Test has been suggested by the party				No			
Sampling Location		Unit		TWA of Noise Level (Day Time)			
1. Near Township Area		dB(A)		65.9			
2. Near Plant Gate		dB(A)		65.4			
3. Near Office Building		dB(A)		64.3			
N.B.: The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.							

Signature
 संजय कुमार/ Sanjay Kumar
 उद्य. महाप्रबन्धक (ई.एम.जी.)
 Dy. General Manager (EMG)
 राष्ट्रीय प्रदूषण नियंत्रण बोर्ड, नई दिल्ली-825321
 NTPC Limited, North Karanpura-825321



SHIBESHWAR PRASAD

Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2023.03.21
 15:58:32 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad

Digitally signed by
 Shreyasee Prasad
 Date: 2023.03.21
 16:11:48 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6981		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Sampling Environmental Condition				Temp. (°C)	26	Humidity (%)	52
[c] Details of Sample				Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d] Monitored by				SHIVA TEST HOUSE on 03.03.23			
[e] Whether any specific Method of Test has been suggested by the party				No			
Sampling Location		Unit		TWA of Noise Level (Day Time)			
1. Near Township Area		dB(A)		65.9			
2. Near Plant Gate		dB(A)		65.4			
3. Near Office Building		dB(A)		64.3			
<p>N.B.: The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.</p>							

Sanjay Kumar
 संजय कुमार / Sanjay Kumar
 उपाय महाप्रबंधक (ई.एम.जी.)
 Dy. General Manager (EMG)
 राष्ट्रीय प्रदूषण नियंत्रण बोर्ड, नई दिल्ली-825321
 NPC Limited, North Karanpura-825321



SHIBESHWAR PRASAD

Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2023.03.21
 15:58:32 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad

Digitally signed by
 Shreyasee Prasad
 Date: 2023.03.21
 16:11:48 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7111	Dt : 21.03.2023	Your Work Order No. 4000285067-037-1019	Dt : 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	28	Humidity (%) 52
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 06.03.23		
[e] Whether any specific Method of Test has been suggested by the party	No		
Sampling Location		Unit	TWA of Noise Level (Day Time)
1. Near Plant Gate		dB(A)	66.5
2. Near Office Building		dB(A)	65.6
3. Near Township Area		dB(A)	63.5
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar
 संजय कुमार / Sanjay Kumar
 Dy. General Manager (EMG)
 एन.टी.पी.सी. लिमिटेड, नंद प्रसाद- 825321
 NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.21 16:01:55 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.21 16:24:08 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7118	Dt : 21.03.2023	Your Work Order No. 4000285067-037-1019	Dt : 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	26	Humidity (%) 52
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 07.03.23		
[e] Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Township Area	dB(A)	65.5	
2. Near Plant Gate	dB(A)	65.2	
3. Near Office Building	dB(A)	64.7	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar
संजय कुमार / Sanjay Kumar
उप महाप्रबंधक (ए एन जी)
Dy. General Manager (EM&G)
राष्ट्रीय निरीक्षक, न्यू कारानपुरा- 825321
NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.21
16:03:48 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.21
16:26:39 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7371	Dt: 27.03.2023	Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a]	Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Sampling Environmental Condition		Temp. (°C)	26	Humidity (%)	58
[c]	Details of Sample		Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra			
[d]	Monitored by		SHIVA TEST HOUSE on 17.03.23			
[e]	Whether any specific Method of Test has been suggested by the party		No			
Sampling Location		Unit	TWA of Noise Level (Day Time)			
1.	Near Plant Gate	dB(A)	67.1			
2.	Near Office Building	dB(A)	66.2			
3.	Near Township Area	dB(A)	64.1			
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.					

Shiveshwar Prasad
 Dy. General Manager (EMG)
 NTPC Limited, North Karanpura
 825321



SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2023.03.27 12:54:50 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad

Digitally signed by Shreyasee Prasad
 Date: 2023.03.27 13:32:21 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7400	Dt: 27.03.2023	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	26	Humidity (%) 52
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 18.03.23		
[e] Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Township Area	dB(A)	67.0	
2. Near Plant Gate	dB(A)	66.2	
3. Near Office Building	dB(A)	65.3	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar
संजय कुमार / Sanjay Kumar
डाय. महासंचालक (ई एम जी)
Dy. General Manager (EMG)
एनपीसी लिमिटेड, नार्थ कारनपुरा-825321
NTPC Limited, North Karanpura-825321



SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.27
12:56:56 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.27
13:36:23 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7538	Dt: 28.03.2023	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	28	Humidity (%) 52
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 22.03.23		
[e] Whether any specific Method of Test has been suggested by the party	No		
Sampling Location	Unit	TWA of Noise Level (Day Time)	
1. Near Plant Gate	dB(A)	66.5	
2. Near Office Building	dB(A)	66.3	
3. Surrounding villages	dB(A)	65.7	
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e. 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Signature of Sanjay Kumar
Sanjay Kumar (E.M.O)
General Manager (EMO)
Patna Office, Patna-800013
MPC Limited, North Karanpura-825321

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.28
12:44:12 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.28
13:53:46 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7587	Dt: 28.03.2023	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%) 51
[c] Details of Sample	Monitoring of Ambient Noise Level (Day Time) within plant premises of North Karanpura Super Thermal Power Project, Chatra		
[d] Monitored by	SHIVA TEST HOUSE on 23.03.23		
[e] Whether any specific Method of Test has been suggested by the party	No		
Sampling Location		Unit	TWA of Noise Level (Day Time)
1. Service Building		dB(A)	67.1
2. CHP		dB(A)	66.8
3. Township Area		dB(A)	60.6
N.B.:	The Ambient Air Quality Standards in respect of Noise as per Noise Pollution (Regulation and Control) Rules 2000 for Industrial area is 75.0 dB(A), for Commercial area is 65.0 dB(A), for Residential area is 55.0 dB(A) & for Silence Zone is 50.0 dB(A) in daytime i.e., 6.00 am to 9.0 p.m. As per Rule 7(1&2) the authority shall take action against violator if the noise level exceed the ambient noise standards by 10 dB(A) or more against any area/zone.		

Sanjay Kumar
जनय कुमार / Sanjay Kumar
उप महाप्रबंधक (ई एस जी)
Dy. General Manager (EMG)
लोकेश्वर नगर, नई दिल्ली- 825321
NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.28 12:45:55 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.03.28 13:57:16 +05'30'
Authorized Signatory
Quality Manager

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Website: www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



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TEST REPORT

Ref. No. STH/TR/22-23/2939 Dt. 13.10.2022 Your Work Order No. 4000288067-037-1019 Dt. 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)
(c) Sample Collected by	SHIVA TEST HOUSE on 01.10.22
(d) Sampling Location	Collected from Near at the top of Tejaswini Building (Township)
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)
(f) Sampling Environmental Condition	Temp: (°C) 32 Humidity (%) 68
(g) No. & Type of Container	One poly Jar
(h) Instrument ID	RDS-1, FPM-1
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)
(j) Sample Code	A-2939
(k) Sample Condition on Receipt	Fil for Analysis
(l) Items required to be tested	As per contract
(m) Whether any specific Method of Test has been suggested by the party	No
(n) Date of receiving the sample	02.10.22
(o) Analysis Start Date / Analysis Completion Date	02.10.22 / 04.10.22

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswini Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	67.1
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	32.1
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.4
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	31.8
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.28
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.0
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	16.8

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2022.11.11 11:54:27 +05'30'



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2022.11.11 11:59:28 +05'30'

Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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 Website: www.shivasth.com; www.shivasth.co.uk



SHIVA TEST HOUSE

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TEST REPORT

Ref. No: **STH/TR/22-23/2939(A)** Dt: **13.10.2022** Your Work Order No. **4000285067-037-1019** Dt: **31.07.2022**

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandiwa Dist- Chatra Jharkhand- 825 321
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)
[c] Sample Collected by	SHIVA TEST HOUSE on 01.10.22
[d] Sampling Location	Collected from Near at the top of Tejasvi Building (Township)
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)
[f] Sampling Environmental Condition	Temp. (°C) 32 Humidity (%) 66
[g] No. & Type of Container	One poly Jar
[h] Instrument ID	RDS-1, FPM-1
[i] Sample Quantity	30 ml x 6 for each (NO _x , SO ₂ , NH ₃)
[j] Sample Code	A-2939
[k] Sample Condition on Receipt	Fit for Analysis
[l] Items required to be tested	As per contract
[m] Whether any specific Method of Test has been suggested by the party	No
[n] Date of receiving the sample	02.10.22
[o] Analysis Start Date / Analysis Completion Date	02.10.22 / 04.10.22

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.341
2. Benzene (C ₆ H ₆)	µg / m ³	6	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	1.85
5. Nickel as Ni	ng / m ³	20	AAS Method	4.26
6. Mercury (Hg)	µg / m ³	Not Specified	USEPA (Method 1631)	< 0.001



SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2022.11.11 11:54:37 +05'30'

Verified by:
Technical Manager

Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.11.11 11:59:42 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10482

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TEST REPORT

Ref. No. SIH/TR/22-23/3517 Dt: 16.11.2022 Your Work Order No: 4000285087-037-1019 Dt: 31.07.2022					
[a]	Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b]	Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c]	Sample Collected by		SHIVA TEST HOUSE on 27.10.22		
[d]	Sampling Location		Collected from Near at the top of Tejasvi Building (Township)		
[e]	Method of Sampling		IS 11235 (Part-1,2,3 & 7)		
[f]	Sampling Environmental Condition		Temp. (°C)	29 Humidity (%) 68	
[g]	No. & Type of Container		One poly Jar		
[h]	Instrument ID		RDS-1, FPM-1		
[i]	Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j]	Sample Code		A-3517		
[k]	Sample Condition on Receipt		Fit for Analysis		
[l]	Items required to be tested		As per contract		
[m]	Whether any specific Method of Test has been suggested by the party		No		
[n]	Date of receiving the sample		28.10.22		
[o]	Analysis Start Date / Analysis Completion Date		28.10.22 / 30.10.22		
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	68.4
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	36.3
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	12.4
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	32.2
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.14
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	4.1
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	18.2

SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2022.11.16 13:43:30 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.11.16 13:49:30 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. **STH/TR/22-23/3517(A)** Dt.: **16.11.2022** Your Work Order No. **4000295067-037-1019** Dt.: **31.07.2022**

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by	SHIVA TEST HOUSE on: 27.10.22		
[d] Sampling Location	Collected from Near at the top of Tejasvi Building (Township)		
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition	Temp (°C)	29	Humidity (%) 68
[g] No. & Type of Container	One poly Jar		
[h] Instrument ID	RDS-1, FPM-1		
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code	A-3517		
[k] Sample Condition on Receipt	Fit for Analysis		
[l] Items required to be tested	As per contract		
[m] Whether any specific Method of Test has been suggested by the party	No		
[n] Date of receiving the sample	28.10.22		
[o] Analysis Start Date / Analysis Completion Date	28.10.22 / 30.10.22		

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.568
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.21
5. Nickel as Ni	ng / m ³	20	AAS Method	4.92
6. Mercury (Hg)	µg / m ³	Not Specified	USEPA Method 1631	< 0.001

Shiva Test House
122-C, Axatha Road No. 5A, Palipukur Colony, Patna - 800 013 (Bihar)
Dy. General Manager (QA/QC)
Ambient Air, Industrial Effluent & Noise

**SHRISHW
AR PRASAD**

Digitally signed by
SHRISHWAR PRASAD
Date: 2022.11.16
13:44:51 +05'30'

Verified by:
Technical Manager



**Shreyasee
Prasad**

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
13:49:45 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10342

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TEST REPORT

Ref. No. STH/TR/22-23/3522 Dt. 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt. 31.07.2022				
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 28.10.22			
[d] Sampling Location	Collected from Near at the top of Tejaswini Building (Township)			
[e] Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%)	68
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-1, FPM-1			
[i] Sample Quantity	30 ml x 6 for each (NO _x , SO _x , NH ₃)			
[j] Sample Code	A-3522			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	29.10.22			
[o] Analysis Start Date / Analysis Completion Date	29.10.22 / 31.10.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswini Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	69.9
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	36.8
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.1
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	31.1
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.18
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.3
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.3

SHIBESHWAR PRASAD
Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
13:47:28 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16 13:54:39
+05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3522(A) Dt: 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanipura Super Thermal Power Project At: Taridwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 28.10.22		
[d] Sampling Location		Collected from Near at the top of Tejasvi Building (Township)		
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	29	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-1, FPM-1		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3622		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		29.10.22		
[o] Analysis Start Date / Analysis Completion Date		29.10.22 / 31.10.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.682
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	<5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	<1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.28
5. Nickel as Ni	ng / m ³	20	AAS Method	5.68
6. Mercury (Hg)	µg / m ³	Not Specified	USEPA (Method 10-6)	<0.001

Shiva Test House
122-C, Azadpur Road No. 5A, Patliputra Colony, Patna-800 013 (Bihar)
Digitally signed by SHIBESHWAR PRASAD
Date: 2022.11.16 13:47:43 +0530

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2022.11.16 13:47:43 +0530

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.11.16 13:54:58 +0530
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. **STH/IR/22-23/2940** Dt: **13.10.2022** Your Work Order No. **4000285067-037-1019** Dt: **31.07.2022**

[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 01.10.22			
[d] Sampling Location		Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp: (°C)	31	Humidity (%)	62
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-2, FPM-2			
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-2940			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		02.10.22			
[o] Analysis Start Date / Analysis Completion Date		02.10.22 / 04.10.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	70.1	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.3	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.4	
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.3	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.107	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.9	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	23.2	

Shri. Shri. / Sanjay Kumar
General Manager (EMG)
Shri. Shri. / Sanjay Kumar
General Manager (EMG)

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2022.11.11 11:54:49 +05'30'

Verified by
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.11.11 12:00:14 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. **STH/TR/22-23/2940(A)** Dt: **13.10.2022** Your Work Order No. **4000285067-037-1010** Dt: **31.07.2022**

(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 01.10.22			
(d) Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	31	Humidity (%)	82
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-2, FPM-2			
(i) Sample Quantity	30 ml x 6 for each (NO _x , SO ₂ , NH ₃)			
(j) Sample Code	A-2940			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	02.10.22			
(o) Analysis Start Date / Analysis Completion Date	02.10.22 / 04.10.22			

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.273
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	1.07
5. Nickel as Ni	ng / m ³	20	AAS Method	4.20
6. Mercury (Hg)	µg / m ³	Not Specified	USEPA (Method 10-5)	< 0.001

Digitally signed by
SHIBESHVAR PRASAD
Date: 2022.11.11
11:55:16 +05'30'

SHIBESHVAR PRASAD

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.11
12:00:29 +05'30'
Authorized Signatory
Quality Manager

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 Mob: +918676386249 +919431047908 Email: shivatest@shivatest.com info@shivatest.com
 Website: www.shivatest.com www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC-10242

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TEST REPORT

Ref. No. STH/TR/22-23/3458 Dt: 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 19.10.22			
[d] Sampling Location		Collected from Nair at the top of Time Office (Main Plant)			
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition		Temp. (°C)	29	Humidity (%)	68
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-2, FPM-2			
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-3458			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		22.10.22			
[o] Analysis Start Date / Analysis Completion Date		22.10.22 / 24.10.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	72.0	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.3	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.4	
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.9	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.143	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.6	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	22.6	

Digitally signed by
SHREYASEE PRASAD
Date: 2022.11.17
14:59:39 +05'30'

Verified by
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.17
16:19:32 +05'30'

Authorized Signatory
Quality Manager

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Website: www.shivatest.com : www.shivatesthouse.com



SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/3458(A) Dt: 16.11.2022 Your Work Order No. 4000285087-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 19.10.22		
[d] Sampling Location		Collected from Near at the top of Time Office (Main Plant)		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	29	Humidity (%) 68
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-2, FPM-2		
[i] Sample Quantity		30 ml x 6 for each (NO _x , SO ₂ , NH ₃)		
[j] Sample Code		A-3458		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		22.10.22		
[o] Analysis Start Date / Analysis Completion Date		22.10.22 / 24.10.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.341
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	1.22
5. Nickel as Ni	ng / m ³	20	AAS Method	6.99
6. Mercury (Hg)	µg / m ³	Not Specified	USEPA (Method 10-6)	0.82

Shri. STH/ Sanjay Kumar
Off. Incharge
Off. General Manager (Envt)
Bihar State Pollution Control Board
1st Floor, 1st Floor, 1st Floor

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.17
14:59:52 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.17
16:18:32 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10682

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TEST REPORT

Ref. No. STH/TR/22-23/3515 Dt: 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 27.10.22		
[d] Sampling Location		Collected from Near at the top of Time Office (Main Plant)		
[e] Method of Sampling		IS 11255 (Part-1, 3, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	29	Humidity (%) 68
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-2, FPM-2		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3515		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		28.10.22		
[o] Analysis Start Date / Analysis Completion Date		28.10.22 / 30.10.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	69.3
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	36.2
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.1
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.8
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.072
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.8
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	15.1

Digitally signed by:
SHIBESHVAR PRASAD
Date: 2022.11.16
13:42:51 +05'30'

SHIBESHVAR
AR PRASAD

Verified by:
Technical Manager



Shreyasee
Prasad

Authorized Signatory
Quality Manager

Digitally signed by Shreyasee
Prasad
Date: 2022.11.16 13:42:30 +05'30'

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. **STH/TR/22-23/3515(A)** Dt: **16.11.2022** Your Work Order No. **4000285067-037-1019** Dt: **31.07.2022**

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by	SHIVA TEST HOUSE on 27.10.22		
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)		
[e] Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%) 68
[g] No. & Type of Container	One poly Jar		
[h] Instrument ID	RDS-2, FPM-2		
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code	A-3515		
[k] Sample Condition on Receipt	Fit for Analysis		
[l] Items required to be tested	As per contract		
[m] Whether any specific Method of Test has been suggested by the party.	No		
[n] Date of receiving the sample	28.10.22		
[o] Analysis Start Date / Analysis Completion Date	28.10.22 / 30.10.22		

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.568
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.79
5. Nickel as Ni	ng / m ³	20	AAS Method	2.80
6. Mercury (Hg)	µg / m ³	Not Specified	USEPA (Method 1631)	< 0.001

Shiva Test House
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Mob. +91 967686249, +91 9431047908
Email: shivatesthouse@gmail.com, info@shivatest.com
Website: www.shivatest.com, www.shivatesthouse.com

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
13:43:01 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
13:43:48 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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PC-10892

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TEST REPORT

Ref. No. **STH/TR/22-23/3520** Dt. **16.11.2022** Your Work Order No. **4000285067-037-1019** Dt. **31.07.2022**

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)
[c] Sample Collected by	SHIVA TEST HOUSE on 28.10.22
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)
[e] Method of Sampling	IS 11235 (Part-1,2,3 & 7)
[f] Sampling Environmental Condition	Temp. (°C) 29 Humidity (%) 68
[g] No. & Type of Container	One poly Jar
[h] Instrument ID	RDS-2, FPM-2
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)
[j] Sample Code	A-3520
[k] Sample Condition on Receipt	Fit for Analysis
[l] Items required to be tested	As per contract
[m] Whether any specific Method of Test has been suggested by the party	No
[n] Date of receiving the sample	29.10.22
[o] Analysis Start Date / Analysis Completion Date	29.10.22 / 31.10.22

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	69.9
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.7
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.8
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.3
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.107
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.0
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	17.7

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SHIBESHWAR PRASAD
Date: 2022.11.16
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SHIBESHWAR PRASAD
Date: 2022.11.16
13:46:27 +05'30'



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
13:53:30 +05'30'

Verified by
Technical Manager

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3520(A) Dt: 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825.321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 28.10.22		
[d] Sampling Location		Collected from Near at the top of Time Office (Main Plant)		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	29	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-2, FPM-2		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3520		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		29.10.22		
[o] Analysis Start Date / Analysis Completion Date		29.10.22 / 31.10.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.582
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.57
5. Nickel as Ni	ng / m ³	20	AAS Method	6.99
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method IC-4)	< 0.001

SHIVA TEST HOUSE
121-C, Ashta, Road No. 5A, Patlipatra Colony, Patna - 800 011 (Bihar)
Mob.: +918676886349 ; +919437047908 Email: shiva@shiva.co.in ; info@shivatest.com
Website: www.shivatest.com ; www.shivatesthouse.com

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2022.11.16 13:46:39 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.11.16 13:53:46 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10582

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TEST REPORT

Ref. No. **STH/TR/22-23/2942** Dt: **13.10.2022** Your Work Order No: **4000286067-037-1010** Dt: **31.07.2022**

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tendwa Dist- Chattra Jharkhand-825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 01.10.22			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	32	Humidity (%)	62
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-2942			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	02.10.22			
[o] Analysis Start Date / Analysis Completion Date	02.10.22 / 04.10.22			

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	70.7
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	34.4
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.6
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.1
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.29
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.7
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	15.5

Dr. Shreshth Kumar
Gen. Manager (QMS)
Shiva Test House
At: North Karanpura, 825201

SHIBESHWAR PRASAD

Digitally signed by:
SHIBESHWAR PRASAD
Date: 2022.10.11
11:55:51 +05'30'



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.10.11 12:01:21 +05'30'

Verified by:
Technical Manager

Authorized Signatory:
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. SIH/TR/22-23/2942(A) Dt: 13.10.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a]	Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321	
[b]	Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)	
[c]	Sample Collected by		SHIVA TEST HOUSE on 01.10.22	
[d]	Sampling Location		Collected from Near at the top of Switch Yard Office Building	
[e]	Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)	
[f]	Sampling Environmental Condition		Temp. (°C)	32 Humidity (%) 68
[g]	No. & Type of Container		One poly Jar	
[h]	Instrument ID		RDS-4, FPM-4	
[i]	Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)	
[j]	Sample Code		A-2942	
[k]	Sample Condition on Receipt		Fit for Analysis	
[l]	Items required to be tested		As per contract	
[m]	Whether any specific Method of Test has been suggested by the party		No	
[n]	Date of receiving the sample		02.10.22	
[o]	Analysis Start Date / Analysis Completion Date		02.10.22 / 04.10.22	
	Parameters	Unit	Limit as per NAAQS 2009	Method of Test
				Sampling Station / Result Near at the top of Switch Yard Office Building
1.	Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10) 0.227
2.	Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11) < 5.0
3.	Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12) < 1.0
4.	Arsenic (As)	ng / m ³	6	AAS Method 1.01
5.	Nickel as Ni	ng / m ³	20	AAS Method 4.30
6.	Mercury (Hg)	µg / m ³	Not Specified	USEPA (Method 10-5) < 0.001

Shivam
New Super Thermal Power
Project Karanpura (4 km off)
Dr. Shibeshwar Prasad (EMO)
Regional Office, New Karanpura - 825321
HPTC Limited, North Karanpura - 825321

SHIBESHWAR PRASAD

Verified by
Technical Manager

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.11
11:56:05 +05'30'



Shreyasee Prasad

Authorized Signatory
Quality Manager

Digitally signed by
Shreyasee Prasad
Date: 2022.11.11
12:01:39 +05'30'

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Website: www.shivatest.com, www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC:19982

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TEST REPORT

Ref. No: STH/TR/22-23/3514 Dt: 16.11.2022 Your Work Order No: 4000235067-037-1019 Dx: 31.07.2022				
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 27.10.22			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%)	68
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-3514			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	28.10.22			
[o] Analysis Start Date / Analysis Completion Date	28.10.22 / 30.10.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.5
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	37.8
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.9
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.8
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.18
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.0
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.5

Shiva Test House
100, Gandhi Road, Patna-800 013
Dr. Shreshth Kumar
General Manager (EMG)
Mobile: 985676816249, 919411047900
Email: info@shivatesthouse.com

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
13:38:47 +05'30'

Verified by
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
13:48:10 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/3514(A) Dt: 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand-825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 27.10.22		
[d] Sampling Location		Collected from Near at the top of Switch Yard Office Building		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	29	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-4, FPM-4		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3514		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No.		
[n] Date of receiving the sample		28.10.22		
[o] Analysis Start Date / Analysis Completion Date		28.10.22 / 30.10.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.341
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.50
5. Nickel as Ni	ng / m ³	20	AAS Method	7.16
6. Mercury (Hg)	µg / m ³	Not Specified	USEPA (Method 10-5)	< 0.001

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SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
13:42:41 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

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Date: 2022.11.16
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/3519 Dt. 16.11.2022 Your Work Order No. 4000285087-037-1019 Dt. 31.07.2022				
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 28.10.22			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%)	68
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-3519			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	29.10.22			
[o] Analysis Start Date / Analysis Completion Date	29.10.22 / 31.10.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	72.0
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	40.3
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.2
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.5
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.21
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.2
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.4

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
13:45:29 +0530'

SHIBESHWAR
AR PRASAD

Verified by
Technical Manager



Shreyasee
Prasad

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Shreyasee Prasad
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/3519(A) Dt: 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 28.10.22		
[d] Sampling Location		Collected from Near at the top of Switch Yard Office Building		
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	29	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-4, FPM-4		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3519		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		29.10.22		
[o] Analysis Start Date / Analysis Completion Date		29.10.22 / 31.10.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.568
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.58
5. Nickel as Ni	ng / m ³	20	AAS Method	8.59
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-6)	< 0.001

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
13:46:09 +05'30'

SHIBESHWAR
PRASAD

Verified by
Technical Manager



Shreyasee
Prasad

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Shreyasee Prasad
Date: 2022.11.16
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Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



TC-10012

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TEST REPORT

Ref. No. STH/TR/22-23/2941 Dt: 13.10.2022					Your Work Order No: 4000285007-037-1019 Dt: 31.07.2022					
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321							
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)							
[c] Sample Collected by			SHIVA TEST HOUSE on 01.10.22							
[d] Sampling Location			Collected from Near at the top of DM Plant							
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)							
[f] Sampling Environmental Condition			Temp. (°C)		32		Humidity (%)		66	
[g] No. & Type of Container			One poly Jar							
[h] Instrument ID			RDS-3, FPM-3							
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)							
[j] Sample Code			A-2941							
[k] Sample Condition on Receipt			Fit for Analysis							
[l] Items required to be tested			As per contract							
[m] Whether any specific Method of Test has been suggested by the party			No.							
[n] Date of receiving the sample			02.10.22							
[o] Analysis Start Date / Analysis Completion Date			02.10.22 / 04.10.22							
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant				
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		67.6				
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		35.0				
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		12.6				
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		31.4				
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.213				
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		2.8				
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		12.7				

Digitally signed by
Shibeshwar Prasad
Date: 2022.11.11
11:53:27 +05'30'

SHIBESHWAR PRASAD

Verified by
Technical Manager



Shreyasee Prasad

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Shreyasee Prasad
Date: 2022.11.11
12:00:46 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/2941(A) Dt. 13.10.2022 Your Work Order No. 4000205097-037-1019 Dt. 31.07.2022				
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
(c) Sample Collected by		SHIVA TEST HOUSE on 01.10.22		
(d) Sampling Location		Collected from Near at the top of DM Plant		
(e) Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
(f) Sampling Environmental Condition		Temp: (°C)	32	Humidity (%)
(g) No. & Type of Container		One poly Jar		
(h) Instrument ID		RDS-3, FPM-3		
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
(j) Sample Code		A-2941		
(k) Sample Condition on Receipt		Fit for Analysis		
(l) Items required to be tested		As per contract		
(m) Whether any specific Method of Test has been suggested by the party		No		
(n) Date of receiving the sample		02.10.22		
(o) Analysis Start Date / Analysis Completion Date		02.10.22 / 04.10.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.227
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.43
5. Nickel as Ni	ng / m ³	20	AAS Method	2.93
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	<0.001

Shiva Test House Karanpura
At: Tandwa Dist: Chatra
Jharkhand- 825 321
Dt: 13.10.2022
For: Shreya Prasad (2022)
HTG Under North Karanpura (2022)

SHIBESHW
AR PRASAD

Digitally signed by
SHIBESHW AR PRASAD
Date: 2022.11.11
11:55:39 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.11
12:01:03 +05'30'
Authorized Signatory
Quality Manager

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Contact us: 122-C, Azadi, Road No. 5A, Padlipada Colony, Patna - 800 013 (Bihar)

Mob: +918676886299 +919431047908

Email:

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Website: www.shivatest.com; www.shivatesthouse.com





SHIVA TEST HOUSE

(Serving since 1988)



TC-10592

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TEST REPORT

Ref No. **STH/TR/22-23/3457** Dt: **16.11.2022** Your Work Order No: **4000285067-037-1019** Dt: **31.07.2022**

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project, At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 19.10.22			
[d] Sampling Location	Collected from Near at the top of DM Plant			
[e] Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	30	Humidity (%)	68
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-3, FPM-3			
[i] Sample Quantity	30 ml x 6 for each (NO _x , SO ₂ , NH ₃)			
[j] Sample Code	A-3457			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	22.10.22			
[o] Analysis Start Date / Analysis Completion Date	22.10.22 / 24.10.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	70.7
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	35.9
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.8
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.4
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.216
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-6)	3.2
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	14.2

Shiva Test House Karanpura
At: Tandwa
Dist: Chatra
Jharkhand- 825 321
Phone: 91867686249, 919431047900
Email: shivatesthouse@gmail.com

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.17
14:59:13 +0530'

Verified by
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.17
16:18:32 +0530'

Authorized Signatory
Quality Manager

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Website: www.shivatesthouse.com www.shivatesthouse.com





SHIVA TEST HOUSE

(Serving since 1988)



TC-10182

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TEST REPORT

Ref. No. STH/IR/22-23/3516 Dt. 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt. 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 27.10.22		
[d] Sampling Location		Collected from Near at the top of DM Plant		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp: (°C)	29	Humidity (%) 68
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-3, FPM-3		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3516		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		28.10.22		
[o] Analysis Start Date / Analysis Completion Date		28.10.22 / 30.10.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	66.4
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	37.6
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.1
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	31.6
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.148
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.1
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.9

Shiveshwar Prasad
General Manager (EHS)
Phone: 93540 40530
Mobile: 93540 40530

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
13:49:03 +05'30'

Verified by
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
13:49:03 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/3516(A) Dt: 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
[a]	Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b]	Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c]	Sample Collected by		SHIVA TEST HOUSE on 27.10.22		
[d]	Sampling Location		Collected from Near at the top of DM Plant		
[e]	Method of Sampling		IS: 11255 (Part-1, 2, 3 & 7)		
[f]	Sampling Environmental Condition		Temp. (°C)	29 Humidity (%) 68	
[g]	No. & Type of Container		One poly Jar		
[h]	Instrument ID		RDS-3, FPM-3		
[i]	Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j]	Sample Code		A-3516		
[k]	Sample Condition on Receipt		Fit for Analysis		
[l]	Items required to be tested		As per contract		
[m]	Whether any specific Method of Test has been suggested by the party		No		
[n]	Date of receiving the sample		28.10.22		
[o]	Analysis Start Date / Analysis Completion Date		28.10.22 / 30.10.22		
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.568
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)		ng / m ³	6	AAS Method	0.60
5. Nickel as Ni		ng / m ³	20	AAS Method	4.44
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA (Method 1631)	< 0.001

SHIBESHWAR PRASAD
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 SHIBESHWAR PRASAD
 Date: 2022.11.16
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SHIBESHWAR
 AR PRASAD

Verified by:
 Technical Manager



Shreyasee
 Prasad

Digitally signed by:
 Shreyasee Prasad
 Date: 2022.11.16
 13:49:16 +05'30'

Authorized Signatory
 Quality Manager

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SHIVA TEST HOUSE

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TC-10532

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TEST REPORT

Ref. No. STH/TR/22-23/3521 Dt: 16.11.2022		Your Work Order No: 4000285067-037-1019 Dt: 31.07.2022			
[a]	Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by	SHIVA TEST HOUSE on 28.10.22			
[d]	Sampling Location	Collected from Near at the top of DM Plant			
[e]	Method of Sampling	IS 11245 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition	Temp: (°C)	29	Humidity (%)	68
[g]	No. & Type of Container	One poly Jar			
[h]	Instrument ID	RDS-3, FPM-3			
[i]	Sample Quantity	30-ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code	A-3521			
[k]	Sample Condition on Receipt	Fit for Analysis			
[l]	Items required to be tested	As per contract			
[m]	Whether any specific Method of Test has been suggested by the party	No			
[n]	Date of receiving the sample	29.10.22			
[o]	Analysis Start Date / Analysis Completion Date	29.10.22 / 31.10.22			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	67.0
2. Particulate Matter (PM _{2.5})		µg / m ³	50	CPCB (GMAAP Vol. I)	38.4
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.5
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	32.3
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.017
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	3.2
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	12.7

Signature of Shreshwar Prasad
 Shreshwar Prasad
 Dy. General Manager (QA/QC)
 Shiva Test House, North Karanpura, Jharkhand-825321

SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2022.11.16 13:47:09 +05'30'

Verified by:
 Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
 Date: 2022.11.16 13:54:02 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. **STH/TR/22-23/3521(A)** Dt.: **16.11.2022** Your Work Order No. **4000285067-037-1019** Dt.: **31.07.2022**

[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 28.10.22		
[d] Sampling Location		Collected from Near at the top of DM Plant		
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	29	Humidity (%) 68
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-3, FPM-3		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3521		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		29.10.22		
[o] Analysis Start Date / Analysis Completion Date		29.10.22 / 31.10.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.796
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.21
5. Nickel as Ni	ng / m ³	20	AAS Method	4.11
6. Mercury (Hg)	µg / m ³	Not Specified	USEPA (Method 10-5)	< 0.001

Digitally signed by
Shibeshwar Prasad
Date: 2022.11.16
13:47:15 +05'30'

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
13:47:15 +05'30'

Verified by
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
13:54:18 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10582

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TEST REPORT

Ref. No. **STH/TR/22-23/3555** Dt. **16.11.2022** Your Work Order No: **4000285067-037-1019** Dt. **31.07.2022**

(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)		
(c) Sample Collected by	SHIVA TEST HOUSE on 01.11.22		
(d) Sampling Location	Collected from Near at the top of Tejasvi Building (Township)		
(e) Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)		
(f) Sampling Environmental Condition	Temp. (°C)	29	Humidity (%) 68
(g) No. & Type of Container	One poly Jar		
(h) Instrument ID	RDS-1, FPM-1		
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
(j) Sample Code	A-3555		
(k) Sample Condition on Receipt	Fit for Analysis		
(l) Items required to be tested	As per contract		
(m) Whether any specific Method of Test has been suggested by the party	No		
(n) Date of receiving the sample	02.11.22		
(o) Analysis Start Date / Analysis Completion Date	02.11.22 / 04.11.22		

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	69.8
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.6
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	11.9
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.0
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.19
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.6
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.5

Digitally signed by
Shreshth Kumar
Date: 2022.11.16
15:18:06 +0530

SHIBESHWAR PRASAD

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
15:22:13 +0530
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STM/TR/22-23/3555(A) Dt: 16.11.2022 Your Work Order No. 4000285087-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chhatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 01.11.22		
[d] Sampling Location		Collected from Near at the top of Tejasvi Building (Township)		
[e] Method of Sampling		IS.11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	29	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-1, FPM-1		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3555		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		02.11.22		
[o] Analysis Start Date / Analysis Completion Date		02.11.22 / 04.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.341
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	µg / m ³	6	AAS Method	0.47
5. Nickel as Ni	ng / m ³	20	AAS Method	2.86
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.43

CPA
Dr. Shreyasee Prasad / Sanjay Kumar
Dr. Shreyasee Prasad (CPA)
Dr. Shreyasee Prasad (CPA)
Dr. Shreyasee Prasad (CPA)
Dr. Shreyasee Prasad (CPA)

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
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Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
15:22:25 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10512

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TEST REPORT

Ref. No: STH/TR/22-23/3573	Dr: 16.11.2022	Your Work Order No: 4000285067-037-1019	Dt: 31.07.2022
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)		
(c) Sample Collected by	SHIVA TEST HOUSE on 02.11.22		
(d) Sampling Location	Collected from Near at the top of Tejaswini Building (Township)		
(e) Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)		
(f) Sampling Environmental Condition	Temp: (°C)	27	Humidity (%) 69
(g) No. & Type of Container	One poly Jar		
(h) Instrument ID	RDS-1, FPM-1		
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
(j) Sample Code	A-3573		
(k) Sample Condition on Receipt	Fit for Analysis		
(l) Items required to be tested	As per contract		
(m) Whether any specific Method of Test has been suggested by the party	No		
(n) Date of receiving the sample	03.11.22		
(o) Analysis Start Date / Analysis Completion Date	03.11.22 / 05.11.22		

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswini Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	69.4
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.9
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.6
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.6
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.11
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.7
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	15.3

Digitally signed by
Shreshwar Kumar
By: Shreshwar Kumar (P) 10/11/22
Date: 2022.11.16
15:20:08 +05'30'

**SHRESHWAR
KUMAR PRASAD**

Verified by:
Technical Manager



**Shreyasee
Prasad**

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
15:26:33 +05'30'
Authorized Signatory
Quality Manager

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Website: www.shivatest.com, www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)

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TEST REPORT

Ref. No: STH/TR/22-23/3573(A) Dt: 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 02.11.22		
[d] Sampling Location		Collected from Near at the top of Tejasvi Building (Township)		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	27	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-1, FPM-1		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3573		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		03.11.22		
[o] Analysis Start Date / Analysis Completion Date		03.11.22 / 05.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.455
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.28
5. Nickel as Ni	ng / m ³	20	AAS Method	5.68
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.16

Digitally signed by
Shibeshwar Kumar
By General Manager (B&C)
MPC Limited, North Karanpura, Jharkhand

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
15:20:22 +05'30'

Verified by
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
15:26:57 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3825(A) Dt: 06.12.2022 Your Work Order No. 4000285067-037-4019 Dt: 31.07.2022				
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 08.11.22			
(d) Sampling Location	Collected from Near at the top of Tejaswini Building (Township)			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	28	Humidity (%)	67
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-1, FPM-1			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-3825			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	09.11.22			
(o) Analysis Start Date / Analysis Completion Date	09.11.22 / 11.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswini Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.796
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.26
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.15
4. Arsenic (As)	ng / m ³	8	AAS Method	0.43
Nickel as Ni	ng / m ³	20	AAS Method	8.53
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.33

Shiva Test House
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SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2022.12.07
15:30:51 +05'30'

Verified by
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:37:11 +05'30'
Authorized Signatory
Quality Manager

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TC-10042

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TEST REPORT

Ref. No. STH/TR/22-23/3830 Dt: 06.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a]	Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321	
[b]	Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)	
[c]	Sample Collected by		SHIVA TEST HOUSE on 09.11.22	
[d]	Sampling Location		Collected from Near at the top of Tejaswi Building (Township)	
[e]	Method of Sampling		IS 11255 (Part-1,2,3 & 7)	
[f]	Sampling Environmental Condition		Temp: (°C)	29 Humidity (%) 66
[g]	No. & Type of Container		One poly Jar	
[h]	Instrument ID		RDS-4, FPM-4	
[i]	Sample Quantity		30-ml x 6 for each (NO ₂ , SO ₂ , NH ₃)	
[j]	Sample Code		A-3830	
[k]	Sample Condition on Receipt		Fit for Analysis	
[l]	Items required to be tested		As per contract	
[m]	Whether any specific Method of Test has been suggested by the party		No	
[n]	Date of receiving the sample		11.11.22	
[o]	Analysis Start Date / Analysis Completion Date		11.11.22 / 13.11.22	
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswi Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.4
2. Particulate Matter (PM _{2.5})	µg / m ³	60	OPCB (GMAAP Vol. I)	39.5
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.4
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.7
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.20
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.9
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.7

Shiveshwar Prasad
General Manager (EMO)
Patna, Bihar, India
Mobile: 919431047908
Email: shiva@shivatest.com

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2022.12.07
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Verified by:
Technical Manager



Shreyasee Prasad

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Shreyasee Prasad
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3830(A) Dt: 06.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 09.11.22		
[d] Sampling Location		Collected from Near at the top of Tejasvi Building (Township)		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	29	Humidity (%) 66
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-4, FPM-4		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3830		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		11.11.22		
[o] Analysis Start Date / Analysis Completion Date		11.11.22 / 13.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.23
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.10
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.46
* Nickel as Ni	ng / m ³	20	AAS Method	1.43
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.39

SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2022.12.07
15:32:38 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.12.07
15:44:05 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3883 Dt: 06.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on: 15.11.22			
[d] Sampling Location	Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	26	Humidity (%)	62
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-3883			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	16.11.22			
[o] Analysis Start Date / Analysis Completion Date	16.11.22 / 18.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	72.0
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.9
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.9
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.3
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.19
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.2
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.1

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2022.12.07
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Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3883(A) Dt: 06.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 16.11.22		
[d] Sampling Location		Collected from Near at the top of Tejasvi Building (Township)		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	26	Humidity (%) 62
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-4, FPM-4		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3883		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		16.11.22		
[o] Analysis Start Date / Analysis Completion Date		16.11.22 / 18.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.09
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.45
5. Nickel as Ni	ng / m ³	20	AAS Method	2.86
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.36

Shyama

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2022.12.07
15:46:50 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:51:04 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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RC-10542

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TEST REPORT

Ref. No. STH/TR/22-23/3907 Dt. 06.12.2022 Your Work Order No. 4000285067-037-1019 Dt. 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 16.11.22		
[d] Sampling Location		Collected from Near at the top of Tejasvi Building (Township)		
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	26	Humidity (%) 88
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-1, FPM-1		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3907		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		17.11.22		
[o] Analysis Start Date / Analysis Completion Date		17.11.22 / 19.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	68.2
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	33.8
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.2
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.2
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.18
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.3
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.6

SHIBESHW
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SHIBESHW AR PRASAD
Date: 2022.12.07
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Verified by :
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:58:12 +05'30'

Authorized Signatory
Quality Manager

END OF TEST REPORT

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Contact us : 122-C1 Asha, Road No. 5A, Patliputra Colony, Patna - 800 013 (Bihar)
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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/3907(A) Dt : 06.12.2022 Your Work Order No. 4000285047-037-1019 Dt : 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 16.11.22		
[d] Sampling Location		Collected from Near at the top of Tejasvi Building (Township)		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	26	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-1, FPM-1		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A3907		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		17.11.22		
[o] Analysis Start Date / Analysis Completion Date		17.11.22 / 19.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.455
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.18
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.15
4. Arsenic (As)	ng / m ³	6	AAS Method	1.99
5. Nickel as Ni	ng / m ³	20	AAS Method	7.10
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 16-31)	0.49



SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2022.12.07
15:48:42 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

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Date: 2022.12.07
15:53:29 +05'30'

Authorized Signatory
Quality Manager

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 Website : www.shivatest.com : www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC-1682

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TEST REPORT

Ref. No. STH/TR/22-23/4282		Dt : 06.12.2022		Your Work Order No : 4000285067-037-1019		Dt : 31.07.2022	
(a)	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b)	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
(c)	Sample Collected by			SHIVA TEST HOUSE on 26.11.22			
(d)	Sampling Location			Collected from Near at the top of Tejasvi Building (Township)			
(e)	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
(f)	Sampling Environmental Condition			Temp. (°C)	25	Humidity (%)	70
(g)	No. & Type of Container			One poly Jar			
(h)	Instrument ID			RDS-1, FPM-1			
(i)	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j)	Sample Code			A-4282			
(k)	Sample Condition on Receipt			Fit for Analysis			
(l)	Items required to be tested			As per contract			
(m)	Whether any specific Method of Test has been suggested by the party			No			
(n)	Date of receiving the sample			28.11.22			
(o)	Analysis Start Date / Analysis Completion Date			28.11.22 / 30.11.22			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result	
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		Near at the top of Tejasvi Building (Township) 72.3	
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		36.3	
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		14.7	
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		34.1	
4. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.19	
5. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		5.1	
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		17.4	

SHIBESHWAR PRASAD

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Date: 2022.12.07
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Verified by
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.12.07
16:00:32 +05'30'
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Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/4282(A)	Date: 06.12.2022	Your Work Order No. 4000286067-037-1019	Date: 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 26.11.22		
[d] Sampling Location		Collected from Near at the top of Tejasvi Building (Township)		
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	25 Humidity (%) 70	
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-1, FPM-1		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-4282		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		28.11.22		
[o] Analysis Start Date / Analysis Completion Date		28.11.22 / 30.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.45
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.08
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17
4. Arsenic (As)	ng / m ³	6	AAS Method	0.61
5. Nickel as Ni	ng / m ³	20	AAS Method	1.42
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.20

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2022.12.07 15:56:29 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2022.12.07 16:00:45 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10002

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TEST REPORT

Ref. No. STH/TR/22-23/4303		Dt. 06.12.2022		Your Work Order No. 4000288067-037-1019		Dt. 31.07.2022		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by				SHIVA TEST HOUSE on 27.11.22				
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)				
[e] Method of Sampling				IS 11255 (Part-1, 3 & 7)				
[f] Sampling Environmental Condition				Temp. (°C)		26	Humidity (%)	63
[g] No. & Type of Container				One poly Jar				
[h] Instrument ID				RDS-1, FPM-1				
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code				A-4303				
[k] Sample Condition on Receipt				Fit for Analysis				
[l] Items required to be tested				As per contract				
[m] Whether any specific Method of Test has been suggested by the party				No				
[n] Date of receiving the sample				28.11.22				
[o] Analysis Start Date / Analysis Completion Date				28.11.22 / 30.11.22				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)				
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.5				
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	37.6				
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.0				
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.7				
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.20				
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.1				
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.6				

SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2022.12.07
15:56:28 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.12.07
16:04:52 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. SIH/TR/22-23/4303(A) Dt: 06.12.2022 Your Work Order No. 4000285067-037-5010 Dt: 31.07.2022				
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project. At: Tandiwa Dist- Chatra Jharkhand- 825 321		
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
(c) Sample Collected by		SHIVA TEST HOUSE on 27.11.22		
(d) Sampling Location		Collected from Near at the top of Tejasvi Building (Township)		
(e) Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
(f) Sampling Environmental Condition		Temp. (°C)	25	Humidity (%)
(g) No. & Type of Container		One poly Jar		
(h) Instrument ID		RDS-1, FPM-1		
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
(j) Sample Code		A-4303		
(k) Sample Condition on Receipt		Fit for Analysis		
(l) Items required to be tested		As per contract		
(m) Whether any specific Method of Test has been suggested by the party		No		
(n) Date of receiving the sample		28.11.22		
(o) Analysis Start Date / Analysis Completion Date		28.11.22 / 30.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.10
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.83
Nickel as Ni	µg / m ³	20	AAS Method	2.84
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.23

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2022.12.07
15:58:41 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
16:05:12 +05'30'
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Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STM/TR/22-23/3552 Dt: 16.11.2022 Your Work Order No: 4000285067-037-1010 Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandiwa Dist: Chhota Jharkhand- 825 321
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)
[c] Sample Collected by	SHIVA TEST HOUSE on 01.11.22
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)
[e] Method of Sampling	IS 11255 (Part 1, 2, 3 & 7)
[f] Sampling Environmental Condition	Temp. (°C) 29 Humidity (%) 68
[g] No. & Type of Container	One poly jar
[h] Instrument ID	RDS-2, FPM-2
[i] Sample Quantity	30 ml x 6 for each (NO _x , SO _x , NH ₃)
[j] Sample Code	A-3552
[k] Sample Condition on Receipt	Fit for Analysis
[l] Items required to be tested	As per contract
[m] Whether any specific Method of Test has been suggested by the party	No
[n] Date of receiving the sample	02.11.22
[o] Analysis Start Date / Analysis Completion Date	02.11.22 / 04.11.22

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	66.3
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	33.8
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.7
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.1
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.22
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.2
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	15.0

Shri. Shri. Shri. Kumar
Dy. General Manager (E&E)
PCCB, Bhubaneswar, Odisha- 751001
15:16:41 +05:30

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2022.11.16 15:16:41 +05:30

Verified by:
Technical Manager



Shreyasee Prasad

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Date: 2022.11.16 15:20:55 +05:30

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. **STH/TR/22-23/3552(A)** Dt: **16.11.2022** Your Work Order No. **4000285047-037-1019** Dt: **31.07.2022**

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tardwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 01.11.22			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%)	68
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-2, FPM-2			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-3552			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	02.11.22			
[o] Analysis Start Date / Analysis Completion Date	02.11.22 / 04.11.22			

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.227
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.79
5. Nickel as Ni	ng / m ³	20	AAS Method	2.80
6. Mercury (Hg)	µg / m ³	Not Specified	USEPA (Method 10-5)	0.25

Shri. SHIBESHWAR PRASAD
General Manager (Chemical)
North Karanpura Super Thermal Power Project
Chatra, Jharkhand - 825 321

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
15:16:55 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

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Shreyasee Prasad
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Quality Manager

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SHIVA TEST HOUSE

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TC-10002

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TEST REPORT

Ref. No. STH/TR/22-23/3570 Dt: 16.11.2022 Your Work Order No: 4000286067-037-1019 Dt: 31.07.2022					
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by		SHIVA TEST HOUSE on 02.11.22			
(d) Sampling Location		Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition		Temp: (°C)	27	Humidity (%)	69
(g) No. & Type of Container		One poly Jar			
(h) Instrument ID		RDS-2, FPM-2			
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code		A-3570			
(k) Sample Condition on Receipt		Fit for Analysis			
(l) Items required to be tested		As per contract			
(m) Whether any specific Method of Test has been suggested by the party		No.			
(n) Date of receiving the sample		03.11.22			
(o) Analysis Start Date / Analysis Completion Date		03.11.22 / 05.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.0	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.6	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.8	
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.8	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.17	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.4	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	25.1	

Digitally signed by
SHIBESHVAR PRASAD
Date: 2022.11.16
15:18:46 +05'30'

Verified by
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3570(A) Dt: 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by...		SHIVA TEST HOUSE on 02.11.22		
[d] Sampling Location		Collected from Near at the top of Time Office (Main Plant)		
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition		Temp: (°C)	27	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-2, FPM-2		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3570		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		03.11.22		
[o] Analysis Start Date / Analysis Completion Date		03.11.22 / 05.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 6182 (Part-10)	0.179
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	1.29
5. Nickel as Ni	ng / m ³	20	AAS Method	9.79
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.91

Dr. Shreyasee Prasad
General Manager (Env)
Mobile: 9867686249
Email: shreyasee@shivatest.com

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SHIBESHWAR PRASAD
Date: 2022.11.16
15:19:01 +05'30'



Shreyasee Prasad

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Date: 2022.11.16 15:23:07 +05'30'

Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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Contact us: 132-C, Aastha Road No. 5A, Pallipatra Colony, Patna - 800 011 (Bihar)
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SHIVA TEST HOUSE

(Serving since 1988)



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TEST REPORT

Ref. No. STH/TR/22-23/3822		Dt. 06.12.2022		Your Work Order No. 4000285067-037-1618		Dt. 31.07.2022	
(a)	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321			
(b)	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
(c)	Sample Collected by			SHIVA TEST HOUSE on 08.11.22			
(d)	Sampling Location			Collected from Near at the top of Time Office (Main Plant)			
(e)	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
(f)	Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	67
(g)	No. & Type of Container			One poly Jar			
(h)	Instrument ID			RDS-2, FPM-2			
(i)	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j)	Sample Code			A-3822			
(k)	Sample Condition on Receipt			Fit for Analysis			
(l)	Items required to be tested			As per contract			
(m)	Whether any specific Method of Test has been suggested by the party			No			
(n)	Date of receiving the sample			09.11.22			
(o)	Analysis Start Date / Analysis Completion Date			09.11.22 / 11.11.22			
Parameters	Unit	Limit as per NAAQS 2008	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.0			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	37.1			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.8			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.8			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.18			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.4			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	25.1			

Shri. Sanjay Kumar
General Manager (R&D)
Tandwa Plant, North Karanpura, Jharkhand

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2022.12.07
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Verified by:
Technical Manager



Shreyasee Prasad

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Shreyasee Prasad
Date: 2022.12.07
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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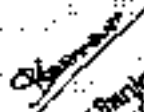
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TEST REPORT

Ref. No. **STH/TR/22-23/3822 (A)** Dt: **06.12.2022** Your Work Order No. **4000285087-037-1019** Dt: **31.07.2022**

(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Taridwa Dist- Chatra Jharkhand- 825 321
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)
(c) Sample Collected by	SHIVA TEST HOUSE on 08.11.22
(d) Sampling Location	Collected from Near at the top of Time Office (Main Plant)
(e) Method of Sampling	IS 11253 (Part-1,2,3 & 7)
(f) Sampling Environmental Condition	Temp. (°C) 26 Humidity (%) 67
(g) No. & Type of Container	One poly Jar
(h) Instrument ID	RDS-2, FPM-2
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)
(j) Sample Code	A-3822
(k) Sample Condition on Receipt	Fit for Analysis
(l) Items required to be tested	As per contract
(m) Whether any specific Method of Test has been suggested by the party	No
(n) Date of receiving the sample	09.11.22
(o) Analysis Start Date/ Analysis Completion Date	09.11.22 / 11.11.22

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.568
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.35
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.22
4. Arsenic (As)	ng / m ³	6	AAS Method	0.13
Nickel as Ni	ng / m ³	20	AAS Method	6.99
5. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.09


 Mr. Ar Prasad / Shreyasee Kumar
 are responsible for the test
 City General Manager (EMO)
 Bihar State Pollution Control Board
 Patna, Bihar, India
 Mobile: 919431047908
 Email: shivam@shiva-test.com

AR PRASAD

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 AR PRASAD
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Verified by:
 Technical Manager



Shreyasee Prasad

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 Date: 2022.12.07
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Authorized Signatory
 Quality Manager

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SHIVA TEST HOUSE

(Serving since 1985)



PC-40482

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TEST REPORT

Ref. No. STH/TR/22-23/3827 Dt: 06.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022

(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)
(c) Sample Collected by	SHIVA TEST HOUSE on 09.11.22
(d) Sampling Location	Collected from Near at the top of Time Office (Main Plant)
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)
(f) Sampling Environmental Condition	Temp. (°C) 29 Humidity (%) 86
(g) No. & Type of Container	One poly Jar
(h) Instrument ID	RDS-1, FPM-1
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)
(j) Sample Code	A-3827
(k) Sample Condition on Receipt	Fit for Analysis
(l) Items required to be tested	As per contract
(m) Whether any specific Method of Test has been suggested by the party	No
(n) Date of receiving the sample	11.11.22
(o) Analysis Start Date / Analysis Completion Date	11.11.22 / 13.11.22

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.3
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. II)	35.1
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.2
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.8
4. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.20
5. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.9
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	16.8

Dy. General Manager (QM)
 Shiva Test House
 Patna, Bihar - 800013
 Mob: 919431047906

SHREYASEE
AR PRASAD

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Shreyasee
Prasad

Digitally signed by
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 Authorized Signatory
 Quality Manager

Verified by
 Technical Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3827(A) Dt: 06.12.2022 Your Work Order No. 4000285067-037-1010 Dt: 31.07.2022				
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Taridwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 09.11.22			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%)	66
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-1, FPM-1			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-3827			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	11.11.22			
[o] Analysis Start Date / Analysis Completion Date	11.11.22 / 13.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.341
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.07
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16
4. Arsenic (As)	ng / m ³	6	AAS Method	0.83
Nickel as Ni	ng / m ³	20	AAS Method	2.84
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.22

Digitally signed by
Shyama Kumar
Oy. General Manager (E&O)
Mobile: 98361, 981 80070- 825321
NREG Unit, North Karanpura, Jharkhand

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.07
15:31:28 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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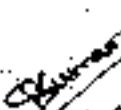
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TEST REPORT

Ref. No. **STH/TR/22-23/3880(A)** Dt: **06.12.2022** Your Work Order No. **4000285067-037-1019** Dt: **31.07.2022**

(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandiwa Dist- Chatra Jharkhand- 825 321
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)
(c) Sample Collected by	SHIVA TEST HOUSE on 15.11.22
(d) Sampling Location	Collected from Near at the top of Time Office (Main Plant)
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)
(f) Sampling Environmental Condition	Temp. (°C) 26 Humidity (%) 62
(g) No. & Type of Container	One poly Jar
(h) Instrument ID	RDS-1, FPM-1
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)
(j) Sample Code	A-3680
(k) Sample Condition on Receipt	Fit for Analysis
(l) Items required to be tested	As per contract
(m) Whether any specific Method of Test has been suggested by the party	No
(n) Date of receiving the sample	16.11.22
(o) Analysis Start Date / Analysis Completion Date	16.11.22 / 18.11.22

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.227
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.08
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17
4. Arsenic (As)	ng / m ³	6	AAS Method	0.60
5. Nickel as Ni	ng / m ³	20	AAS Method	1.42
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.19


 Mr. Shiveshwar Prasad
 Dy. General Manager (QA/QC)
 Shiva Test House
 122-C, Ashta Road, North Karanpura 825321

SHIBESHWAR PRASAD

Verified by:
Technical Manager

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Shreyasee Prasad

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 Quality Manager

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SHIVA TEST HOUSE

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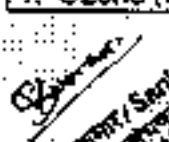
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TEST REPORT

Ref. No: STH/TR/22-23/3904 Dt: 06.12.2022 Your Work Order No: 4000285087-037-1018 Dt: 31.07.2022

(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 16.11.22			
(d) Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	26	Humidity (%)	68
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-2, FPM-2			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-3904			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	17.11.22			
(o) Analysis Start Date / Analysis Completion Date	17.11.22 / 18.11.22			

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.2
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.6
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.9
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.8
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.14
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.0
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	26.4


 Shreyasee Prasad
 Dy. General Manager (EMO)
 Industrial Estate, North Karanpura-825321
 Jharkhand

SHIBESHWAR PRASAD

Digitally signed by
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Verified by :
 Technical Manager



Shreyasee Prasad

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 Quality Manager

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TEST REPORT

Ref. No. **STH/TR/22-23/3904(A)** Dt: **06.12.2022** Your Work Order No. **4000285067-037-1019** Dt: **31.07.2022**

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by	SHIVA TEST HOUSE on 16.11.22		
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)		
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition	Temp. (°C)	26	Humidity (%) 68
[g] No. & Type of Container	One poly Jar		
[h] Instrument ID	RDS-2, FPM-2		
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code	A-3904		
[k] Sample Condition on Receipt	Fit for Analysis		
[l] Items required to be tested	As per contract		
[m] Whether any specific Method of Test has been suggested by the party	No		
[n] Date of receiving the sample	17.11.22		
[o] Analysis Start Date / Analysis Completion Date	17.11.22 / 19.11.22		

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result
				Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.455
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.18
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17
4. Arsenic (As)	ng / m ³	6	AAS Method	1.15
5. Nickel as Ni	ng / m ³	20	AAS Method	5.59
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.33

SHIBESHWAR PRASAD
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SHIBESHWAR PRASAD

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Technical Manager

Digitally signed by
SHIBESHWAR PRASAD
 Date: 2022.12.07
 15:47:25 +05'30'



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
 Date: 2022.12.07
 15:51:49 +05'30'
 Authorized Signatory
 Quality Manager

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 Mob.: +919431047908, +919431047909 Email: shivatesthouse@gmail.com, info@shivatesthouse.com
 Website: www.shivatesthouse.com, www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



FC-10612

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TEST REPORT

Ref. No. STH/TR/22-23/4279 Dt. 06.12.2022 Your Work Order No. 4000285087-037-1019 Dt. 31.07.2022				
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 26.11.22			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	25	Humidity (%)	70
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-1, FPM-1			
[i] Sample Quantity	30 ml x 8 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-4279			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	28.11.22			
[o] Analysis Start Date / Analysis Completion Date	28.11.22 / 30.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.3
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	40.0
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.7
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	37.6
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.09
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.8
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.0

Digitally signed by
SHIVESHWAR PRASAD
Date: 2022.12.07
15:54:49 +05'30'

SHIVESHWAR PRASAD
General Manager (QA/QC)
SHIVA TEST HOUSE
112-C, Ashta Road No. 5A, Pallipura Colony, Patna - 800 013 (Bihar)



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:59:10 +05'30'

Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/4279(A) Dt: 06.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandiya Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 26.11.22			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	25	Humidity (%)	70
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-2, FPM-2			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-4279			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	28.11.22			
[o] Analysis Start Date / Analysis Completion Date:	28.11.22 / 30.11.22			

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.341
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.63
Nickel as Ni	ng / m ³	20	AAS Method	2.80
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.50

Digitally signed by
Shibeshwar Prasad
Dt: 2022.12.07
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SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.07
19:55:02+05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:59:24+05'30'
Authorized Signatory
Quality Manager

— END OF TEST REPORT —

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 Website: www.shivatest.com ; www.shivahouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC-10582

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TEST REPORT

Ref. No. STH/TR/22-23/4309		Dt: 06.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2023	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 27.11.22			
[d] Sampling Location				Collected from Neta at the top of Time Office (Main Plant)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	26	Humidity (%)	63
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-2, FPM-2			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-4300			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				28.11.22			
[o] Analysis Start Date / Analysis Completion Date				28.11.22 / 30.11.22			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	73.0		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	40.9		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.4		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	37.6		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.10		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	5.5		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	21.6		

Shreyasee Sanjay Kumar
Off. Representative of the party
By General Manager (E&E)
Shri. B. B. Singh, 2022-12-07
15:57:14 +05'30'

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.07
15:57:14 +05'30'

Verified by
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
16:01:34 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4300(A)	On 06.12.2022	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 27.11.22			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	26	Humidity (%) 63	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-2, FPM-2			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-4300			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	28.11.22			
[o] Analysis Start Date / Analysis Completion Date	28.11.22 / 30.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.09
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17
4. Arsenic (As)	ng / m ³	6	AAS Method	0.46
Nickel as Ni	ng / m ³	20	AAS Method	1.40
5. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.54

Shibeshwar Kumar
General Manager (EMO)
Water Board, North Karanpura-825021

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.07
15:57:26 +0530'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
16:01:50 +0530'
Authorized Signatory
Quality Manager

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Website: www.shivatest.com : www.shivatesthouse.com



SHIVA TEST HOUSE

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TC-10092

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TEST REPORT

Ref. No: STH/TR/22-23/3554 Dt: 16.11.2022 Your Work Order No: 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 01.11.22			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%)	68
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO _x , SO ₂ , NH ₃)			
[j] Sample Code	A-3554			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	02.11.22			
[o] Analysis Start Date / Analysis Completion Date	02.11.22 / 04.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	68.5
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	34.8
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.0
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-3)	32.3
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.241
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.0
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	12.7

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
15:17:40 +05'30'

Verified by
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
15:21:47 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/3554(A) Dt: 16.11.2022 Your Work Order No. 4000285087-037-1019 Dt: 31.07.2022					
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on: 01.11.22			
[d] Sampling Location		Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp: (°C)	29	Humidity (%)	68
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-4, FPM-4			
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-3554			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		02.11.22			
[o] Analysis Start Date / Analysis Completion Date		02.11.22 / 04.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building	
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.341	
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0	
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0	
4. Arsenic (As)	ng / m ³	6	AAS Method	0.53	
5. Nickel as Ni	ng / m ³	20	AAS Method	5.87	
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 80-S)	0.62	

Shiva Test House
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SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
15:17:54 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
15:22:00 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



TC-10582

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TEST REPORT

Ref. No: STH/TR/22-23/3572 Dt: 16.11.2022 Your Work Order No: 4000285067-037-1018 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on: 02.11.22		
[d] Sampling Location		Collected from Near at the top of Switch Yard Office Building		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	21	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-4, FPM-4		
[i] Sample Quantity		30 ml x 6 for each (NO _x , SO ₂ , NH ₃)		
[j] Sample Code		A-3572		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		03.11.22		
[o] Analysis Start Date / Analysis Completion Date		03.11.22 / 05.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	70.7
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	36.1
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.2
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	31.8
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.11
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.1
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.2

Shri. Shyamsunder Kumar
Technical Manager (Env.)
Shri. Shyamsunder Kumar
Technical Manager (Env.)
Shri. Shyamsunder Kumar
Technical Manager (Env.)

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
15:19:43 +05'30'

Verified by:
Technical Manager



Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
15:25:53 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No: STH/TR/22-23/3572(A) Dt: 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 02.11.22			
(d) Sampling Location	Collected from Near at the top of Switch Yard Office Building			
(e) Method of Sampling	IS:11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	27	Humidity (%)	89
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-4, FPM-4			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-3572			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	03.11.22			
(o) Analysis Start Date / Analysis Completion Date	03.11.22 / 05.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.227
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.29
5. Nickel as Ni	ng / m ³	20	AAS Method	2.86
6. Mercury (Hg)	µg / m ³	Not Specified	USEPA (Method 10-5)	0.41

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
15:19:57 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.11.16
15:26:12 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



TC-10032

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TEST REPORT

Ref. No: STH/TR/22-23/8824 Dt: 06.12.2022 Your Work Order No: 4000285067-037-10/9 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand - 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 08.11.22		
[d] Sampling Location		Collected from Near at the top of Switch Yard Office Building		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	26	Humidity (%) 67
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-4, FPM-4		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		4-3824		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		09.11.22		
[o] Analysis Start Date / Analysis Completion Date		09.11.22 / 11.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.8
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	37.4
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.0
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.0
4. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.14
5. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.6
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	15.5

SHIVA TEST HOUSE
General Manager (EMG)
Digitally signed by:
SHRISHAWAN PRASAD
Date: 2022.12.07
15:26:12 +05:30

SHRISHAWAN PRASAD
Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by:
Shreyasee Prasad
Date: 2022.12.07
15:56:28 +05:30
Authorized Signatory
Quality Manager

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 Website: www.shivatest.com, www.shivatesthouse.com



SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/3824(A) Dt: 16.11.2022 Your Work Order No: 4000286087-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 08.11.22			
[d] Sampling Location	Collected from: Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp: (°C)	28	Humidity (%)	67
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-3824			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	09.11.22			
[o] Analysis Start Date / Analysis Completion Date	09.11.22 / 11.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.08
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.15
4. Arsenic (As)	ng / m ³	6	AAS Method	0.36
Nickel as Ni	ng / m ³	20	AAS Method	5.73
5. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.58

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.07
15:30:24 +05'30'

SHIBESHWAR PRASAD
General Manager (QA/QC)
SHIVA TEST HOUSE



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:36:42 +05'30'

Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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 Website: www.shivatest.com www.shivatesthouse.com



SHIVA TEST HOUSE

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PC-10882

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TEST REPORT

Ref. No: STH/TR/22-23/3829 Dt: 06.12.2022 Your Work Order No: 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 09.11.22			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%)	66
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-3, FPM-3			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-3829			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	11.11.22			
[o] Analysis Start Date / Analysis Completion Date	11.11.22 / 13.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	69.0
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	36.9
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.1
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.4
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.22
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.8
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	13.3

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.07
15:32:03 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by:
Shreyasee Prasad
Date: 2022.12.07
15:39:33 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3829(A) Dt: 06.12.2022 Your Work Order No: 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 09.11.22			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%)	66
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-3, FPM-3			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-3829			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	11.11.22			
[o] Analysis Start Date / Analysis Completion Date	11.11.22 / 13.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.455
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.12
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16
4. Arsenic (As)	ng / m ³	6	AAS Method	0.50
5. Nickel as Ni	ng / m ³	20	AAS Method	4.40
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.59

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.07
15:32:15 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:39:52 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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PC-10882

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TEST REPORT

Ref. No: STH/TR/22-23/3882 Dt: 06.12.2022 Your Work Order No: 4000285067-037-1019 Dt: 31.07.2022

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)
[c] Sample Collected by	SHIVA TEST HOUSE on 15.11.22
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building
[e] Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)
[f] Sampling Environmental Condition	Temp. (°C) 26 Humidity (%) 62
[g] No. & Type of Container	One poly Jar
[h] Instrument ID	RDS-3, FPM-3
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)
[j] Sample Code	A-3882
[k] Sample Condition on Receipt	Fit for Analysis
[l] Items required to be tested	As per contract
[m] Whether any specific Method of Test has been suggested by the party	No
[n] Date of receiving the sample	16.11.22
[o] Analysis Start Date / Analysis Completion Date	16.11.22 / 18.11.22

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	69.6
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	36.3
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.6
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.8
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.202
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.1
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	13.9

Digitally signed by
SHREESHAN PRASAD
Date: 2022.12.07
15:46:12 +05'30'

SHREESHAN PRASAD

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:50:24 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. **STH/TR/22-23/3882(A)** Dt: **06.12.2022** Your Work Order No. **4000285047-037-1019** Dt: **31.07.202**

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by	SHIVA TEST HOUSE on 15.11.22		
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building		
[e] Method of Sampling	IS 11253 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition	Temp. (°C)	26	Humidity (%) 62
[g] No. & Type of Container	One poly Jar		
[h] Instrument ID	RDS-3, FPM-3		
[i] Sample Quantity	30 ml. x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code	A-3882		
[k] Sample Condition on Receipt	Fit for Analysis		
[l] Items required to be tested	As per contract		
[m] Whether any specific Method of Test has been suggested by the party	No		
[n] Date of receiving the sample	16.11.22		
[o] Analysis Start Date / Analysis Completion Date	16.11.22 / 18.11.22		

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.341
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.14
4. Arsenic (As)	ng / m ³	6	AAS Method	0.43
5. Nickel as Ni	ng / m ³	20	AAS Method	1.47
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.55

Digitally signed by
SHREYASEE PRASAD
Date: 2022.12.07
15:46:24 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:50:37 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/3906 Dt: 06.12.2022 Your Work Order No. 4000285067-037-1010 Dt: 31.07.2022				
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chahta Jharkhand- 825 321		
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
(c) Sample Collected by:		SHIVA TEST HOUSE on 16.11.22		
(d) Sampling Location		Collected from Near at the top of Switch Yard Office Building		
(e) Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
(f) Sampling Environmental Condition		Temp. (°C)	26	Humidity (%) 68
(g) No. & Type of Container		One poly Jar		
(h) Instrument ID		RDS-4, FPM-4		
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
(j) Sample Code		A-3906		
(k) Sample Condition on Receipt		Fit for Analysis		
(l) Items required to be tested		As per contract		
(m) Whether any specific Method of Test has been suggested by the party		No		
(n) Date of receiving the sample		17.11.22		
(o) Analysis Start Date / Analysis Completion Date		17.11.22 / 19.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.2
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.2
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.2
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.4
6. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.07
8. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.6
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.5

Digitally signed by
SHREYASEE PRASAD
Date: 2022.12.07
15:48:02 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:52:40 +05'30'
Authorized Signatory
Quality Manager

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Website: www.shivatest.com : www.shivatesthouse.com



SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/3906(A) Dt: 06.12.2022 Your Work Order No. 4000285087-037-1019 Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Taridwa Dist- Chhatra Jharkhand- 825 321
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)
[c] Sample Collected by	SHIVA TEST HOUSE on 16.11.22
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)
[f] Sampling Environmental Condition	Temp. (°C) 26 Humidity (%) 68
[g] No. & Type of Container	One poly Jar
[h] Instrument ID	RDS-4, FPM-4
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)
[j] Sample Code	A-3906
[k] Sample Condition on Receipt	Fit for Analysis
[l] Items required to be tested	As per contract
[m] Whether any specific Method of Test has been suggested by the party	No
[n] Date of receiving the sample	17.11.22
[o] Analysis Start Date / Analysis Completion Date	17.11.22 / 19.11.22

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.06
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19
4. Arsenic (As)	ng / m ³	6	AAS Method	0.36
Nickel as Ni	ng / m ³	20	AAS Method	4.30
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA Method 1631	0.33

SHIBESHWAR PRASAD
General Manager (EMG)
NCT Limited, North Karanpura, Jharkhand

SHIBESHWAR PRASAD

Verified by
Technical Manager

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SHIBESHWAR PRASAD
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15:48:13 +05'30'



Shreyasee Prasad

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Shreyasee Prasad
Date: 2022.12.07
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



PL-10082

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TEST REPORT

Ref No. STH/TR/22-23/4281	Da: 06.12.2022	Your Work Order No. 4000285047-037-1010	Di: 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by	SHIVA TEST HOUSE on 26.11.22		
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building		
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition	Temp. (°C)	25	Humidity (%) 70
[g] No. & Type of Container	One poly Jar		
[h] Instrument ID	BDS-4, FPM-4		
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code	A-4281		
[k] Sample Condition on Receipt	Fk for Analysis		
[l] Items required to be tested	As per contract		
[m] Whether any specific Method of Test has been suggested by the party	No		
[n] Date of receiving the sample	28.11.22		
[o] Analysis Start Date / Analysis Completion Date	28.11.22 / 30.11.22		

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.7
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	40.3
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.9
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.6
4. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.19
5. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-6)	4.3
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.5

Digitally signed by
SHIVESHVAR PRASAD
Date: 2022.12.07
15:55:35 +05'30'

Verified by
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
16:00:01 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No: STH/TR/22-23/4281(A)		Dt: 06.12.2022		Your Work Order No: 4000285067-037-1010		Dt: 31.07.2022		
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand-825 321				
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
(c) Sample Collected by				SHIVA TEST HOUSE on 26.11.22				
(d) Sampling Location				Collected from Near at the top of Switch Yard Office Building				
(e) Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)				
(f) Sampling Environmental Condition				Temp. (°C)		25	Humidity (%)	70
(g) No. & Type of Container				One poly Jar				
(h) Instrument ID				RDS-4, FPM-4				
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
(j) Sample Code				A-4281				
(k) Sample Condition on Receipt				Fit for Analysis				
(l) Items required to be tested				As per contract				
(m) Whether any specific Method of Test has been suggested by the party				No				
(n) Date of receiving the sample				28.11.22				
(o) Analysis Start Date / Analysis Completion Date				28.11.22 / 30.11.22				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building				
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34				
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11				
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.20				
4. Arsenic (As)	ng / m ³	6	AAS Method	0.44				
Nickel as Ni	ng / m ³	20	AAS Method	2.86				
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA Method 10-5	0.36				

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SHRIBESHWAR PRASAD

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Verified by:
Technical Manager



Shreyasee Prasad

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Shreyasee Prasad
Date: 2022.12.07
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4302		Dt: 06.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 27.11.22			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)		26	Humidity (%)
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-4, FPM-4			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-4302			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				28.11.22			
[o] Analysis Start Date / Analysis Completion Date				28.11.22 / 30.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.7			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	42.0			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.5			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	36.4			
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.20			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.7			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	22.5			

Digitally signed by
SHIBESHVAR PRASAD
Date: 2022.12.07
15:58:04 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No: STH/TR/22-23/4302(A)		Dt: 06.12.2022		Your Work Order No. 4000285067-037-1010		Dt: 31.07.2022		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by				SHIVA TEST HOUSE on 27.11.22				
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building				
[e] Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)				
[f] Sampling Environmental Condition				Temp. (°C)		26	Humidity (%)	63
[g] No. & Type of Container				One poly Jar				
[h] Instrument ID				RDS-4, FPM-4				
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code				A-4302				
[k] Sample Condition on Receipt				Fit for Analysis				
[l] Items required to be tested				As per contract				
[m] Whether any specific Method of Test has been suggested by the party				No				
[n] Date of receiving the sample				28.11.22				
[o] Analysis Start Date / Analysis Completion Date				28.11.22 / 30.11.22				
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.46			
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.14			
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.22			
4. Arsenic (As)		ng / m ³	6	AAS Method	0.44			
Nickel as Ni		ng / m ³	20	AAS Method	4.30			
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA (Method 10-5)	0.40			

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Verified by:
 Technical Manager



Shreyasee
 Prasad

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 16:04:35 +05'30'

Authorized Signatory
 Quality Manager

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SHIVA TEST HOUSE

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TC-10147

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TEST REPORT

Ref. No. **STH/TR/22-23/3553** Dt. **16.11.2022** Your Work Order No. **4000285067-037-1010** Dt. **31.07.2022**

[a] Name and address of the Customer	North Karangpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)
[c] Sample Collected by	SHIVA TEST HOUSE on 01.11.22
[d] Sampling Location	Collected from Near at the top of DM Plant
[e] Method of Sampling	IS 11251 (Part-1,2,3 & 7)
[f] Sampling Environmental Condition	Temp. (°C) 29 Humidity (%) 68
[g] No. & Type of Container	One poly Jar
[h] Instrument ID	RDS-3, FPM-3
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)
[j] Sample Code	A-3553
[k] Sample Condition on Receipt	Fit for Analysis
[l] Items required to be tested	As per contract
[m] Whether any specific Method of Test has been suggested by the party	No
[n] Date of receiving the sample	02.11.22
[o] Analysis Start Date / Analysis Completion Date	02.11.22 / 04.11.22

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.5
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	37.1
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.7
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.7
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.086
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.4
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	17.1

Shreyasee
Prasad
General Manager (QA/QC)
Mob: +91 9471047908
Email: shreyasee@shivatesthouse.com

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Verified by:
Technical Manager



Shreyasee Prasad

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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3553(A) Dt: 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on: 01.11.22		
[d] Sampling Location		Collected from Near at the top of DM Plant		
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition		Temp: (°C)	29	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-3, FPM-3		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3553		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		02.11.22		
[o] Analysis Start Date / Analysis Completion Date		02.11.22 / 04.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.113
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.72
5. Nickel as Ni	ng / m ³	20	AAS Method	2.80
3. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 1631)	0.61

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AR PRASAD

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SHRISHWAR PRASAD
Date: 2022.11.16
15:17:29 +05'30'



Shreyasee
Prasad

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15:21:32 +05'30'

Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10542

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TEST REPORT

Ref. No.: STH/TR/22-23/3571 Dt.: 16.11.2022 Your Work Order No.: 4000285067-037-1019 Dt.: 31.07.2022				
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 02.11.22			
[d] Sampling Location	Collected from Near at the top of DM Plant			
[e] Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	27	Humidity (%)	89
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-3, FPM-3			
[i] Sample Quantity	30 ml x 5 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-3571			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	03.11.22			
[o] Analysis Start Date / Analysis Completion Date	03.11.22 / 05.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	68.1
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. II)	35.4
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.3
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.4
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.035
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.4
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	17.3

For Start / Sample Kunal
For Analysis / Report Shreyasee
For Collection / Sample Kunal
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SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.11.16
15:19:15 +05'30'



Shreyasee Prasad

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Authorized Signatory
Quality Manager

Verified by
Technical Manager

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SHIVA TEST HOUSE

(Serving since 1988)

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TEST REPORT

Ref. No: STH/TR/22-23/3571(A) Dt: 16.11.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 02.11.22		
[d] Sampling Location		Collected from Near at the top of DM Plant		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	27	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-3, FPM-3		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3571		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		03.11.22		
[o] Analysis Start Date / Analysis Completion Date		03.11.22 / 05.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.568
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	< 5.0
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	< 1.0
4. Arsenic (As)	ng / m ³	6	AAS Method	0.78
5. Nickel as-Ni	ng / m ³	20	AAS Method	2.93
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.65

Digitally signed by:
SHIBESHWAR PRASAD
Date: 2022.11.16
15:19:28 +05'30'



Shreyasee
Prasad

Digitally signed by Shreyasee Prasad
Date: 2022.11.16 15:23:41 +05'30'

Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10362

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TEST REPORT

Ref. No. STH/TR/22-23/3823 Dt: 06.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 08.11.22			
(d) Sampling Location	Collected from: Near at the top of DM Plant			
(e) Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	28	Humidity (%)	67
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-3, FPM-3			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-3823			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	09.11.22			
(o) Analysis Start Date / Analysis Completion Date	09.11.22 / 11.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	Near at the top of DM Plant 66.4
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	35.9
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	18.5
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.4
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.11
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.8
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	14.8

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.07
15:29:47 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:36:02 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. **STH/TR/22-23/3823(A)** Dt: **06.12.2022** Your Work Order No. **4000285067-037-1019** Dt: **31.07.2022**

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chhota Jharkhand- 825 321		
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by	SHIVA TEST HOUSE on 08.11.22		
[d] Sampling Location	Collected from Near at the top of DM Plant		
[e] Method of Sampling	IS 11233 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition	Temp. (°C)	26	Humidity (%) 67
[g] No. & Type of Container	One poly Jar		
[h] Instrument ID	RDS-3, FPM-3		
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code	A-3823		
[k] Sample Condition on Receipt	Fit for Analysis		
[l] Items required to be tested	As per contract		
[m] Whether any specific Method of Test has been suggested by the party	No		
[n] Date of receiving the sample	09.11.22		
[o] Analysis Start Date / Analysis Completion Date	09.11.22 / 11.11.22		

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.455
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.35
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.21
4. Arsenic (As)	ng / m ³	6	AAS Method	0.21
5. Nickel as Ni	ng / m ³	20	AAS Method	4.40
Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.26

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**SHRISHW
AR PRASAD**

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Shreshwar Prasad
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19:30:01 +05'30'

Verified by:
Technical Manager



**Shreyasee
Prasad**

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Shreyasee Prasad
Date: 2022.12.07
15:36:16 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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PC/10612

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TEST REPORT

Ref. No. STH/TR/22-23/3828 Dt: 06.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 09.11.22		
[d] Sampling Location		Collected from Near at the top of DM Plant		
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition		Temp: (°C)	29	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-2, FPM-2		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3828		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		11.11.22		
[o] Analysis Start Date / Analysis Completion Date		11.11.22 / 13.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	72.0
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.3
3. Sulphur Dioxide as SO ₂	µg / m ³	60	IS 5182 (Part-2)	13.0
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.2
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.075
Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.0
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.7

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SHREYASEE PRASAD
Date: 2022.12.07
15:31:40 +05'30'



Shreyasee Prasad

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Shreyasee Prasad
Date: 2022.12.07
15:38:13 +05'30'

Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. **STH/TR/22-23/3828(A)** Dt: **06.12.2022** Your Work Order No: **4000285067-037-1010** Dt: **31.07.2022**

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321		
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by	SHIVA TEST HOUSE on 09.11.22		
[d] Sampling Location	Collected from Near at the top of DM Plant		
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%) 86
[g] No. & Type of Container	One poly Jar		
[h] Instrument ID	RDS-2, FPM-2		
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code	A-3828		
[k] Sample Condition on Receipt	Fit for Analysis		
[l] Items required to be tested	As per contract		
[m] Whether any specific Method of Test has been suggested by the party	No		
[n] Date of receiving the sample	11.11.22		
[o] Analysis Start Date / Analysis Completion Date	11.11.22 / 13.11.22		

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.227
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.64
5. Nickel as Ni	ng / m ³	20	AAS Method	1.40
Mercury (Hg)	ng / m ³	Not Specified	US-EPA (Method 16-31)	0.53

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SHIBESHWAR PRASAD
Date: 2022.12.07
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SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2022.12.07
15:31:52 +05'30'



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:38:31 +05'30'
Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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SHIVA TEST HOUSE

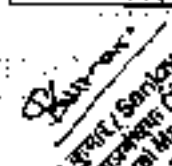
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TEST REPORT

Ref. No: STH/TR/22-23/3881 Dt: 06.12.2022 Your Work Order No: 4000285067-037-1019 Dt: 31.07.2022					
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by		SHIVA TEST HOUSE on 15.11.22			
(d) Sampling Location		Collected from Near at the top of DM Plant			
(e) Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition		Temp. (°C)	26	Humidity (%)	62
(g) No. & Type of Container		One poly Jar			
(h) Instrument ID		RDS-2, FPM-2			
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code		A-3881			
(k) Sample Condition on Receipt		Fit for Analysis			
(l) Items required to be tested		As per contract			
(m) Whether any specific Method of Test has been suggested by the party		No			
(n) Date of receiving the sample		16.11.22			
(o) Analysis Start Date / Analysis Completion Date		16.11.22 / 18.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	Near at the top of DM Plant 72.6	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.7	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.8	
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	36.4	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.082	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.2	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	19.7	


 Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2022.12.07
 15:45:47 +05'30'
 Verified by:
 Technical Manager



Shreyasee
 Prasad

Digitally signed by
 Shreyasee Prasad
 Date: 2022.12.07
 15:50:00 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3881(A) Dt: 06.12.2022 Your Work Order No. 4000285087-037-1019 Dt: 31.07.2022				
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Taridwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 15.11.22			
(d) Sampling Location	Collected from Near at the top of DM Plant			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	26	Humidity (%)	62
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-2, FPM-2			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-3881			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	16.11.22			
(o) Analysis Start Date / Analysis Completion Date	16.11.22 / 18.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.341
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.096
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17
4. Arsenic (As)	ng / m ³	6	AAS Method	0.50
5. Nickel as Ni	ng / m ³	20	AAS Method	2.80
Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 1631)	0.50

Shiva Test House
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Website: www.shivatest.com / www.shivatesthouse.com

SHIBESHWAR PRASAD
Verified by:
Technical Manager

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.07
15:46:00 +05'30'



Shreyasee Prasad
Authorized Signatory
Quality Manager

Digitally signed by
Shreyasee Prasad
Date: 2022.12.07
15:50:12 +05'30'

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SHIVA TEST HOUSE

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TC-10562

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TEST REPORT

Ref. No. STH/TR/22-23/3905 Dt. 06.12.2022 Your Work Order No. 4000285067-037-1019 Dt. 31.07.2022				
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 16.11.22			
(d) Sampling Location	Collected from Near at the top of DM Plant			
(e) Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	26	Humidity (%)	68
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-3, FPM-3			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-3905			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	17.11.22			
(o) Analysis Start Date / Analysis Completion Date	17.11.22 / 19.11.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	68.2
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	36.3
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.0
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.0
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.14
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	2.9
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	13.6

Dr. Shreya Prasad / Shreya Kumar
Dr. Shreya Prasad / Shreya Kumar
Dr. Shreya Prasad / Shreya Kumar
Dr. Shreya Prasad / Shreya Kumar
Dr. Shreya Prasad / Shreya Kumar
Dr. Shreya Prasad / Shreya Kumar
Dr. Shreya Prasad / Shreya Kumar
Dr. Shreya Prasad / Shreya Kumar
Dr. Shreya Prasad / Shreya Kumar
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SHIBESHWAR PRASAD

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Date: 2022.12.07
15:47:37 +0530

Verified by:
Technical Manager



Shreyasee Prasad

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Quality Manager

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Website: www.shivahouse.com, www.shivatesthouse.com



SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/3905(A) Dt: 06.12.2022 Your Work Order No. 4000285087-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 16.11.22		
[d] Sampling Location		Collected from Near at the top of DM Plant		
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition		Temp: (°C)	26	Humidity (%)
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-3, FPM-3		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-3905		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		17.11.22		
[o] Analysis Start Date / Analysis Completion Date		17.11.22 / 19.11.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.341
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.18
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17
4. Arsenic (As)	ng / m ³	6	AAS Method	0.50
5. Nickel as Ni	ng / m ³	20	AAS Method	2.9
Mercury (Hg)	ng / m ³	Not Specified	US EPA Method 1631	0.89

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Shreyasee Prasad

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Quality Manager

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TEST REPORT

Ref. No: STH/TR/22-23/4280		Dt: 06.12.2022		Your Work Order No: 4000285087-037-1019		Dt: 31.07.2022		
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
(c) Sample Collected by				SHIVA TEST HOUSE on 26.11.22				
(d) Sampling Location				Collected from Near at the top of DM Plant				
(e) Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)				
(f) Sampling Environmental Condition				Temp. (°C)		25	Humidity (%)	70
(g) No. & Type of Container				One poly Jar				
(h) Instrument ID				RDS-3, FPM-3				
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
(j) Sample Code				A-4280				
(k) Sample Condition on Receipt				Fit for Analysis				
(l) Items required to be tested				As per contract				
(m) Whether any specific Method of Test has been suggested by the party				No				
(n) Date of receiving the sample				28.11.22				
(o) Analysis Start Date / Analysis Completion Date				28.11.22 / 30.11.22				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant				
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.2				
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	36.7				
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.8				
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.6				
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.23				
5. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.1				
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	14.6				

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Shreyasee Prasad

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TEST REPORT

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[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)
[c] Sample Collected by	SHIVA TEST HOUSE on 26.11.22
[d] Sampling Location	Collected from Near at the top of DM Plant
[e] Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)
[f] Sampling Environmental Condition	Temp. (°C) 25 Humidity (%) 70
[g] No. & Type of Container	One poly Jar
[h] Instrument ID	RDS-3, FPM-3
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)
[j] Sample Code	A-4280
[k] Sample Condition on Receipt	Fit for Analysis
[l] Items required to be tested	As per contract
[m] Whether any specific Method of Test has been suggested by the party	No
[n] Date of receiving the sample	28.11.22
[o] Analysis Start Date / Analysis Completion Date	28.11.22 / 30.11.22

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.341
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.10
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.48
5. Nickel as Ni	ng / m ³	20	AAS Method	2.93
Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 16-31)	0.56

Digitally signed by
SHRIBESHVAR PRASAD
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Technical Manager



Shreyasee Prasad

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Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4301		Dt. 06.12.2022		Your Work Order No. 4000285067-837-1019		Dt. 31.07.2022					
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321							
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)							
[c] Sample Collected by				SHIVA TEST HOUSE on 27.11.22							
[d] Sampling Location				Collected from Near at the top of DM Plant							
[e] Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)							
[f] Sampling Environmental Condition				Temp. (°C)		28		Humidity (%)		63	
[g] No. & Type of Container				One poly Jar							
[h] Instrument ID				RDS-3, FPM-3							
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)							
[j] Sample Code				A-4301							
[k] Sample Condition on Receipt				Fit for Analysis							
[l] Items required to be tested				As per contract							
[m] Whether any specific Method of Test has been suggested by the party				No							
[n] Date of receiving the sample				28.11.22							
[o] Analysis Start Date / Analysis Completion Date				28.11.22 / 30.11.22							
Parameters			Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant				
1. Particulate Matter (PM ₁₀)			µg / m ³	100	IS 5182 (Part-23)		71.8				
2. Particulate Matter (PM _{2.5})			µg / m ³	60	CPCB (GMAAP Vol. II)		38.8				
3. Sulphur Dioxide as SO ₂			µg / m ³	80	IS 5182 (Part-2)		13.6				
4. Nitrogen Dioxide as NO ₂			µg / m ³	80	IS 5182 (Part-6)		34.9				
Lead (Pb)			µg / m ³	1	IS 5182 (Part-22)		0.19				
5. Ammonia as NH ₃			µg / m ³	400	IS 5182 (Part-5)		4.4				
7. Ozone (O ₃)			µg / m ³	180	IS 5182 (Part-9)		14.9				

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Technical Manager



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Quality Manager

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TEST REPORT

Ref. No: **STH/TR/22-23/4301(A)** Dt: **06.12.2022** Your Work Order No. **4000285067-037-1019** Dt: **31.07.2022**

(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist: Chhatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 27.11.22			
(d) Sampling Location	Collected from Near at the top of DM Plant			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	26	Humidity (%)	63
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-3, FPM-3			
(i) Sample Quantity	30 ml x 6 for each (NO _x , SO ₂ , NH ₃)			
(j) Sample Code	A-4301			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	28.11.22			
(o) Analysis Start Date / Analysis Completion Date	28.11.22 / 30.11.22			

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.23
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.10
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16
4. Arsenic (As)	ng / m ³	6	AAS Method	0.45
5. Nickel as Ni	ng / m ³	20	AAS Method	2.93
Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.51

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TEST REPORT

Ref No. STH/TR/22-23/4490	Dt: 21.12.2022	Your Work Order No. 4000285007-037-1019	Dt: 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 09.12.22			
(d) Sampling Location	Collected from Near at the top of DM Plant			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	26	Humidity (%)	
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-3, FPM-3			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-4490			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	10.12.22			
(o) Analysis Start Date / Analysis Completion Date	10.12.22 / 13.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.2
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	37.1
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.3
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.1
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.22
5. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.4
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	15.8

P. Sullivan
 State Rep. / Sanjay Kumar
 my constituents (1-774-337-1111)
 District Manager (EMG)
 District 10th and 11th - 2002
 Representing North Carolina - 2002

SHIBESHWAR PRASAD
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Technical Manager



Shreyasee Prasad
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TEST REPORT

Ref. No. STH/TR/22-23/4490(A)		Dt: 21.12.2022		Your Work Order No. 4000285047-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by				SHIVA TEST HOUSE on 09.12.22				
[d] Sampling Location				Collected from Near at the top of DM Plant				
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition				Temp. (°C)		28	Humidity (%)	67
[g] No. & Type of Container				One poly Jar				
[h] Instrument ID				RDS-3, FPM-3				
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code				A-4490				
[k] Sample Condition on Receipt				Fit for Analysis				
[l] Items required to be tested				As per contract				
[m] Whether any specific Method of Test has been suggested by the party				No				
[n] Date of receiving the sample				10.12.22				
[o] Analysis Start Date / Analysis Completion Date				10.12.22 / 13.12.22				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant				
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.455				
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11				
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17				
4. Arsenic (As)	ng / m ³	6	AAS Method	0.46				
5. Nickel as Ni	ng / m ³	20	AAS Method	1.47				
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-S)	0.54				

SHRIVAT / Sanjay Kumar
By: Shreyasee Prasad
General Manager (Tech)
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Email: info@shivatest.com

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Technical Manager.



Shreyasee Prasad

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Website: www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC-10662

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TEST REPORT

Ref. No. STH/TR/22-23/4548		Dt.: 21.12.2022		Your Work Order No. 4000265067-037-1019		Dt.: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 10.12.22			
(d) Sampling Location				Collected from Near at the top of DM Plant			
(e) Method of Sampling				IS 11235 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)		25	
(g) No. & Type of Container				Humidity (%)		71	
(h) Instrument ID				One poly Jar			
(i) Sample Quantity				RDS-3, FPM-3			
(j) Sample Code				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(k) Sample Condition on Receipt				A-4548			
(l) Items required to be tested				Fit for Analysis			
(m) Whether any specific Method of Test has been suggested by the party				As per contract			
(n) Date of receiving the sample				No			
(o) Analysis Start Date / Analysis Completion Date				12.12.22 / 14.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.4			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.9			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.9			
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.0			
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.19			
5. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.4			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.4			

Digitally signed by
SHREYASEE PRASAD
Date: 2022.12.27
11:46:16 +05'30'

SHREYASEE
AR PRASAD

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.27
11:46:16 +05'30'

Authorized Signatory
Quality Manager

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Website : www.shivatest.com, www.shivahouse.com



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TEST REPORT

Ref. No. STH/TR/22-23/4548(A)		Dt: 21.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
(c) Sample Collected by				SHIVA TEST HOUSE on 10.12.22				
(d) Sampling Location				Collected from Near at the top of DM Plant				
(e) Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)				
(f) Sampling Environmental Condition				Temp: (°C)		25	Humidity (%)	71
(g) No. & Type of Container				One poly Jar				
(h) Instrument ID				RDS-3, FPM-3				
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
(j) Sample Code				A-4548				
(k) Sample Condition on Receipt				Fit for Analysis				
(l) Items required to be tested				As per contract				
(m) Whether any specific Method of Test has been suggested by the party				No				
(n) Date of receiving the sample				12.12.22				
(o) Analysis Start Date / Analysis Completion Date				12.12.22 / 14.12.22				
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)		0.227		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)		0.11		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)		0.18		
4. Arsenic (As)		ng / m ³	6	AAS Method		0.60		
5. Nickel as Ni		ng / m ³	20	AAS Method		1.42		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)		0.24		

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.27
11:40:54 +05'30'

SHIBESHWAR PRASAD

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.27
11:46:36 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10882

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TEST REPORT

Ref. No. STH/TR/22-23/4647 Dt: 30.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by		SHIVA TEST HOUSE on 14.12.22			
(d) Sampling Location		Collected from Near at the top of DM Plant			
(e) Method of Sampling		IS 11355 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition		Temp. (°C)	24	Humidity (%)	73
(g) No. & Type of Container		One poly Jar			
(h) Instrument ID		RDS-3, FPM-3			
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code		A-4647			
(k) Sample Condition on Receipt		Fit for Analysis			
(l) Items required to be tested		As per contract			
(m) Whether any specific Method of Test has been suggested by the party		No			
(n) Date of receiving the sample		15.12.22			
(o) Analysis Start Date / Analysis Completion Date		15.12.22 / 18.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS-5182 (Part-23)	70.2	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	37.6	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.3	
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.3	
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.10	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.1	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	11.1	

SHIVA TEST HOUSE
General Manager (E&S)
Digitally signed by SHIVESHWAR PRASAD
Date: 2023.01.03 15:14:53 +05'30'



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.01.03 15:14:53 +05'30'

Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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TEST REPORT

Ref No. STH/TR/22-23/4647(A)		Dt : 30.12.2022		Your Work Order No. 4000265047-037-1019		Dt : 31.07.2022				
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321							
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)							
[c] Sample Collected by			SHIVA TEST HOUSE on 14.12.22							
[d] Sampling Location			Collected from Near at the top of DM Plant							
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)							
[f] Sampling Environmental Condition			Temp. (°C)		24		Humidity (%)		73	
[g] No. & Type of Container			One poly Jar							
[h] Instrument ID			RDS-3, FPM-3							
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)							
[j] Sample Code			A-4647							
[k] Sample Condition on Receipt			Fit for Analysis							
[l] Items required to be tested			As per contract							
[m] Whether any specific Method of Test has been suggested by the party			No							
[n] Date of receiving the sample			15.12.22							
[o] Analysis Start Date / Analysis Completion Date			15.12.22 / 18.12.22							
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant				
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)		0.455				
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)		0.18				
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)		0.16				
4. Arsenic (As)		ng / m ³	6	AAS Method		0.28				
5. Nickel as Ni		ng / m ³	20	AAS Method		5.87				
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)		0.57				

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
15:15:06 +05'30'

SHIBESHWAR PRASAD
General Manager (Env)
SHIVA TEST HOUSE, North Karanpura, Chatra



Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
15:15:06 +05'30'

Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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SHIVA TEST HOUSE

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PC-10482

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TEST REPORT

Ref. No. STH/TR/22-23/4652		Dt: 30.12.2022		Year Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by				SHIVA TEST HOUSE on 15.12.22				
[d] Sampling Location				Collected from Near at the top of DM Plant				
[e] Method of Sampling				IS 11235 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition				Temp. (°C)		24	Humidity (%)	72
[g] No. & Type of Container				One poly Jar				
[h] Instrument ID				RDS-3, FPM-3				
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code				A-4652				
[k] Sample Condition on Receipt				Fit for Analysis				
[l] Items required to be tested				As per contract				
[m] Whether any specific Method of Test has been suggested by the party				No				
[n] Date of receiving the sample				16.12.22				
[o] Analysis Start Date / Analysis Completion Date				16.12.22 / 19.12.22				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant				
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.7				
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.2				
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.3				
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.0				
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.04				
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-6)	3.6				
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	12.4				

Digitally signed by
SHRIBESHWAR PRASAD
Date: 2023.01.03
15:17:45 +05'30'

SHRIBESHWAR PRASAD

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/21-23/4652(A)		Dt: 30.12.2022		Your Work Order No. 4000285047-037-1018		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 15.12.22			
(d) Sampling Location				Collected from Near at the top of DM Plant			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	72
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-3, FPM-3			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-4652			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				16.12.22			
(o) Analysis Start Date / Analysis Completion Date				16.12.22 / 19.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.568			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.04			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.21			
5. Nickel as Ni	ng / m ³	20	AAS Method	2.93			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.32			

Shreya Prasad / Ranjita Kumar
 Sr. Analyst (A) (A-171-172)
 Sr. Analyst (A) (A-171-172)
 Sr. Analyst (A) (A-171-172)
 Sr. Analyst (A) (A-171-172)

SHREYASHWAR PRASAD
 Digitally signed by
 SHREYASHWAR PRASAD
 Date: 2023.01.03
 15:11:29 +05'30'

Verified by :
 Technical Manager



Shreyase Prasad
 Digitally signed by
 Shreyase Prasad
 Date: 2023.01.03
 15:17:06 +05'30'
 Authorized Signatory
 Quality Manager

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SHIVA TEST HOUSE

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TC-10682

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TEST REPORT

Ref. No. STH/TR/22-23/4607		Dt: 30.12.2022		Your Work Order No. 4000205067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 20.12.22			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 11255 (Part-I, 2, 3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	71
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-4807			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				21.12.22			
[o] Analysis Start Date / Analysis Completion Date				21.12.22 / 24.12.22			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	71.3		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	38.8		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.8		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.7		
Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.11		
5. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	3.3		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	13.6		

Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
16:19:05 +05'30'



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
16:19:05 +05'30'
Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4807(A)	Date: 30.12.2022	Your Work Order No. 4000285067-037-1019	Date: 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 20.12.22		
[d] Sampling Location		Collected from Near at the top of DM Plant		
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	24 Humidity (%) 71	
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-3, FPM-3		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-4807		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		21.12.22		
[o] Analysis Start Date / Analysis Completion Date		21.12.22 / 24.12.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.568
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.08
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17
4. Arsenic (As)	ng / m ³	6	AAS Method	0.21
5. Nickel as Ni	ng / m ³	20	AAS Method	8.80
Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.65

Shiva Test House
At: Tandwa
Dist: Chatra
Jharkhand- 825 321

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.01.03 15:21:27 +05'30'
Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.01.03 16:19:21 +05'30'
Authorized Signatory
Quality Manager

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Website: www.shivatesthouse.com



SHIVA TEST HOUSE

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PC-10882

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TEST REPORT

Ref. No. STH/TR/22-23/4855 Dt. 31.12.2022 Your Work Order No. 4000285067-037-1019 Dt. 31.07.2022					
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 21.12.22			
[d] Sampling Location		Collected from Near at the top of DM Plant			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp. (°C)	24	Humidity (%)	72
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-3, FPM-3			
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-4855			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		22.12.22			
[o] Analysis Start Date / Analysis Completion Date		22.12.22 / 25.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.16	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	40.5	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.7	
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.2	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.14	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.6	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	12.2	

Digitally signed by:
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Shreyasee
Prasad
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Shreyasee Prasad
Date: 2023.01.03
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Technical Manager

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TEST REPORT

Ref. No. **STH/TR/22-23/4855(A)** Dt: **31.12.2022** Your Work Order No. **4000285067-037-1019** Dt: **31.07.2022**

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 21.12.22			
[d] Sampling Location	Collected from Near at the top of DM Plant			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	24	Humidity (%)	72
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-3, FPM-3			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-4855			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	22.12.22			
[o] Analysis Start Date / Analysis Completion Date	22.12.22 / 25.12.22			

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.68
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.10
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17
4. Arsenic (As)	ng / m ³	6	AAS Method	0.36
5. Nickel as Ni	ng / m ³	20	AAS Method	6.27
Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.57

SHIVA TEST HOUSE
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SHIBESHWA AR PRASAD
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Verified by:
Technical Manager



Shreyasee
Prasad

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Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5137		Dt: 02.01.2023		Your Work Order No. 4000285057-037-1010		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 29.12.22			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	18	Humidity (%)	73
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5137			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				30.12.22			
[o] Analysis Start Date / Analysis Completion Date				30.12.22 / 02.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant	
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		75.2	
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAMP Vol. I)		41.8	
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		13.1	
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		35.0	
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.15	
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		5.0	
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		14.6	

SHIVA TEST HOUSE
201, Ashoka Road, Patliputra Colony, Patna - 800 013 (Bihar)
Genl. Manager (E&O)
Phone: 9826 768249, 9826 768249
Fax: 9826 768249

SHIBESHWAR PRASAD
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Verified by:
Technical Manager



Shreyasee Prasad
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5137(A)		Dt: 03.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 29.12.22			
(d) Sampling Location				Collected from Near at the top of DM Plant			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)	18	Humidity (%)	73
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-3, FPM-3			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-5137			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				30.12.22			
(o) Analysis Start Date / Analysis Completion Date				30.12.22 / 02.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.227		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.12		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.18		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.39		
5. Nickel as Ni		ng / m ³	20	AAS Method	2.93		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-6)	0.25		

Signature
 Shri. Shri. Sanjay Kumar
 Dy. General Manager (Environ)
 P.O. Box No. 1000, Patna
 NTPC Limited, North Karanpura Project

SHIBESHWAR PRASAD
 Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2023.01.03
 16:54:28 +05'30'

Verified by:
 Technical Manager



Shreyasee Prasad
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 Shreyasee Prasad
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 Quality Manager

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TC-10002

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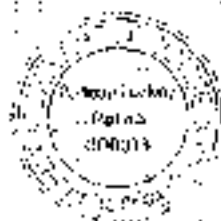
TEST REPORT

Ref. No. STH/TR/22-23/5154		Dt: 03.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by			SHIVA TEST HOUSE on 30.12.22					
[d] Sampling Location			Collected from Near at the top of DM Plant					
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)					
[f] Sampling Environmental Condition			Temp. (°C)		18		Humidity (%)	72
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-3, FPM-3					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-5154					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			31.12.22					
[o] Analysis Start Date / Analysis Completion Date			31.12.22 / 02.01.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		69.9		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		37.2		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		14.4		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		33.0		
Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.21		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		4.3		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		15.6		

Digitally signed by
SHRISHWAR PRASAD
Date: 2023.01.03
16:52:02 +05'30'

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AR PRASAD

Verified by:
Technical Manager



Shreyasee
Prasad

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Shreyasee Prasad
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TEST REPORT

Ref. No. STH/TR/22-23/5154(A)		Dt: 03.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
(c) Sample Collected by				SHIVA TEST HOUSE on 30.12.22				
(d) Sampling Location				Collected from Near at the top of DM Plant				
(e) Method of Sampling				IS 11355 (Part-1,2,3 & 7)				
(f) Sampling Environmental Condition				Temp. (°C)		16	Humidity (%)	72
(g) No. & Type of Container				One poly Jar				
(h) Instrument ID				RDS-3, FPM-3				
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
(j) Sample Code				A-5154				
(k) Sample Condition on Receipt				Fit for Analysis				
(l) Items required to be tested				As per contract				
(m) Whether any specific Method of Test has been suggested by the party				No				
(n) Date of receiving the sample				31.12.22				
(o) Analysis Start Date / Analysis Completion Date				31.12.22 / 02.01.23				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant				
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.68				
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.07				
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17				
4. Arsenic (As)	ng / m ³	6	AAS Method	0.28				
5. Nickel as Ni	ng / m ³	20	AAS Method	2.84				
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.25				

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Quality Manager

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TC-10442

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TEST REPORT

Ref. No. STH/TR/22-23/4499 Dt: 21.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)
(c) Sample Collected by	SHIVA TEST HOUSE on 09.12.22
(d) Sampling Location	Collected from Near at the top of Time Office (Main Plant)
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)
(f) Sampling Environmental Condition	Temp. (°C) 26 Humidity (%) 67
(g) No. & Type of Container	One poly Jar
(h) Instrument ID	RDS-1, FPM-1
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)
(j) Sample Code	A-4489
(k) Sample Condition on Receipt	Fit for Analysis
(l) Items required to be tested	As per contract
(m) Whether any specific Method of Test has been suggested by the party	No
(n) Date of receiving the sample	10.12.22
(o) Analysis Start Date / Analysis Completion Date	10.12.22 / 13.12.22

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	75.4
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol.1)	41.3
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.0
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	38.8
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.08
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.2
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.6

Shreshwar Prasad
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SHREYASEE PRASAD
Date: 2022.12.27
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Verified by:
Technical Manager



Shreyasee Prasad
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Shreyasee Prasad
Date: 2022.12.27
11:42:10 +05'30'

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SHIVA TEST HOUSE

(Serving since 1988)

RECOGNISED AS ENVIRONMENTAL LABORATORY BY MoEFCC, GOVT. OF INDIA, UNDER ENVIRONMENT (PROTECTION) ACT 1986, DEPTT. OF INDUSTRY, FORESTS & ENVIRONMENT, GOVT. OF BIHAR AND BIHAR STATE POLLUTION CONTROL BOARD

TEST REPORT

Ref. No. STH/TR/22-23/4489(A)		Dt: 21.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 09.12.22			
[d] Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)		26	Humidity (%)
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-2, FPM-2			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-4289			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				10.12.22			
[o] Analysis Start Date / Analysis Completion Date				10.12.22 / 13.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.227			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.14			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.62			
Nickel as Ni	ng / m ³	20	AAS Method	1.40			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.53			

SHIBESHWAR PRASAD
General Manager (Tech)
Digitally signed by SHIBESHWAR PRASAD
Date: 2022.12.27 11:38:27 +05'30'



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2022.12.27 11:42:25 +05'30'
Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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SHIVA TEST HOUSE

(Serving since 1988)



TC-10002

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TEST REPORT

Ref. No. STH/TR/22-23/4547					Dt: 21.12.2022		Your Work Order No. 4000285067-937-1010		Dt: 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharichand- 825 321							
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)							
[c] Sample Collected by			SHIVA TEST HOUSE on 10.12.22							
[d] Sampling Location			Collected from Near as the top of Time Office (Main Plant)							
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)							
[f] Sampling Environmental Condition			Temp. (°C)		25		Humidity (%)		71	
[g] No. & Type of Container			One poly Jar							
[h] Instrument ID			RDS-2, FPM-2							
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)							
[j] Sample Code			A-4547							
[k] Sample Condition on Receipt			Fit for Analysis							
[l] Items required to be tested			As per contract							
[m] Whether any specific Method of Test has been suggested by the party			No							
[n] Date of receiving the sample			12.12.22							
[o] Analysis Start Date / Analysis Completion Date			12.12.22 / 14.12.22							
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Time Office (Main Plant)				
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		73.3				
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		41.7				
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		15.1				
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		38.8				
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.09				
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		5.8				
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		20.6				

Shiva Test House
122-C, Ashta, Road No. 5A, Padipura Colony, Patna - 800 013 (Bihar)
By General Manager (EMO)
Phone: 9302768862, 9319431047, 9302768862
Fax: 9302768862

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.27
11:40:20 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.27
11:45:43 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/4547(A)		Dt: 21.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
(c) Sample Collected by				SHIVA TEST HOUSE on 10.12.22				
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)				
(e) Method of Sampling				IS 11255 (Part-I, 2, 3 & 7)				
(f) Sampling Environmental Condition				Temp. (°C)		25	Humidity (%)	71
(g) No. & Type of Container				One poly Jar				
(h) Instrument ID				RDS-2, FPM-2				
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
(j) Sample Code				A-4547				
(k) Sample Condition on Receipt				Fit for Analysis				
(l) Items required to be tested				As per contract				
(m) Whether any specific Method of Test has been suggested by the party				No				
(n) Date of receiving the sample				12.12.22				
(o) Analysis Start Date / Analysis Completion Date				12.12.22 / 14.12.22				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)				
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34				
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.09				
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17				
4. Arsenic (As)	ng / m ³	6	AAS Method	0.49				
Nickel as Ni	ng / m ³	20	AAS Method	2.80				
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.51				

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.27
17:40:31 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.27
11:46:00 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



TC-10582

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TEST REPORT

Ref. No. STH/TR/23-23/4646 Dt: 30.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
[a]	Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b]	Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c]	Sample Collected by		SHIVA TEST HOUSE on 14.12.22		
[d]	Sampling Location		Collected from Near at the top of Time Office (Main Plant)		
[e]	Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f]	Sampling Environmental Condition		Temp. (°C)	24 Humidity (%) 73	
[g]	No. & Type of Container		One poly Jar		
[h]	Instrument ID		RDS-1, FPM-1		
[i]	Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j]	Sample Code		A-4646		
[k]	Sample Condition on Receipt		Fit for Analysis		
[l]	Items required to be tested		As per contract		
[m]	Whether any specific Method of Test has been suggested by the party		No		
[n]	Date of receiving the sample		15.12.22		
[o]	Analysis Start Date / Analysis Completion Date		15.12.22 / 16.12.22		
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	70.1
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol I)	39.6
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	16.6
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	32.7
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.10
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	4.0
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	14.8

Shri. Shri. / Sanjay Kumar
1971-1972-1973-1974-1975-1976-1977-1978-1979-1980-1981-1982-1983-1984-1985-1986-1987-1988-1989-1990-1991-1992-1993-1994-1995-1996-1997-1998-1999-2000-2001-2002-2003-2004-2005-2006-2007-2008-2009-2010-2011-2012-2013-2014-2015-2016-2017-2018-2019-2020-2021-2022-2023-2024-2025-2026-2027-2028-2029-2030-2031-2032-2033-2034-2035-2036-2037-2038-2039-2040-2041-2042-2043-2044-2045-2046-2047-2048-2049-2050-2051-2052-2053-2054-2055-2056-2057-2058-2059-2060-2061-2062-2063-2064-2065-2066-2067-2068-2069-2070-2071-2072-2073-2074-2075-2076-2077-2078-2079-2080-2081-2082-2083-2084-2085-2086-2087-2088-2089-2090-2091-2092-2093-2094-2095-2096-2097-2098-2099-2100-2101-2102-2103-2104-2105-2106-2107-2108-2109-2110-2111-2112-2113-2114-2115-2116-2117-2118-2119-2120-2121-2122-2123-2124-2125-2126-2127-2128-2129-2130-2131-2132-2133-2134-2135-2136-2137-2138-2139-2140-2141-2142-2143-2144-2145-2146-2147-2148-2149-2150-2151-2152-2153-2154-2155-2156-2157-2158-2159-2160-2161-2162-2163-2164-2165-2166-2167-2168-2169-2170-2171-2172-2173-2174-2175-2176-2177-2178-2179-2180-2181-2182-2183-2184-2185-2186-2187-2188-2189-2190-2191-2192-2193-2194-2195-2196-2197-2198-2199-2200-2201-2202-2203-2204-2205-2206-2207-2208-2209-2210-2211-2212-2213-2214-2215-2216-2217-2218-2219-2220-2221-2222-2223-2224-2225-2226-2227-2228-2229-2230-2231-2232-2233-2234-2235-2236-2237-2238-2239-2240-2241-2242-2243-2244-2245-2246-2247-2248-2249-2250-2251-2252-2253-2254-2255-2256-2257-2258-2259-2260-2261-2262-2263-2264-2265-2266-2267-2268-2269-2270-2271-2272-2273-2274-2275-2276-2277-2278-2279-2280-2281-2282-2283-2284-2285-2286-2287-2288-2289-2290-2291-2292-2293-2294-2295-2296-2297-2298-2299-2300-2301-2302-2303-2304-2305-2306-2307-2308-2309-2310-2311-2312-2313-2314-2315-2316-2317-2318-2319-2320-2321-2322-2323-2324-2325-2326-2327-2328-2329-2330-2331-2332-2333-2334-2335-2336-2337-2338-2339-2340-2341-2342-2343-2344-2345-2346-2347-2348-2349-2350-2351-2352-2353-2354-2355-2356-2357-2358-2359-2360-2361-2362-2363-2364-2365-2366-2367-2368-2369-2370-2371-2372-2373-2374-2375-2376-2377-2378-2379-2380-2381-2382-2383-2384-2385-2386-2387-2388-2389-2390-2391-2392-2393-2394-2395-2396-2397-2398-2399-2400-2401-2402-2403-2404-2405-2406-2407-2408-2409-2410-2411-2412-2413-2414-2415-2416-2417-2418-2419-2420-2421-2422-2423-2424-2425-2426-2427-2428-2429-2430-2431-2432-2433-2434-2435-2436-2437-2438-2439-2440-2441-2442-2443-2444-2445-2446-2447-2448-2449-2450-2451-2452-2453-2454-2455-2456-2457-2458-2459-2460-2461-2462-2463-2464-2465-2466-2467-2468-2469-2470-2471-2472-2473-2474-2475-2476-2477-2478-2479-2480-2481-2482-2483-2484-2485-2486-2487-2488-2489-2490-2491-2492-2493-2494-2495-2496-2497-2498-2499-2500-2501-2502-2503-2504-2505-2506-2507-2508-2509-2510-2511-2512-2513-2514-2515-2516-2517-2518-2519-2520-2521-2522-2523-2524-2525-2526-2527-2528-2529-2530-2531-2532-2533-2534-2535-2536-2537-2538-2539-2540-2541-2542-2543-2544-2545-2546-2547-2548-2549-2550-2551-2552-2553-2554-2555-2556-2557-2558-2559-2560-2561-2562-2563-2564-2565-2566-2567-2568-2569-2570-2571-2572-2573-2574-2575-2576-2577-2578-2579-2580-2581-2582-2583-2584-2585-2586-2587-2588-2589-2590-2591-2592-2593-2594-2595-2596-2597-2598-2599-2600-2601-2602-2603-2604-2605-2606-2607-2608-2609-2610-2611-2612-2613-2614-2615-2616-2617-2618-2619-2620-2621-2622-2623-2624-2625-2626-2627-2628-2629-2630-2631-2632-2633-2634-2635-2636-2637-2638-2639-2640-2641-2642-2643-2644-2645-2646-2647-2648-2649-2650-2651-2652-2653-2654-2655-2656-2657-2658-2659-2660-2661-2662-2663-2664-2665-2666-2667-2668-2669-2670-2671-2672-2673-2674-2675-2676-2677-2678-2679-2680-2681-2682-2683-2684-2685-2686-2687-2688-2689-2690-2691-2692-2693-2694-2695-2696-2697-2698-2699-2700-2701-2702-2703-2704-2705-2706-2707-2708-2709-2710-2711-2712-2713-2714-2715-2716-2717-2718-2719-2720-2721-2722-2723-2724-2725-2726-2727-2728-2729-2730-2731-2732-2733-2734-2735-2736-2737-2738-2739-2740-2741-2742-2743-2744-2745-2746-2747-2748-2749-2750-2751-2752-2753-2754-2755-2756-2757-2758-2759-2760-2761-2762-2763-2764-2765-2766-2767-2768-2769-2770-2771-2772-2773-2774-2775-2776-2777-2778-2779-2780-2781-2782-2783-2784-2785-2786-2787-2788-2789-2790-2791-2792-2793-2794-2795-2796-2797-2798-2799-2800-2801-2802-2803-2804-2805-2806-2807-2808-2809-2810-2811-2812-2813-2814-2815-2816-2817-2818-2819-2820-2821-2822-2823-2824-2825-2826-2827-2828-2829-2830-2831-2832-2833-2834-2835-2836-2837-2838-2839-2840-2841-2842-2843-2844-2845-2846-2847-2848-2849-2850-2851-2852-2853-2854-2855-2856-2857-2858-2859-2860-2861-2862-2863-2864-2865-2866-2867-2868-2869-2870-2871-2872-2873-2874-2875-2876-2877-2878-2879-2880-2881-2882-2883-2884-2885-2886-2887-2888-2889-2890-2891-2892-2893-2894-2895-2896-2897-2898-2899-2900-2901-2902-2903-2904-2905-2906-2907-2908-2909-2910-2911-2912-2913-2914-2915-2916-2917-2918-2919-2920-2921-2922-2923-2924-2925-2926-2927-2928-2929-2930-2931-2932-2933-2934-2935-2936-2937-2938-2939-2940-2941-2942-2943-2944-2945-2946-2947-2948-2949-2950-2951-2952-2953-2954-2955-2956-2957-2958-2959-2960-2961-2962-2963-2964-2965-2966-2967-2968-2969-2970-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SHIVA TEST HOUSE

(Serving since 1988)

RECOGNISED AS ENVIRONMENTAL LABORATORY BY MOEFCC, GOVT. OF INDIA, UNDER ENVIRONMENT (PROTECTION) ACT 1986, DEPTT. OF INDUSTRY, FORESTS & ENVIRONMENT, GOVT. OF BIHAR AND BIHAR STATE POLLUTION CONTROL BOARD

TEST REPORT

Ref. No. STH/TR/22-23/4646(A)		Dt: 30.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 14.12.22			
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	73
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-2, FPM-2			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-4646			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				15.12.22			
(o) Analysis Start Date / Analysis Completion Date				15.12.22 / 18.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.341			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.04			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.15			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.29			
Nickel as Ni	ng / m ³	20	AAS Method	5.59			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-G)	0.08			



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.01.03
15:14:40 +05'30'

Authorized Signatory
Quality Manager

Verified by:
Technical Manager

- END OF TEST REPORT -

- This report applies only to sample tested as above.
- Total Liability of our Laboratory is limited to invoiced amount.
- Test Report endorsed only the tests and not the product certificate.
- Test Report can not be reproduced partially or full for legal/court purpose without written permission of the Laboratory.

Page 1 of 1

Contact us : 122-C, Aashu, Road No. 5A, Patlipada Colony, Patna - 800 013 (Bihar)
 Mob. : +918676886249, +919431047908 Email : shiva@shivatest.com ; info@shivatest.com
 Website : www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1985)



TC-10402

RECOGNISED AS ENVIRONMENTAL LABORATORY BY MoEFCC, GOVT. OF INDIA, UNDER ENVIRONMENT (PROTECTION) ACT 1986, DEPTT. OF INDUSTRY, FORESTS & ENVIRONMENT, GOVT. OF BIHAR AND BIHAR STATE POLLUTION CONTROL BOARD

TEST REPORT

Ref. No. STH/TR/22-23/4651	Dt: 18.12.2022	Your Work Order No: 4000285087-037-1019	Dt: 31.07.2022
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by	SHIVA TEST HOUSE on 15.12.22		
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)		
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition	Temp. (°C)	24	Humidity (%) 72
[g] No. & Type of Container	One poly Jar		
[h] Instrument ID	RDS-2, FPM-2		
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code	A-4651		
[k] Sample Condition on Receipt	Fit for Analysis		
[l] Items required to be tested	As per contract		
[m] Whether any specific Method of Test has been suggested by the party	No		
[n] Date of receiving the sample	16.12.22		
[o] Analysis Start Date / Analysis Completion Date	16.12.22 / 19.12.22		

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.7
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.3
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.4
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.4
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.04
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.7
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	13.9

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
15:11:19 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
15:16:22 +05'30'

Authorized Signatory
Quality Manager

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Mob: +918676886249; +919451047908 Email: shivamail@yahoo.com; info@shivatest.com
Website: www.shivatest.com; www.shivalesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)

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TEST REPORT

Ref. No. STH/TR/22-23/4651(A)	Dt : 30.11.2022	Your Work Order No. 4000288087-037-1019	IN : 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project. At: Tandwa Dist- Chatra. Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 15.12.22			
(d) Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	24	Humidity (%) : 72	
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-2, FPM-2			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-4651			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	16.12.22			
(o) Analysis Start Date / Analysis Completion Date	16.12.22 / 19.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.05
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.14
4. Arsenic (As)	ng / m ³	6	AAS Method	0.14
Nickel as Ni	ng / m ³	20	AAS Method	4.7
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.16

SHIVA TEST HOUSE
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SHIBESHW
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SHIBESHWAR PRASAD
Date: 2023.01.03
15:11:31 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad
Digitally signed by:
Shreyasee Prasad
Date: 2023.01.03
15:16:36 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/4806 Dt: 30.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 20.12.22			
[d] Sampling Location		Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp. (°C)	24	Humidity (%)	71
[g] No. & Type of Container		One poly jar			
[h] Instrument ID		RDS-1, FPM-1			
[i] Sample Quantity		30 ml x 8 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-4806			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		21.12.22			
[o] Analysis Start Date / Analysis Completion Date		21.12.22 / 24.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.7	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	40.9	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	16.8	
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-5)	33.8	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.14	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.4	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	15.8	

Digitally signed by
Shrineswar Prasad
Date: 2023.01.03
10:20:42 +05'30'

Verified by:
Technical Manager



Digitally signed by
Shrineswar Prasad
Date: 2023.01.03
10:18:38 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



FC-14582

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TEST REPORT

Ref. No. STH/TR/23-23/4854	Dt. 31.12.2022	Your Work Order No. 4000285067-037-1019	Dt. 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 21.12.22			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	24	Humidity (%)	72
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-2, FPM-2			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-4854			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	22.12.22			
[o] Analysis Start Date / Analysis Completion Date	22.12.22 / 25.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.7
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	42.1
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	17.3
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.0
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.18
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.6
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	16.4

SHIBESHWAR PRASAD

Verified by
Technical Manager

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
15:22:38 +05'30'



Shreyasee Prasad

Authorized Signatory
Quality Manager

Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
16:21:03 +05'30'

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/4854(A)		Ln: 31.12.2022		Your Work Order No. 4000205067-037-1019		Ln: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 21.12.22			
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	72
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-2, FPM-2			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-4854			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				22.12.22			
(o) Analysis Start Date / Analysis Completion Date				22.12.22 / 25.12.22			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.80		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.06		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.17		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.50		
5. Nickel as Ni		ng / m ³	20	AAS Method	9.79		
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA Method 1631	0.25		

Shreya
Mr. Shreya / Sanjay Kumar
At: Tandwa
Dist- Chatra
Jharkhand- 825 321
Cell: 9431147903, 9431147904
Email: shreya@shivatest.com

SHIBESHWAR PRASAD
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
15:22:49 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10882

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TEST REPORT

Ref. No. STH/TR/22-23/5136		Dt: 03.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 29.12.22			
[d] Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)		18 Humidity (%) 73	
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5136			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				30.12.22			
[o] Analysis Start Date / Analysis Completion Date				30.12.22 / 02.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.3			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	43.4			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.8			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	37.7			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.06			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.1			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	21.6			

Shiva Test House
General Manager (E&C)
North Karanpura Super Thermal Power Project
Chatra, Jharkhand - 825 321

SHIVAR PRASAD
Digitally signed by SHIVAR PRASAD
Date: 2023.01.03 16:53:56 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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IC-10342

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TEST REPORT

Ref. No. STH/TR/22-23/5153		Dt: 03.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 30.12.22			
[d] Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	18	Humidity (%)	72
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-2, FPM-2			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5153			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				31.12.22			
[o] Analysis Start Date / Analysis Completion Date				31.12.22 / 02.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	73.4		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	42.1		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	15.9		
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.0		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.11		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	4.9		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	16.4		

Shiva Test House
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SHIBESHWAR PRASAD
Date: 2023.01.03
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Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
16:59:53 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/5153(A)	Dt: 01.01.2023	Your Work Order No. 4000285047-037-1019	Dt: 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 30.12.22			
(d) Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	18	Humidity (%)	
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-2, FPM-2			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-5153			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	31.12.22			
(o) Analysis Start Date / Analysis Completion Date	31.12.22 / 02.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.455
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.03
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.14
4. Arsenic (As)	ng / m ³	6	AAS Method	0.14
Nickel as Ni	ng / m ³	20	AAS Method	5.59
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.08

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
14:55:52 +05'30'



Shreyasee
Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
17:00:10 +05'30'
Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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SHIVA TEST HOUSE

(Serving since 1988)



TC-10382

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TEST REPORT

Ref. No. 5TH/TR/22-23/4491 Dt: 21.12.2022 Your Work Order No. 4000286067-037-1019 Dt: 31.07.2022					
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by:		SHIVA TEST HOUSE on 09.12.22			
(d) Sampling Location		Collected from Near at the top of Switch Yard Office Building			
(e) Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition		Temp. (°C)	26	Humidity (%)	87
(g) No. & Type of Container		One poly Jar			
(h) Instrument ID		RDS-4, FPM-4			
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code		A-4491			
(k) Sample Condition on Receipt		Fit for Analysis			
(l) Items required to be tested		As per contract			
(m) Whether any specific Method of Test has been suggested by the party		No			
(n) Date of receiving the sample		10.12.22			
(o) Analysis Start Date / Analysis Completion Date		10.12.22 / 13.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.7	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	41.2	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.0	
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	36.2	
6. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.19	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.7	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	19.5	

SHIVA TEST HOUSE
101, Indraprastha (4th floor)
Dy. General Manager (E&C)
Industrial Area, Patna - 800 013

Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2022.12.27 11:43:23 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. <i>STH/TR/22-23/4491(A)</i> Dt: <i>21.12.2022</i> Your Work Order No. <i>4000265067-037-1010</i> Dt: <i>31.07.2022</i>				
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	<i>Ambient Air Quality Monitoring (As per NAAQS)</i>			
(c) Sample Collected by	SHIVA TEST HOUSE on 09.12.22			
(d) Sampling Location	<i>Collected from Near at the top of Switch Yard Office Building</i>			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C) <i>26</i> Humidity (%) <i>67</i>			
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-4, FPM-4			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-4491			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	10.12.22			
(o) Analysis Start Date / Analysis Completion Date	10.12.22 / 13.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.23
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19
4. Arsenic (As)	ng / m ³	6	AAS Method	0.47
Nickel as Ni	ng / m ³	20	AAS Method	4.30
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA Method 1631	0.35

Shiva Test House
204, Shree Krishna Colony, Patna - 800 013 (Bihar)
Dr. Shreshwar Kumar
General Manager (Tech)
Mob: +91 9666666249, +91 9431047908
Email: shivatesthouse@gmail.com

SHIBRESHWAR PRASAD
Digitally signed by SHIBRESHWAR PRASAD
Date: 2022.12.27 11:39:33 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2022.12.27 11:43:36 +05'30'

Authorized Signatory
Quality Manager

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TC-10182

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TEST REPORT

Ref. No. STH/TR/22-23/4549		Dt: 21.12.2022		Year Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 10.12.22			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)		25	
[g] No. & Type of Container				Humidity (%)		71	
[h] Instrument ID				One poly Jar			
[i] Sample Quantity				RDS-4, FPM-4			
[j] Sample Code				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[k] Sample Condition on Receipt				A-4349			
[l] Items required to be tested				Fit for Analysis			
[m] Whether any specific Method of Test has been suggested by the party				As per contract			
[n] Date of receiving the sample				No			
[o] Analysis Start Date / Analysis Completion Date				12.12.22			
				12.12.22 / 14.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result			
				Near at the top of Switch Yard Office Building			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.7			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	42.8			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.9			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	37.1			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.19			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-6)	5.2			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	23.7			

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SHIBESHWAR PRASAD
Date: 2022.12.27
11:41:06 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2022.12.27
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4549(A)	Dt: 21.12.2022	Your Work Order No. 4000295017-037-1019	Dt: 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 10.12.22			
(d) Sampling Location	Collected from Near as the top of Switch Yard Office Building			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	25	Humidity (%) 71	
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-4, FPM-4			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-4549			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	12.12.22			
(o) Analysis Start Date / Analysis Completion Date	12.12.22 / 14.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.21
4. Arsenic (As)	ng / m ³	6	AAS Method	0.45
Nickel as Ni	ng / m ³	20	AAS Method	2.86
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 1631)	0.36

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SHIBESHWAR PRASAD
Date: 2022.12.27
11:41:17 +05'30'



Shreyasee
Prasad
Digitally signed by
Shreyasee Prasad
Date: 2022.12.27
11:47:12 +05'30'
Authorized Signatory
Quality Manager

Verified by :
Technical Manager

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ISO 15002

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TEST REPORT

Ref. No. STH/TR/22-23/4648		Dt. 30.12.2022		Your Work Order No. 4000286067-037-1019		Dt. 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 14.12.22			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)		24	Humidity (%)
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-4, FPM-4			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-4648			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				15.12.22			
[o] Analysis Start Date / Analysis Completion Date				15.12.22 / 18.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.8			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	37.0			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	16.4			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.7			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.21			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.0			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	11.5			

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Shreyasee Prasad
Date: 2023.01.03
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Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
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Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4648(A)		Dt: 30.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 14.12.22			
(d) Sampling Location				Collected from Near at the top of Switch Yard Office Building			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)		24	
(g) No. & Type of Container				Humidity (%)		73	
(h) Instrument ID				One poly Jar			
(i) Sample Quantity				RDS-4, FPM-4			
(j) Sample Code				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(k) Sample Condition on Receipt				A-4648			
(l) Items required to be tested				Fit for Analysis			
(m) Whether any specific Method of Test has been suggested by the party				As per contract			
(n) Date of receiving the sample				No			
(o) Analysis Start Date / Analysis Completion Date				15.12.22			
				15.12.22 / 18.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.04			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.14			
Nickel as Ni	ng / m ³	20	AAS Method	5.73			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.49			

Digitally signed by
SHREYASEE PRASAD
Date: 2023.01.03
15:15:30 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

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Shreyasee Prasad
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Authorized Signatory
Quality Manager

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TC-10682

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TEST REPORT

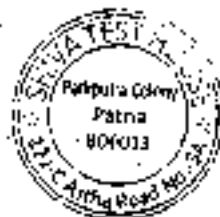
Ref. No. STH/TR/22-23/4653		Dt: 30.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 15.12.22			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	72
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-4, FPM-4			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-4653			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				16.12.22			
[o] Analysis Start Date / Analysis Completion Date				16.12.22 / 19.12.22			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	72.9		
2. Particulate Matter (PM _{2.5})		µg / m ³	50	CPCB (GMAAP Vol. I)	38.2		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	16.7		
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	31.7		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.14		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	4.2		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	10.3		

Shri. Suresh Kumar
General Manager (Env)
1511721 405307
1511721 405307

SHIVA
PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
15:17:21 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4653(A)	Dt: 30.12.2022	Your Work Order No. 4000295047-037-1019	Dt: 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 15.12.22			
(d) Sampling Location	Collected from Near at the top of Switch Yard Office Building			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	24	Humidity (%) 72	
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-4, FPM-4			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-4653			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	15.12.22			
(o) Analysis Start Date / Analysis Completion Date	16.12.22 / 19.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.01
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.15
4. Arsenic (As)	ng / m ³	6	AAS Method	0.22
5. Nickel as Ni	ng / m ³	20	AAS Method	4.30
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 1631)	0.16

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
15:17:36 +05'30'

Verified by :
Technical Manager



Shreyasee
Prasad

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Shreyasee Prasad
Date: 2023.01.03
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Authorized Signatory
Quality Manager

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Website: www.shivatest.com; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1985)



TC-10542

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TEST REPORT

Ref. No. STH/TR/22-23/4808 Dt: 30.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by		SHIVA TEST HOUSE on 20.12.22			
(d) Sampling Location		Collected from Near at the top of Switch Yard Office Building			
(e) Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition		Temp. (°C)	24	Humidity (%)	71
(g) No. & Type of Container		One poly Jar			
(h) Instrument ID		RDS-4, FPM-4			
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code		A-4696			
(k) Sample Condition on Receipt		Fit for Analysis			
(l) Items required to be tested		As per contract			
(m) Whether any specific Method of Test has been suggested by the party		No			
(n) Date of receiving the sample		21.12.22			
(o) Analysis Start Date / Analysis Completion Date		21.12.22 / 24.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.5	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.1	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	17.5	
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.1	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.14	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.3	
7. Ozone (O ₃)	µg / m ³	130	IS 5182 (Part-9)	13.7	

SHIVA TEST HOUSE
At: Tandwa, Dist- Chatra, Jharkhand- 825 321
Digitally signed by
Dr. Shreyasee Prasad
Date: 2023.01.03
15:27:40 +05'30'



Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
16:19:47 +05'30'
Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4806(A)		Dt: 30.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
(c) Sample Collected by				SHIVA TEST HOUSE on 20.12.22				
(d) Sampling Location				Collected from Near at the top of Switch Yard Office Building				
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)				
(f) Sampling Environmental Condition				Temp. (°C)		24	Humidity (%)	71
(g) No. & Type of Container				One poly Jar				
(h) Instrument ID				RDS-4, FPM-4				
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
(j) Sample Code				A-4806				
(k) Sample Condition on Receipt				Fit for Analysis				
(l) Items required to be tested				As per contract				
(m) Whether any specific Method of Test has been suggested by the party				No				
(n) Date of receiving the sample				21.12.22				
(o) Analysis Start Date / Analysis Completion Date				21.12.22 / 24.12.22				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building				
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.57				
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.08				
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18				
4. Arsenic (As)	ng / m ³	6	AAS Method	0.22				
Nickel as Ni	ng / m ³	20	AAS Method	7.16				
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.33				

SHIVA TEST HOUSE
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SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.01.03 15:21:52 +05'30'
Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.01.03 16:19:59 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10682

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TEST REPORT

Ref. No. STH/TR/22-23/4856		Dt: 31.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 21.12.22			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)		24	
				Humidity (%)		72	
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-4, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-4856			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				22.12.22			
[o] Analysis Start Date / Analysis Completion Date				22.12.22 / 25.12.22			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Switch Yard Office Building	
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		74.6	
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		40.3	
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		15.7	
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		36.1	
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.18	
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-6)		4.5	
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		14.3	

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
16:16:53 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
16:22:02 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4856(A) Dt: 31.12.2022 Your Work Order No. 3000285067-037-1019 Dt: 31.07.2022				
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 21.12.22			
(d) Sampling Location	Collected from Near at the top of Switch Yard Office Building			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C) 24 Humidity (%) 72			
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-4, FPM-4			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-4856			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	22.12.22			
(o) Analysis Start Date / Analysis Completion Date	22.12.22 / 26.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.02
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16
4. Arsenic (As)	ng / m ³	6	AAS Method	0.29
Nickel as Ni	ng / m ³	20	AAS Method	5.73
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-6)	0.25

Shreyasee Prasad
Sr. Analyst / Senior Manager
At: Karanpura (Ch. Rd. 2nd)
Dist: Chatra, Jharkhand (825321)
Mobile: 9826228187, 9826228188
Email: shreyasee@shivatesthouse.com

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Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. SIH/TR/22-23/5138	Di: 03.01.2023	Your Work Order No. 4000285067-037-1019	Di: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project: At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 29.12.22			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	18	Humidity (%) 73	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-5138			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	30.12.22			
[o] Analysis Start Date / Analysis Completion Date	30.12.22 / 02.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	77.3
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	44.4
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.1
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.5
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.16
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.8
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	21.9

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
16:54:39 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
16:58:31 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5138(A)		Dt: 03.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by				SHIVA TEST HOUSE on 29.12.22				
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building				
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition				Temp: (°C)		18	Humidity (%)	73
[g] No. & Type of Container				One poly Jar				
[h] Instrument ID				RDS-4, FPM-4				
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code				A-5138				
[k] Sample Condition on Receipt				Fit for Analysis				
[l] Items required to be tested				As per contract				
[m] Whether any specific Method of Test has been suggested by the party				No.				
[n] Date of receiving the sample				30.12.22				
[o] Analysis Start Date / Analysis Completion Date				30.12.22 / 02.01.23				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building				
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34				
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13				
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.21				
4. Arsenic (As)	ng / m ³	6	AAS Method	0.46				
Nickel as Ni	ng / m ³	20	AAS Method	2.84				
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.17				

Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
16:58:49 +05'30'

SHIBESHWAR PRASAD

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
16:58:57 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-18612

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TEST REPORT

Ref. No. SIH/TR/22-23/5155	Dt: 03.01.2023	Your Work Order No. 4000285087-037-1019	Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 30.12.22			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	18	Humidity (%)	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-5155			
[k] Sample Condition on Receipt	Ft for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No.			
[n] Date of receiving the sample	31.12.22			
[o] Analysis Start Date / Analysis Completion Date	31.12.22 / 02.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	72.5
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.0
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.7
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.9
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.11
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	3.5
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	13.9

Digitally signed by
Shreshw
Prasad
Date: 2023.01.03
15:26:29 +05'30'



Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
17:01:02 +05'30'

Verified by :
Technical Manager

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/5155(A)	Dr: 03.01.2023	Your Work Order No. 4000285087-037-1019	Dr: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 30.12.22			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	18	Humidity (%) 72	
[g] No. & Type of Container	Orie poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-5155			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	31.12.22			
[o] Analysis Start Date / Analysis Completion Date	31.12.22 / 02.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.68
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.04
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.28
Nickel as Ni	ng / m ³	20	AAS Method	5.87
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.40

Digitally signed by
SHREYASEE PRASAD
Date: 2023.01.03
16:56:41 +05'30'

SHIVA TEST HOUSE
At: Tandwa
Dist- Chatra
Jharkhand- 825 321



Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
17:01:19 +05'30'

Authorized Signatory
Quality Manager

Verified by :
Technical Manager

— END OF TEST REPORT —

- This report applies only to sample tested as above.
- Total Liability of our Laboratory is limited to invoiced amount.
- Test Report endorsed only the tests and not the product certificate.
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Contact us : 122-C, Amtha, Road No. 5A, Pailiputra Colony, Patna - 800 013 (Bihar)
Mob : +918676886249 ; +919431047908 Email : shiva@shivahouse.com ; info@shivahouse.com
Website : www.shivahouse.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC-10682

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TEST REPORT

Ref. No. STH/TR/22-23/4492 Dt: 21.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 08.12.22			
(d) Sampling Location	Collected from Near at the top of Tejasvi Building (Township)			
(e) Method of Sampling	IS 11255 (Part-1, 2, 3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C): 26 Humidity (%) 67			
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-1, FPM-1			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-4492			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No.			
(n) Date of receiving the sample	10.12.22			
(o) Analysis Start Date / Analysis Completion Date	10.12.22 / 13.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.0
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.9
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.2
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.2
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.20
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.4
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	19.2

Digitally signed by
SHREESHWAR PRASAD
Date: 2022.12.27
11:39:43 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.27
11:43:49 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



TC-10642

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TEST REPORT

Ref. No. STH/TR/22-23/4550		Dt: 21.12.2022		Your Work Order No. 4000205067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 10.12.22			
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	25	Humidity (%)	71
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-4550			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				12.12.22			
[o] Analysis Start Date / Analysis Completion Date				12.12.22 / 14.12.22			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	72.5		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	40.9		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.5		
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	36.0		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.18		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	4.6		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	15.8		

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.27
11:41:28 +05'30'

SHIBESHWAR PRASAD

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.27
11:47:30 +05'30'

Authorized Signatory
Quality Manager

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Contact us: 122-C, Ausha, Road No. 5A, Palipura Colony, Patna - 800 013 (Bihar)
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Website: www.shivadst.com; www.shivadsthouse.com



SHIVA TEST HOUSE

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TEST REPORT

Ref. No. SIH/TR/22-23/4550(A)		Dt: 21.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by:				SHIVA TEST HOUSE on 10.12.22			
[d] Sampling Location				Collected from: Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)		25	Humidity (%)
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-4550			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				12.12.22			
[o] Analysis Start Date / Analysis Completion Date				12.12.22 / 14.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.113			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.48			
Nickel as Ni	ng / m ³	20	AAS Method	1.47			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 1631)	0.49			

CV Shiva
Shri. Shri. Sanjay Kumar
Dy. General Manager (SIH)
Bihar State Pollution Control Board
B-2, 2nd Floor, 1st Floor, 2nd Floor
B-2, 2nd Floor, 1st Floor, 2nd Floor

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2022.12.27
11:41:41 +0530

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2022.12.27
11:47:48 +0530
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/4649(A) Dt: 30.12.2022 Your Work Order No. 4000285087-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321	
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)	
[c] Sample Collected by			SHIVA TEST HOUSE on 14.12.22	
[d] Sampling Location			Collected from Near at the top of Tejasvi Building (Township)	
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)	
[f] Sampling Environmental Condition			Temp. (°C)	24 Humidity (%) 73
[g] No. & Type of Container			One poly Jar	
[h] Instrument ID			RDS-1, FPM-1	
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)	
[j] Sample Code			A-4649	
[k] Sample Condition on Receipt			Fit for Analysis	
[l] Items required to be tested			As per contract	
[m] Whether any specific Method of Test has been suggested by the party			No	
[n] Date of receiving the sample			15.12.22	
[o] Analysis Start Date / Analysis Completion Date			15.12.22 / 16.12.22	
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.09
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.14
4. Arsenic (As)	ng / m ³	6	AAS Method	1.85
Nickel as Ni	ng / m ³	20	AAS Method	4.26
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.08

Digitally signed by
 DR. SHREYASEE PRASAD
 Date: 2023.01.03
 15:15:55 +05'30'
 HIBESHWAR PRASAD
 Digitally signed by
 HIBESHWAR PRASAD
 Date: 2023.01.03
 15:15:55 +05'30'



Shreyasee Prasad

Digitally signed by
 Shreyasee Prasad
 Date: 2023.01.03
 15:15:55 +05'30'
 Authorized Signatory
 Quality Manager

Verified by :
 Technical Manager

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SHIVA TEST HOUSE

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TC-16082

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TEST REPORT

Ref. No. STH/TR/22-23/4654	Dt: 30.12.2022	Your Work Order No: 4000285087-037-1019	Di: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 15.12.22			
[d] Sampling Location	Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp: (°C)	24	Humidity (%)	72
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-1, FPM-1			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-4654			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	16.12.22			
[o] Analysis Start Date / Analysis Completion Date	16.12.22 / 19.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	57.7
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	37.6
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.2
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.9
6. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.14
8. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.5
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	14.1

Digitally signed by
Dr. General Manager (EHS)
NTPC Ltd., North Karanpura
Date: 2023.01.03
15:17:52 +05'30'

SHIBESHWAR
AR PRASAD

Verified by :
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
15:17:52 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/4654(A)		DI : 30.12.2022		Your Work Order No. 4000285067-037-1019		DI : 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 15.12.22			
[d] Sampling Location				Collected from Near at the top of Tejaswini Building (Township)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	72
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-4654			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				16.12.22			
[o] Analysis Start Date / Analysis Completion Date				18.12.22 / 19.12.22			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswini Building (Township)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.568		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.07		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.15		
4. Arsenic (As)		ng / m ³	6	AAS Method	1.78		
Nickel as Ni		ng / m ³	20	AAS Method	2.84		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA Method 1631	0.25		

Shiva Test House
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SHRISHW
AR PRASAD
Digitally signed by
SHRISHW AR PRASAD
Date: 2023.01.03
15:14:00 +05'30'

Verified by :
Technical Manager



Shreyasee
Prasad
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Shreyasee Prasad
Date: 2023.01.03
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Quality Manager

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SHIVA TEST HOUSE

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TC-10582

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TEST REPORT

Ref. No. STH/TR/22-23/4809		Dt: 30.12.2022		Your Work Order No. 4000205067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 20.12.22			
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	71
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-4809			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested..				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample.				21.12.22			
[o] Analysis Start Date / Analysis Completion Date				21.12.22 / 24.12.22			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	68.2			
2. Particulate Matter (PM _{2.5})	µg / m ³	50	CPCB (GMAAP Vol. I)	36.3			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.2			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.0			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.18			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-6)	4.2			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	15.0			

SHIVESHWAR PRASAD
 Digitally signed by SHIVESHWAR PRASAD
 Date: 2023.01.03 15:22:03 +05'30'
 Verified by :
 Technical Manager



Shreyasee Prasad
 Digitally signed by Shreyasee Prasad
 Date: 2023.01.03 16:20:19 +05'30'
 Authorized Signatory
 Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No: STH/TR/22-23/4809(A)					Dt: 30.12.2022		Your Work Order No. 4000205067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321							
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)							
[c] Sample Collected by				SHIVA TEST HOUSE on 20.12.22							
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)							
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)							
[f] Sampling Environmental Condition				Temp. (°C)		24		Humidity (%)		71	
[g] No. & Type of Container				One poly Jar							
[h] Instrument ID				RDS-1, FPM-1							
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)							
[j] Sample Code				A-4809							
[k] Sample Condition on Receipt				Fit for Analysis							
[l] Items required to be tested				As per contract							
[m] Whether any specific Method of Test has been suggested by the party				No							
[n] Date of receiving the sample				21.12.22							
[o] Analysis Start Date / Analysis Completion Date				21.12.22 / 24.12.22							
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Tejasvi Building (Township)					
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)		0.45					
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)		0.06					
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)		0.16					
4. Arsenic (As)		ng / m ³	6	AAS Method		0.21					
Nickel as Ni		ng / m ³	20	AAS Method		5.68					
6. Mercury (Hg)		ng / m ³	Not Specified	USEPA (Method 1631)		0.16					

Digitally signed by
SHREYASEE PRASAD
Date: 2023.01.03
15:22:14 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

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Shreyasee Prasad
Date: 2023.01.03
16:20:34 +05'30'
Authorized Signatory
Quality Manager

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Website: www.shivatest.com, www.shivatesthouse.com



SHIVA TEST HOUSE

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TC-10342

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TEST REPORT

Ref. No. STH/TR/22-23/4657 Dt: 31.12.2022 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022				
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 21.12.22		
[d] Sampling Location		Collected from Near at the top of Tejasvi Building (Township)		
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	24	Humidity (%) 72
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-1, FPM-1		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-4857		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		22.12.22		
[o] Analysis Start Date / Analysis Completion Date		22.12.22 / 25.12.22		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.3
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.0
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	18.8
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.8
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.21
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.0
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	17.1

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Shreyasee Prasad
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Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/4857(A)		Dt: 31.12.2022		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by				SHIVA TEST HOUSE on 24.12.22				
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)				
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition				Temp. (°C)		24	Humidity (%)	72
[g] No. & Type of Container				One poly Jar				
[h] Instrument ID				RDS-1, FPM-1				
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code				A-4857				
[k] Sample Condition on Receipt				Fit for Analysis				
[l] Items required to be tested				As per contract				
[m] Whether any specific Method of Test has been suggested by the party				No				
[n] Date of receiving the sample				22.12.22				
[o] Analysis Start Date / Analysis Completion Date				22.12.22 / 25.12.22				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)				
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.77				
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.04				
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.13				
4. Arsenic (As)	ng / m ³	6	AAS Method	0.28				
Nickel as Ni	ng / m ³	20	AAS Method	7.10				
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 1631)	0.41				

SHIVA TEST HOUSE
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Date: 2023.01.03
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Verified by :
Technical Manager



Shreyashee
Prasad
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Shreyashee Prasad
Date: 2023.01.03
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Authorized Signatory
Quality Manager

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TC-90504

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TEST REPORT

Ref. No. STH/TR/22-23/5139		Dt: 03.01.2023		Your Work Order No. 4000205067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project. At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by			SHIVA TEST HOUSE on 29.12.22				
[d] Sampling Location			Collected from Near at the top of Tejasvi Building (Township)				
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition			Temp. (°C)		18	Humidity (%)	
[g] No. & Type of Container			One poly Jar.				
[h] Instrument ID			RDS-1, FPM-1				
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code			A-5239				
[k] Sample Condition on Receipt			Fit for Analysis				
[l] Items required to be tested			As per contract				
[m] Whether any specific Method of Test has been suggested by the party			No				
[n] Date of receiving the sample			30.12.22				
[o] Analysis Start Date / Analysis Completion Date			30.12.22 / 02.01.23				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	75.7			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	43.3			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.0			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	37.1			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.11			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.4			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	22.8			

Summary:
 लॉन्ग ड्रमर / Summary
 लॉन्ग ड्रमर / Summary
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SHIBESHWAR PRASAD Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
16:55:03 +05'30'

Verified by :
Technical Manager



Shreyasee
Prasad

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5139(A)		Dt: 03.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 29.12.22			
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)		18	Humidity (%)
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5139			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				30.12.22			
[o] Analysis Start Date / Analysis Completion Date				30.12.22 / 02.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.23			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.24			
Nickel as Ni	ng / m ³	20	AAS Method	1.43			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 1631)	0.28			

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
16:55:15 +05'30'

Verified by:
Technical Manager



Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
16:59:25 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10462

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TEST REPORT

Ref. No. <i>STH/TR/22-23/5156</i>		Dt: <i>03.01.2023</i>		Your Work Order No. <i>4000285047-037-1019</i>		Dt: <i>31.07.2022</i>		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			<i>Ambient Air Quality Monitoring (As per NAAQS)</i>					
[c] Sample Collected by			SHIVA TEST HOUSE on 30.12.22					
[d] Sampling Location			<i>Collected from Near at the top of Tejasvi Building (Township)</i>					
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)					
[f] Sampling Environmental Condition			Temp. (°C)		18	Humidity (%)		72
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-1, FPM-1					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-5156					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			31.12.22					
[o] Analysis Start Date / Analysis Completion Date			31.12.22 / 02.01.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result - Near at the top of Tejasvi Building (Township)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		74.0		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. II)		40.3		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		15.9		
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		34.6		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.18		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		4.4		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		15.5		

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.03
14:23:33 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.03
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5156(A)		Dt: 03.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 30.12.22			
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	18	Humidity (%)	72
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5156			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				31.12.22			
[o] Analysis Start Date / Analysis Completion Date				31.12.22 / 02.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.88			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.07			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.29			
Nickel as Ni	ng / m ³	20	AAS Method	8.59			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 1631)	0.08			

SHIBESHWAR PRASAD
General Manager (Lab)
164307-40530



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.01.03 17:01:51 +0530
Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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SHIVA TEST HOUSE

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TC-10882

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TEST REPORT

Ref. No. STH/TR/22-23/5248		Dt: 13.01.2023		Year Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
(c) Sample Collected by				SHIVA TEST HOUSE on 05.01.23				
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)				
(e) Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)				
(f) Sampling Environmental Condition				Temp. (°C)		15	Humidity (%)	75
(g) No. & Type of Container				One poly Jar				
(h) Instrument ID				RDS-1, FPM-1				
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
(j) Sample Code				A-5248				
(k) Sample Condition on Receipt				Fit for Analysis				
(l) Items required to be tested				As per contract				
(m) Whether any specific Method of Test has been suggested by the party				No				
(n) Date of receiving the sample				07.01.23				
(o) Analysis Start Date / Analysis Completion Date				07.01.23 / 09.01.23				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)				
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.3				
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol I)	42.5				
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.2				
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	37.1				
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.09				
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.2				
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.9				

Dr. Shreya
1807 1807/ Sanjay Kumar
1807 1807/ Sanjay Kumar
Dr. General Manager (EMO)
1807 1807/ Sanjay Kumar
1807 1807/ Sanjay Kumar

SHIBESHW
AR PRASAD
Digitally signed by
SHIBESHW AR PRASAD
Date: 2023.01.13
13:30:52 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad
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Shreyasee Prasad
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13:35:54 +05'30'
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Quality Manager

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Website : www.shivatesthouse.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC-10582

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TEST REPORT

Ref. No. <i>STH/TR/22-23/5276</i>	Dt: <i>13.01.2023</i>	Your Work Order No. <i>4000285087-037-1019</i>	Dr: <i>31.07.2022</i>
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by	SHIVA TEST HOUSE on 06.01.23		
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)		
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)		
[f] Sampling Environmental Condition	Temp. (°C)	18	Humidity (%) 72
[g] No. & Type of Container	One poly Jar		
[h] Instrument ID	RDS-2, FPM-2		
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code	A-5276		
[k] Sample Condition on Receipt	Fit for Analysis		
[l] Items required to be tested	As per contract		
[m] Whether any specific Method of Test has been suggested by the party	No		
[n] Date of receiving the sample	07.01.23		
[o] Analysis Start Date / Analysis Completion Date	07.01.23 / 09.01.23		

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.1
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	36.3
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.7
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.4
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.21
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.7
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	16.5

Shri. B. S. Singh / Shri. B. S. Singh
2nd Assistant (4 yrs exp)
Dy. General Manager (EMIS)
Bihar Road, Indraprastha, Patna
Jharkhand, North Karanpura District

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2023.01.13
13:33:58 +05'30'

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Technical Manager



Shreyasee
Prasad

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TEST REPORT

Ref. No. <i>STH/TR/22-23/5276(A)</i> Dt: <i>13.01.2023</i>		Your Work Order No. <i>4000285067-037-1019</i>		Dt: <i>31.07.2022</i>	
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample		<i>Ambient Air Quality Monitoring (As per NAAQS)</i>			
(c) Sample Collected by		SHIVA TEST HOUSE on <i>06.01.23</i>			
(d) Sampling Location		<i>Collected from Near at the top of Thane Office (Main Plant)</i>			
(e) Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)			
(f) Sampling Environmental Condition		Temp. (°C)		<i>18</i>	Humidity (%)
(g) No. & Type of Container		One poly Jar			
(h) Instrument ID		RDS-2, FPM-2			
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code		A-5276			
(k) Sample Condition on Receipt		Fit for Analysis			
(l) Items required to be tested		As per contract			
(m) Whether any specific Method of Test has been suggested by the party		No			
(n) Date of receiving the sample		<i>07.01.23</i>			
(o) Analysis Start Date / Analysis Completion Date		<i>07.01.23 / 09.01.23</i>			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Thane Office (Main Plant)	
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.68	
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.08	
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18	
4. Arsenic (As)	ng / m ³	8	AAS Method	0.14	
Nickel as Ni	ng / m ³	20	AAS Method	7.10	
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 1631)	0.49	

Shri. Shri. Sanjay Kumar
Sd/- Director (E & W)
Dt. General Manager (E & W)
P.O. Box 8888, 1st Floor, 825321
North Karanpura, Jharkhand

SHIBESHWAR PRASAD
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Date: 2023.01.13 13:34:09 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad
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Quality Manager

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Website: www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

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TC-10382

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TEST REPORT

Ref. No. STH/TR/22-23/5396 Dt: 21.01.2023 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by		SHIVA TEST HOUSE on 11.01.23			
(d) Sampling Location		Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition		Temp. (°C)	14	Humidity (%)	75
(g) No. & Type of Container		One poly Jar			
(h) Instrument ID		RDS-2, FPM-2			
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code		A-5396			
(k) Sample Condition on Receipt		Fit for Analysis			
(l) Items required to be tested		As per contract			
(m) Whether any specific Method of Test has been suggested by the party		No			
(n) Date of receiving the sample		12.01.23			
(o) Analysis Start Date / Analysis Completion Date		12.01.23 / 14.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.0	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	42.0	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.7	
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	36.6	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.09	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.3	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	22.2	

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.21
16:57:32 +05'30'

SHIBESHWAR PRASAD

Verified by:
Technical Manager



Shreyasee Prasad

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Shreyasee Prasad
Date: 2023.01.21
17:01:36 +05'30'
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Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5396(A)		Dt: 21.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 11.01.23			
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)	14	Humidity (%)	75
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-2, FPM-2			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-5396			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				12.01.23			
(o) Analysis Start Date / Analysis Completion Date				12.01.23 / 14.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.11			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.10			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.21			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.42			
Nickel as Ni	ng / m ³	20	AAS Method	2.80			
5. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.32			

Shravan
 Sr. Engineer / Sanjay Kumar
 Sr. Instrumentation & test engg
 Dy. General Manager (EHS)
 Project: 1000 MW Super Thermal Power
 NTPC Limited, North Karanpura, Jharkhand

SHIBESHWAR PRASAD
 Digitally signed by
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 Date: 2023.01.21
 16:57:54 +05'30'

Verified by:
 Technical Manager



Shreyasee Prasad

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 Quality Manager

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SHIVA TEST HOUSE

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TC-10502

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TEST REPORT

Ref. No. STH/TR/22-23/5436					Dt: 21.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321							
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)							
[c] Sample Collected by			SHIVA TEST HOUSE on 13.01.23							
[d] Sampling Location			Collected from Near at the top of Time Office (Main Plant)							
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)							
[f] Sampling Environmental Condition			Temp. (°C)		17		Humidity (%)		73	
[g] No. & Type of Container			One poly Jar							
[h] Instrument ID			RDS-2, FPM-2							
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)							
[j] Sample Code			A-5436							
[k] Sample Condition on Receipt			Fit for Analysis							
[l] Items required to be tested			As per contract							
[m] Whether any specific Method of Test has been suggested by the party			No							
[n] Date of receiving the sample			14.01.23							
[o] Analysis Start Date / Analysis Completion Date			14.01.23 / 16.01.23							
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Time Office (Main Plant)				
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		74.4				
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		39.1				
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		17.6				
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		37.2				
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.04				
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		5.0				
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		17.0				

Dr. Sanjay Kumar
187, Jyoti Chandra Chakravarty Rd, 1st Flr,
Dy. General Manager (EM&O)
Bihar State Pollution Control Board
Bhagalpur, Bihar-824001

SHIBESHWAR PRASAD
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Date: 2023.01.21 16:59:32 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

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TEST REPORT

Ref. No. STH/TR/22-23/5436(A)		Dt: 21.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 13.01.23			
[d] Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	17	Humidity (%)	73
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-2, FPM-2			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5436			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				14.01.23			
[o] Analysis Start Date / Analysis Completion Date				14.01.23 / 16.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.68			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.05			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.06			
Nickel as Ni	ng / m ³	20	AAS Method	7.16			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.16			

Shri. S. S. Sanyal Kumar
 Dy. General Manager (Lab)
 Shri. S. S. Sanyal Kumar
 Dy. General Manager (Lab)
 Shri. S. S. Sanyal Kumar
 Dy. General Manager (Lab)



SHIBESHWAR PRASAD
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 SHIBESHWAR PRASAD
 Date: 2023.01.21
 16:59:43 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad
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SHIVA TEST HOUSE

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TC-10382

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TEST REPORT

Ref. No. STH/TR/22-23/5885 Dt: 02.02.2023 Your Work Order No. 4000285087-037-1019 Dt: 31.07.2022					
[a]	Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b]	Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c]	Sample Collected by		SHIVA TEST HOUSE on: 25.01.23		
[d]	Sampling Location		Collected from Near at the top of Time Office (Main Plant)		
[e]	Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f]	Sampling Environmental Condition		Temp. (°C)	19 Humidity (%) 71	
[g]	No. & Type of Container		One poly Jar		
[h]	Instrument ID		RDS-1, FPM-1		
[i]	Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j]	Sample Code		4-5885		
[k]	Sample Condition on Receipt		Fit for Analysis		
[l]	Items required to be tested		As per contract		
[m]	Whether any specific Method of Test has been suggested by the party		No		
[n]	Date of receiving the sample		28.01.23		
[o]	Analysis Start Date / Analysis Completion Date		28.01.23 / 30.01.23		
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	74.0
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	46.6
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	11.9
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.0
Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.09
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.7
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	24.5

Shivashwari Sanjay Kumar
1st Assistant (A-1000)
General Manager (E&E)
Bihar State Pollution Control Board
Bhagalpur, Bihar

SHIVASHWARI PRASAD
Digitally signed by SHIVASHWARI PRASAD
Date: 2023.02.02 14:59:27 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.02 15:14:22 +05'30'
Authorized Signatory
Quality Manager

- END OF TEST REPORT -

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Contact us : (22x7, Ashta, Road No. 5A, Pallipura Colony, Patna - 800 013, Bihar)
Mob : +918676886249, +919431047908 Email : shivashwari@shiva-test.com, info@shivatest.com
Website : www.shivatest.com, www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)

RECOGNISED AS ENVIRONMENTAL LABORATORY BY M&EPC, GOVT. OF INDIA, UNDER ENVIRONMENT (PROTECTION) ACT 1986, DEPTT. OF INDUSTRY, FORESTS & ENVIRONMENT, GOVT. OF BIHAR AND BIHAR STATE POLLUTION CONTROL BOARD

TEST REPORT

Ref. No. STH/TR/22-23/5895(A) Dt: 02.02.2023 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 25.01.23			
[d] Sampling Location		Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp. (°C)	19	Humidity (%)	71
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-2, FPM-2			
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-5895			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		28.01.23			
[o] Analysis Start Date / Analysis Completion Date		28.01.23 / 30.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)	
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.23	
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11	
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.22	
4. Arsenic (As)	ng / m ³	6	AAS Method	0.39	
Nickel as Ni	ng / m ³	20	AAS Method	2.80	
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.28	

Shri. Suresh Kumar
Dy. General Manager (E&E)
Shri. Suresh Kumar
Dy. General Manager (E&E)
Shri. Suresh Kumar
Dy. General Manager (E&E)

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.02
14:50:45 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.02
15:14:52 +05'30'

Authorized Signatory
Quality Manager

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Website : www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/5890		Dt: 02.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 27.01.23			
[d] Sampling Location				Collected from Near as the top of Time Office (Main Plant)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp: (°C)	19	Humidity (%)	70
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-2, FPM-2			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5890			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				28.01.23			
[o] Analysis Start Date / Analysis Completion Date				28.01.23/ 30.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	73.2		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. II)	41.7		
3. Sulphur Dioxide as SO ₂		µg / m ³	60	IS 5182 (Part-2)	17.2		
Nitrogen Dioxide as NO ₂		µg / m ³	60	IS 5182 (Part-6)	35.1		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.04		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	5.0		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	17.1		

SHIBESHVAR PRASAD
General Manager (E&E)
15.06.48+05'30'

Digitally signed by
SHIBESHVAR PRASAD
Date: 2023.02.02
15:06:48+05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.02
15:18:07+05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5890(A)		Dt : 02.02.2023		Your Work Order No. 4000286067-037-1019		Dt : 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 27.01.23			
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)		19	
(g) No. & Type of Container				Humidity (%)		70	
(h) Instrument ID				One poly Jar			
(i) Sample Quantity				RDS-2, FPM-2			
(j) Sample Code				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(k) Sample Condition on Receipt				A-5890			
(l) Items required to be tested				Fit for Analysis			
(m) Whether any specific Method of Test has been suggested by the party				As per contract			
(n) Date of receiving the sample				No			
(o) Analysis Start Date / Analysis Completion Date				28.01.23			
				28.01.23/ 30.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.23			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.04			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.14			
Nickel as Ni	ng / m ³	20	AAS Method	4.20			
5. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.16			

SHIVA TEST HOUSE
122-C, Aashu, Road No. 3A, Padipura Colony, Patna-800013 (Bihar)
Dt: 02.02.2023
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.02 15:07:03 +05'30'

SHIBESHWAR PRASAD

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.02 15:18:26 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10632

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TEST REPORT

Ref. No. 5TH/TR/22-23/5928		Dt: 04.02.2023		Your Work Order No. 4000285047-837-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 30.01.23			
[d] Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	19	Humidity (%)	70
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5928			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				01.02.23			
[o] Analysis Start Date / Analysis Completion Date				01.02.23 / 04.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	75.8			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	43.0			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.1			
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.3			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.08			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.5			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	21.6			

Digitally signed by
SHIBESHVAR PRASAD
Date: 2023.02.04
13:27:37 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.04
13:47:10 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5928(A) Dt: 04.02.2023		Your Work Order No. 4000285067-437-1019		Dt: 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 30.01.23			
[d] Sampling Location		Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp. (°C)	19	Humidity (%)	71
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-2, FPM-2			
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-5928			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		01.02.23			
[o] Analysis Start Date / Analysis Completion Date		01.02.23 / 04.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)	
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34	
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.10	
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.20	
4. Arsenic (As)	ng / m ³	6	AAS Method	0.37	
5. Nickel as Ni	ng / m ³	20	AAS Method	1.40	
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method IO-5)	0.23	

SHIVA TEST HOUSE
374 Chhatrapati (K. P. S. Rd.)
Dr. General Manager (RMO)
At: Chatra, Dist: Jharkhand-825321

SHIVESH
AR PRASAD

Digitally signed by
SHIVESH AR PRASAD
Date: 2023.02.04
13:27:54 +05'30'

Verified by :
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.04
13:47:28 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5933		Dt: 04.02.2023		Your Work Order No. 4040285067-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 31.01.23			
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)	19	Humidity (%)	70
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-2, FPM-2			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-5933			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				01.02.23			
(o) Analysis Start Date / Analysis Completion Date				01.02.23 / 04.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	74.4		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	42.1		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	18.2		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	35.8		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.11		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	5.2		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	17.7		

SHIVA TEST HOUSE
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Website: www.shivatest.com ; www.shivatesthouse.com

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.04
13:30:44 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.04
13:49:49 +05'30'

Authorized Signatory
Quality Manager

- END OF TEST REPORT -

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TEST REPORT

Ref. No. STH/TR/22-23/5933(A)	DI: 04.02.2023	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 31.01.23			
(d) Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	19	Humidity (%) 70	
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-2, FPM-2			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-5933			
(k) Sample Condition on Receipt	Fk for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	01.02.23			
(o) Analysis Start Date / Analysis Completion Date	01.02.23 / 04.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.05
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17
4. Arsenic (As)	ng / m ³	6	AAS Method	0.21
5. Nickel as Ni	ng / m ³	20	AAS Method	2.80
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-S)	0.25

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.04
13:30:57 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.04
13:50:07 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



TC-10082

RECOGNISED AS ENVIRONMENTAL LABORATORY BY MoEFCC, GOVT. OF INDIA, UNDER ENVIRONMENT (PROTECTION) ACT 1986, DEPTT. OF INDUSTRY, FORESTS & ENVIRONMENT, GOVT. OF BIHAR AND BIHAR STATE POLLUTION CONTROL BOARD

TEST REPORT

Ref. No. STH/TR/22-23/5249 Dt: 13.01.2023 Your Work Order No. 4000285067-037-1018 Dt: 31.07.2022					
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 05.01.23			
[d] Sampling Location		Collected from Near at the top of DM Plant			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp. (°C)	15	Humidity (%)	75
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-3, FPM-3			
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-5249			
[k] Sample Condition on Receipt		Ft for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		07.01.23			
[o] Analysis Start Date / Analysis Completion Date		07.01.23 / 09.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant:	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	70.3	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	40.1	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.8	
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.3	
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.17	
5. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.3	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	17.0	

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SHREYASEE PRASAD
Date: 2023.01.13
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Shreyasee
Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.01.13
13:36:47 +05'30'

Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/5249(A)		Dt: 13.01.2023		Your Work Order No. 4000285047-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 05.01.23			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	15	Humidity (%)	75
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5249			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				07.01.23			
[o] Analysis Start Date / Analysis Completion Date				07.01.23 / 09.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.09			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.40			
5. Nickel as Ni	ng / m ³	20	AAS Method	2.93			
Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 1631)	0.49			

Digitally signed by
SHRIBESHWAR PRASAD
Date: 2023.01.13
13:37:04 +05'30'

SHRIBESHWAR PRASAD
General Manager (QA/QC)
Sector 100B, 1st Stage, PATNA
Bihar 800 013



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.13
13:37:04 +05'30'

Authorized Signatory
Quality Manager

Verified by :
Technical Manager

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Website : www.shivatest.com ; www.shivatsthouse.com



SHIVA TEST HOUSE

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TC-10002

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TEST REPORT

Ref. No. STH/TR/22-23/5277		Dt: 13.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 06.01.23			
[d] Sampling Location				Collected from Near at the top of DM Plant.			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	18	Humidity (%)	72
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5277			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				07.01.23			
[o] Analysis Start Date / Analysis Completion Date				07.01.23 / 09.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant	
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		72.6	
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		40.9	
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		17.9	
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		35.1	
Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.18	
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		4.8	
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		16.4	

Shreyasee / Sanjay Kumar
204 Zentech House (4th floor)
Dr. General Manager (E&E)
Bihar State Pollution Control Board
Bhubaneswar, Odisha-751005

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.01.13 13:34:20 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad
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Date: 2023.01.13 13:41:57 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5277(A)		Dt: 13.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 06.01.23			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp: (°C)		18	
[g] No. & Type of Container				Humidity (%)		72	
[h] Instrument ID				One poly Jar			
[i] Sample Quantity				RDS-3, FPM-3			
[j] Sample Code				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[k] Sample Condition on Receipt				A-5277			
[l] Items required to be tested				Fit for Analysis			
[m] Whether any specific Method of Test has been suggested by the party				As per contract			
[n] Date of receiving the sample				No			
[o] Analysis Start Date / Analysis Completion Date				07.01.23			
Analysis Start Date / Analysis Completion Date				07.01.23 / 09.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.06			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.43			
5. Nickel as Ni	ng / m ³	20	AAS Method	5.59			
Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.25			

Shiva Test House
122-C, Asaf Ali, Road No. 5A, Patliputra Colony, Patna - 800 013 (Bihar)
By: General Manager (EMO)
Date: 13.01.2023
13:42:11 +05:30



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.01.13
13:42:11 +05:30

Verified by:
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.01.13
13:42:11 +05:30
Authorized Signatory
Quality Manager

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TC-10652

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TEST REPORT

Ref. No. STH/TR/22-23/5397		Dt: 21.01.2023		Your Work Order No. 4000285067-037-1019		Dt.: 31.07.2022		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by			SHIVA TEST HOUSE on 11.01.23					
[d] Sampling Location			Collected from Room at the top of DM Plant					
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)					
[f] Sampling Environmental Condition			Temp. (°C)		14		Humidity (%)	75
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-3, FPM-3					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-5397					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			12.01.23					
[o] Analysis Start Date / Analysis Completion Date			12.01.23 / 14.01.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		70.5		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		40.6		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		13.3		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		34.2		
Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.16		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		4.4		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		19.2		


 Shiveshwar Prasad
 General Manager (QM)
 STH, North Karanpura
 Dist- Chatra, Jharkhand- 825321

Digitally signed by
 SHIVESHWAR PRASAD
 Date: 2023.01.21
 16:53:06 +05'30'

Verified by:
 Technical Manager



Shreyasee
 Prasad

Digitally signed by
 Shreyasee Prasad
 Date: 2023.01.21
 17:02:12 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5397(A)		Dt : 21.01.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 11.01.23			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	14	Humidity (%)	75
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5397			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				12.01.23			
[o] Analysis Start Date / Analysis Completion Date				12.01.23 / 14.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.18		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.15		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.38		
5. Nickel as Ni		ng / m ³	20	AAS Method	1.47		
Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 1631)	0.53		

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.21
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SHIBESHWAR
AR PRASAD

Verified by :
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.21
17:02:24 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5437 Dt: 21.01.2023 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by		SHIVA TEST HOUSE on 13.01.23			
(d) Sampling Location		Collected from Near at the top of DM Plant			
(e) Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)			
(f) Sampling Environmental Condition		Temp. (°C)	17	Humidity (%)	73
(g) No. & Type of Container		One poly Jar			
(h) Instrument ID		RDS-3, FPM-3			
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code		A-5437			
(k) Sample Condition on Receipt		Fit for Analysis			
(l) Items required to be tested		As per contract			
(m) Whether any specific Method of Test has been suggested by the party		No			
(n) Date of receiving the sample		14.01.23			
(o) Analysis Start Date / Analysis Completion Date		14.01.23 / 16.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	72.8	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	40.9	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	16.8	
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.6	
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.18	
5. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-6)	4.8	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	16.4	

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.21
16:59:57 +05'30'



Shreyasee
Prasad

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Shreyasee Prasad
Date: 2023.01.21
17:13:42 +05'30'

Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5437(A)		Dt: 21.01.2023		Your Work Order No. 4000205067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 13.01.23			
[d]	Sampling Location			Collected from Near at the top of DM Plant			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	17	Humidity (%)	73
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-3, FPM-3			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-5437			
[k]	Sample Condition on Receipt			Fit for Analyse			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			14.01.23			
[o]	Analysis Start Date/ Analysis Completion Date			14.01.23 / 16.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.45		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.06		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.17		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.43		
5. Nickel as Ni		ng / m ³	20	AAS Method	5.59		
Mercury (Hg)		ng / m ³	Not Specified	USEPA (method 10-5)	0.25		

SHIVA TEST HOUSE
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Verified by :
Technical Manager

Shreyasee
Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.01.21
17:11:54 +05'30'
Authorized Signatory
Quality Manager

- END OF TEST REPORT -

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Mob: +918676336249; +919431047905 Email: shivamat@shiva.co.in; info@shivatest.com
Website: www.shivatest.com; www.shivatesthouse.com

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TEST REPORT

Ref. No. SHH/TK/22-23/5886		Dt: 02.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 25.01.23			
[d] Sampling Location				Collected from Near in the top of DM Plant			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	19	Humidity (%)	71
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5886			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				28.01.23			
[o] Analysis Start Date / Analysis Completion Date				28.01.23 / 30.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant	
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		72.3	
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol I)		42.2	
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		14.3	
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		35.2	
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.16	
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		5.1	
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		19.8	

Dr. Gaur / Sanjay Kumar
Dr. General Manager (R&D)
Pharm. Div. of Bharat-India
Pharm. Div. of Bharat-India

SHIBESHWA
R PRASAD

Verified by :
Technical Manager



Shreyasee
Prasad

Digitally signed by Shreyans
Dated: 2023.02.02 15:15:16 +0530
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)

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TEST REPORT

Ref. No. STH/TR/22-23/5886(A)		Dt: 02.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 25.01.23			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	19	Humidity (%)	71
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5886			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				28.01.23			
[o] Analysis Start Date / Analysis Completion Date				28.01.23 / 30.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.46		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.19		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.16		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.40		
5. Nickel as Ni		ng / m ³	20	AAS Method	2.93		
Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-6)	0.52		

Shiva Test House
At: Tandwa, Dist- Chatra, Jharkhand- 825 321
Contact: 9431047903, 9431047904
Email: info@shivatest.com, info@shivatest.com

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.02
15:01:06 +05'30'



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.02 at 15:05:15 +05'30'

Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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Website : www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/5891(A)		Dt: 02.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 27.01.23			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)		19	
[g] No. & Type of Container				Humidity (%)		70	
[h] Instrument ID				One poly Jar			
[i] Sample Quantity				RDS-3, FPM-3			
[j] Sample Code				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[k] Sample Condition on Receipt				A-5891			
[l] Sample Condition on Receipt				Fit for Analysis			
[m] Items required to be tested				As per contract			
[n] Whether any specific Method of Test has been suggested by the party				No			
[o] Date of receiving the sample				26.01.23			
[p] Analysis Start Date / Analysis Completion Date				26.01.23/30.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.03			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16			
4. Arsenic (As)	ng / m ³	8	AAS Method	0.07			
5. Nickel as Ni	ng / m ³	20	AAS Method	1.47			
Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.24			

SHIBESHWAR PRASAD
General Manager (Lab)
SHIVA TEST HOUSE
122-C, Anthe Road, North Karanpura, Patna-800011

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.02 15:07:28 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.02 15:19:14 +05'30'
Authorized Signatory
Quality Manager

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Website: www.shivatst.com ; www.shivatsthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC-14382

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TEST REPORT

Ref. No. STH/TE/22-23/5929	Dt: 04.02.2023	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 30.01.23			
[d] Sampling Location	Collected from Near at the top of DM Plant			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	19	Humidity (%) 71	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-3, FPM-3			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-5929			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	01.02.23			
[o] Analysis Start Date / Analysis Completion Date	01.02.23 / 04.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.2
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	44.3
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.8
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-8)	34.2
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.13
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.7
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	17.3

Shri. Shri. / Sanjay Kumar
137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.04 13:28:08 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.04 13:47:43 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/5929(A)		Dt: 04.02.2023		Your Work Order No. 4000285087-037-1018		Dt: 31.07.2023		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by				SHIVA TEST HOUSE on 30.01.23				
[d] Sampling Location				Collected from Near at the top of DM Plant				
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition				Temp. (°C)		19	Humidity (%)	71
[g] No. & Type of Container				One poly Jar				
[h] Instrument ID				RDS-3, FPM-3				
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code				A-5929				
[k] Sample Condition on Receipt				Fit for Analysis				
[l] Items required to be tested				As per contract				
[m] Whether any specific Method of Test has been suggested by the party				No				
[n] Date of receiving the sample				01.02.23				
[o] Analysis Start Date / Analysis Completion Date				01.02.23 / 04.02.23				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant				
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46				
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.17				
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18				
4. Arsenic (As)	ng / m ³	6	AAS Method	0.34				
5. Nickel as Ni	ng / m ³	20	AAS Method	1.47				
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.28				

Shiva Test House
At: Tandwa, Sanjay Kumar
Dist: Chatra (Bihar)
By: General Manager (Lab)
Phone: 88024, 914 45721
HTPC Limited, North Karanpura 82521

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.04
13:28:55 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.04 13:47:51 +05'30'

Authorized Signatory
Quality Manager

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Website : www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)

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TEST REPORT

Ref. No. STH/TR/22-23/5934		DL: 04.02.2023		Your Work Order No. 4000285087-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 31.01.23			
[d]	Sampling Location			Collected from Near at the top of DM Plant			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	19	Humidity (%)	70
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-3, FPM-3			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-5934			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			01.02.23			
[o]	Analysis Start Date / Analysis Completion Date			01.02.23 / 04.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	77.0		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	41.4		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	21.2		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-8)	38.6		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.11		
Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	4.7		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	15.8		

SHIBESHWAR PRASAD
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Date: 2023.02.04 13:31:11 +05'30'

SHIBESHWAR PRASAD

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.04 13:50:29 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



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TEST REPORT

Ref. No. STH/TR/22-23/5934(A)		Dt.: 04.02.2023		Your Work Order No. 4000288067-037-1019		Dt. 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 31.01.23			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 11253 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	19	Humidity (%)	70
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5934			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				01.02.23			
[o] Analysis Start Date / Analysis Completion Date				01.02.23 / 04.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.11			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.05			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.14			
5. Nickel as Ni	ng / m ³	20	AAS Method	2.93			
Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.32			

Shri. S. S. S. / Sanjay Kumar
2nd Assistant (C) on chg.
Dt. General Manager (E&E)
Pollut. Contr. Dept. Bihar
HTO Listed, North Karanpura, Jharkh.

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2023.02.04
13:57:24 +05'30'



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.04
13:50:49 +05'30'

Verified by :
Technical Manager

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10482

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TEST REPORT

Ref. No. STH/TR/22-23/5250 Dt: 13.01.2023 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 05.01.23			
[d] Sampling Location		Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp. (°C)	15	Humidity (%)	75
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-4, FPM-4			
[i] Sample Quantity		30 ml x 8 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-5250			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		07.01.23			
[o] Analysis Start Date / Analysis Completion Date		07.01.23 / 09.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.3	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	41.2	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.2	
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	38.0	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.16	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.0	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	22.5	

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SHREYASEE PRASAD
Date: 2023.01.13
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Shreyasee Prasad

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Shreyasee Prasad
Date: 2023.01.13
13:37:24 +05'30'

Verified by :
Technical Manager

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5250(A)		Dt: 13.01.2023		Your Work Order No. 4000285007-037-1019		Dt: 31.07.2022		
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
(c) Sample Collected by				SHIVA TEST HOUSE on 06.01.23				
(d) Sampling Location				Collected from Near at the top of Switch Yard Office Building				
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)				
(f) Sampling Environmental Condition				Temp. (°C):		16	Humidity (%)	76
(g) No. & Type of Container				One poly Jar				
(h) Instrument ID				RDS-4, FPM-4				
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
(j) Sample Code				A-5250				
(k) Sample Condition on Receipt				Fit for Analysis				
(l) Items required to be tested				As per contract				
(m) Whether any specific Method of Test has been suggested by the party				No				
(n) Date of receiving the sample				07.01.23				
(o) Analysis Start Date / Analysis Completion Date				07.01.23 / 09.01.23				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building				
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.23				
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11				
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.20				
4. Arsenic (As)	ng / m ³	6	AAS Method	0.40				
Nickel as Ni	ng / m ³	20	AAS Method	1.43				
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method IO-5)	0.33				



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SHIBESHWAR PRASAD
Date: 2023.01.13
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SHIBESHWAR
PRASAD

Verified by:
Technical Manager

Shreyasee
Prasad

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Shreyasee Prasad
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-18682

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TEST REPORT

Ref. No. <i>SIH/TR/22-23/5278</i>		Di: <i>13.01.2023</i>		Your Work Order No. <i>4000286067-037-1019</i>		Di: <i>31.07.2022</i>		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			<i>Ambient Air Quality Monitoring (As per NAAQS)</i>					
[c] Sample Collected by			SHIVA TEST HOUSE on <i>06.01.23</i>					
[d] Sampling Location			<i>Collected from Near at the top of Switch Yard Office Building</i>					
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)					
[f] Sampling Environmental Condition			Temp. (°C)		18	Humidity (%)		72
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-4, FPM-4					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-5278					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			07.01.23					
[o] Analysis Start Date / Analysis Completion Date			07.01.23 / 09.01.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		73.1		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		39.7		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		16.8		
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		36.8		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.14		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		3.8		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		14.6		

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SHIBESHWAR PRASAD
Date: 2023.01.13
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AR PRASAD

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.13
13:42:26 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5278(A)		Dt: 13.01.2023		Your Work Order No. 4000285047-037-1019		Dt: 31.07.2022		
(a) Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
(b) Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
(c) Sample Collected by			SHIVA TEST HOUSE on 06.01.23					
(d) Sampling Location			Collected from Near at the top of Switch Yard Office Building					
(e) Method of Sampling			IS 11255 (Part-12,3 & 7)					
(f) Sampling Environmental Condition			Temp. (°C)		18	Humidity (%)		72
(g) No. & Type of Container			One poly Jar					
(h) Instrument ID			RDS-4, FPM-4					
(i) Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
(j) Sample Code			A-5278					
(k) Sample Condition on Receipt			Fit for Analysis					
(l) Items required to be tested			As per contract					
(m) Whether any specific Method of Test has been suggested by the party			No					
(n) Date of receiving the sample			07.01.23					
(o) Analysis Start Date / Analysis Completion Date			07.01.23 / 09.01.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.68			
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.04			
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.18			
4. Arsenic (As)		ng / m ³	6	AAS Method	0.07			
Nickel as Ni		ng / m ³	20	AAS Method	6.87			
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA (Method 10-5)	0.32			

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.13
13:34:55 +05'30'

Verified by :
Technical Manager



Shreyasee
Prasad

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Shreyasee Prasad
Date: 2023.01.13
13:42:44 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5398		Dt: 21.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 11.01.23			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)		14	
[g] No. & Type of Container				Humidity (%)		76	
[h] Instrument ID				One poly Jar			
[i] Sample Quantity				RDS-4, FPM-4			
[j] Sample Code				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[k] Sample Condition on Receipt				A-5398			
[l] Items required to be tested				Fill for Analysis			
[m] Whether any specific Method of Test has been suggested by the party				As per contract			
[n] Date of receiving the sample				No			
[o] Analysis Start Date / Analysis Completion Date				12.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.4			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.9			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.7			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.9			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.16			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.1			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	21.9			

Dr. Shreya Prasad
 Sr. Analyst / Senior Manager
 Digitally signed by
 SHREYASEE PRASAD
 Date: 2023.01.21
 16:52:29 +05'30'



Shreyasee Prasad
 Digitally signed by
 Shreyasee Prasad
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 17:02:37 +05'30'
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 Quality Manager

Verified by:
 Technical Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5398(A)		Dt: 21.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by				SHIVA TEST HOUSE on 11.01.23				
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building				
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition				Temp. (°C)		14	Humidity (%)	75
[g] No. & Type of Container				One poly Jar				
[h] Instrument ID				RDS-4, FPM-4				
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code				A-5398				
[k] Sample Condition on Receipt				Fit for Analysis				
[l] Items required to be tested				As per contract				
[m] Whether any specific Method of Test has been suggested by the party				No				
[n] Date of receiving the sample				12.01.23				
[o] Analysis Start Date / Analysis Completion Date				12.01.23 / 14.01.23				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building				
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.11				
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.10				
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.21				
4. Arsenic (As)	ng / m ³	6	AAS Method	0.40				
Nickel as Ni	ng / m ³	20	AAS Method	2.86				
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 1631)	0.16				

Digitally signed by
SHRISHWAR PRASAD
Date: 2023.01.21
16:58:42 +05'30'



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Shreyasee Prasad
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17:02:56 +05'30'
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Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/5438		Dt: 21.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 13.07.23			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp: (°C)		17	
				Humidity (%)		73	
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-4, FPM-4			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5438			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				14.01.23			
[o] Analysis Start Date / Analysis Completion Date				14.01.23 / 16.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.2			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.7			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	18.5			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	37.4			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.04			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.2			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	15.8			

SHIVA TEST HOUSE
122-C, Aashra, Road No. 5A, Patliputra Colony, Patna - 800 013 (Bihar)
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Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.21
17:14:07 +05'30'
Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5438(A)		Dt: 31.01.2023		Your Work Order No. 4000285067-037-1018		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 13.01.23			
[d]	Sampling Location			Collected from Near at the top of Switch Yard Office Building			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	17	Humidity (%)	73
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-5438			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			14.01.23			
[o]	Analysis Start Date / Analysis Completion Date			14.01.23 / 16.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.11		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.05		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.17		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.14		
Nickel as Ni		ng / m ³	20	AAS Method	4.40		
5. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 1631)	0.11		

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Website: www.shivatest.com, www.shivatesthouse.com



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.01.21 17:00:38 +05'30'

Verified by:
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.01.21 17:14:20 +05'30'
Authorized Signatory
Quality Manager

- END OF TEST REPORT -

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TC-10482

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TEST REPORT

Ref. No. <i>STH/TR/22-23/5887</i> Dt: <i>02.02.2023</i> Your Work Order No. <i>4000285097-037-1019</i> Dt: <i>31.07.2022</i>				
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321	
[b] Details of Sample			<i>Ambient Air Quality Monitoring (As per NAAQS)</i>	
[c] Sample Collected by			SHIVA TEST HOUSE on 28.01.23	
[d] Sampling Location			<i>Collected from Near at the top of Switch Yard Office Building</i>	
[e] Method of Sampling			IS 11253 (Part-1,2,3 & 7)	
[f] Sampling Environmental Condition			Temp. (°C)	19 Humidity (%) 71
[g] No. & Type of Container			One poly Jar	
[h] Instrument ID			RDS-4, FPM-4	
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)	
[j] Sample Code			A-5887	
[k] Sample Condition on Receipt			Fit for Analysis	
[l] Items required to be tested			As per contract	
[m] Whether any specific Method of Test has been suggested by the party			No	
[n] Date of receiving the sample			28.01.23	
[o] Analysis Start Date / Analysis Completion Date			28.01.23 / 30.01.23	
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	75.2
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	41.2
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.4
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	36.5
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.16
8. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.1
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	22.5

Shiva Test House
General Manager (Lab)
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.02
15:05:31 +05'30'



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.02
15:15:49 +05'30'

Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5892		Dt: 02.02.2023		Your Work Order No. 4000286067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by			SHIVA TEST HOUSE on 27.01.23				
[d] Sampling Location			Collected from Near at the top of Switch Yard Office Building				
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition			Temp (°C)		19	Humidity (%)	
[g] No. & Type of Container			One poly Jar				
[h] Instrument ID			RDS-4, FPM-4				
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code			A-5892				
[k] Sample Condition on Receipt			Fit for Analysis				
[l] Items required to be tested			As per contract				
[m] Whether any specific Method of Test has been suggested by the party			No				
[n] Date of receiving the sample			28.01.23				
[o] Analysis Start Date / Analysis Completion Date			28.01.23 / 30.01.23				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	76.0			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.1			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	17.8			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	38.0			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.07			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.1			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	16.4			

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TEST REPORT

Ref. No. STH/TR/22-23/5892(A)		Dt: 02.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 27.01.23			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)		19	
[g] No. & Type of Container				Humidity (%)		70	
[h] Instrument ID				One poly Jar			
[i] Sample Quantity				RDS-4, FPM-4			
[j] Sample Code				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[k] Sample Condition on Receipt				A-5892			
[l] Items required to be tested				Fit for Analysis			
[m] Whether any specific Method of Test has been suggested by the party				As per contract			
[n] Date of receiving the sample				No			
[o] Analysis Start Date / Analysis Completion Date				26.01.23			
				26.01.23 / 30.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.57			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.04			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.14			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.07			
Nickel as Ni	ng / m ³	20	AAS Method	5.1			
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.08			

SHIVA TEST HOUSE
122-C, Ashoka Road, Panna
Dist. Panna, M.P. 491003

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.02
15:07:54 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.02
15:19:46 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TK/22-23/5930		Dt: 04.02.2023		Your Work Order No: 4000285867-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 30.01.23			
[d]	Sampling Location			Collected from Near at the top of Switch Yard Office Building			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	19	Humidity (%)	71
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-5930			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			01.02.23			
[o]	Analysis Start Date / Analysis Completion Date			01.02.23 / 04.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	76.1		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	42.4		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.5		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	38.3		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.14		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	5.8		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	21.9		

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.04
13:29:33 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.04
13:48:15 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5930(A)		Dt : 04.02.2023		Your Work Order No. 4000285067-037-1010		Dt : 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 30.01.23			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	19	Humidity (%)	71
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-4, FPM-4			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5930			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				01.02.23			
[o] Analysis Start Date / Analysis Completion Date				01.02.23 / 04.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.21			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.36			
5. Nickel as Ni	ng / m ³	20	AAS Method	2.86			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.12			

SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.04
13:29:46 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.04
13:48:35 +05'30'

Authorized Signatory
Quality Manager

— END OF TEST REPORT —

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/5935		Dt: 04.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 31.01.23			
[d]	Sampling Location			Collected from Near at the top of Switch Yard Office Building			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	19	Humidity (%)	70
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-5935			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			01.02.23			
[o]	Analysis Start Date / Analysis Completion Date			01.02.23 / 04.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	74.9		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. II)	40.3		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	18.5		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	36.8		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.04		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	4.7		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	16.7		

Digitally signed by
SHIBESHVAR PRASAD
Date: 2023.02.04
13:51:13 +05'30'

Verified by :
Technical Manager



Digitally signed by
Shreyasee Prasad
Date: 2023.02.04
13:51:13 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



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TEST REPORT

Ref. No: STH/TR/22-23/5935(A)	Dt: 04.02.2023	Yours Work Order No. 4000285067-037-4049	Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 31.01.23			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	19	Humidity (%) 70	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-5935			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	01.02.23			
[o] Analysis Start Date / Analysis Completion Date	01.02.23 / 04.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.68
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.05
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.15
4. Arsenic (As)	ng / m ³	6	AAS Method	0.06
5. Nickel as Ni	ng / m ³	20	AAS Method	2.86
Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.16

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SHIBESHWAR PRASAD

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Date: 2023.02.04 13:31:51 +0530

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.04 13:51:34 +0530

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10082

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TEST REPORT

Ref. No. STH/TR/22-23/5251 Dt: 13.01.2023 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
[a]	Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b]	Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c]	Sample Collected by		SHIVA TEST HOUSE on 05.07.23		
[d]	Sampling Location		Collected from Near at the top of Tejasvi Building (Township)		
[e]	Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f]	Sampling Environmental Condition		Temp. (°C)	15 Humidity (%) 75	
[g]	No. & Type of Container		One poly Jar		
[h]	Instrument ID		RDS-1, FPM-1		
[i]	Sample Quantity		30 ml x 8 for each (NO ₂ , SO ₂ , NH ₃)		
[j]	Sample Code		A-5251		
[k]	Sample Condition on Receipt		Fit for Analysis		
[l]	Items required to be tested		As per contract		
[m]	Whether any specific Method of Test has been suggested by the party		No		
[n]	Date of receiving the sample		07.01.23		
[o]	Analysis Start Date / Analysis Completion Date		07.01.23 / 09.01.23		
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	73.8
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	39.3
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	12.1
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.1
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.16
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	5.4
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	19.8

Verified by:
Technical Manager



Shreyasee
Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.01.13
13:37:55 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. SIH/TR/22-23/5251(A)		Dt: 13.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by				SHIVA TEST HOUSE on 05.01.23				
[d] Sampling Location				Collected from Near at the top of Tejaswini Building (Township)				
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition				Temp. (°C)		15	Humidity (%)	75
[g] No. & Type of Container				One poly Jar				
[h] Instrument ID				RDS-1, FPM-1				
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code				A-5251				
[k] Sample Condition on Receipt				Fit for Analysis				
[l] Items required to be tested				As per contract				
[m] Whether any specific Method of Test has been suggested by the party				No				
[n] Date of receiving the sample				07.01.23				
[o] Analysis Start Date / Analysis Completion Date				07.01.23 / 09.01.23				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswini Building (Township)				
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34				
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.06				
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.15				
4. Arsenic (As)	ng / m ³	6	AAS Method	0.45				
Nickel as Ni	ng / m ³	20	AAS Method	2.84				
6. Mercury (Hg)	ng / m ³	Not Specified	USEPA (Method 10-6)	0.22				

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SHIBESHWAR PRASAD
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.13
13:32:32 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad
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Shreyasee Prasad
Date: 2023.01.13
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-40882

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TEST REPORT

Ref. No. STH/TR/22-23/5279		Dt: 13.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 06.01.23			
[d]	Sampling Location			Collected from Near at the top of Tejasavi Building (Township)			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	18	Humidity (%)	72
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-1, FPM-1			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-5279			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			07.01.23			
[o]	Analysis Start Date / Analysis Completion Date			07.01.23 / 09.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasavi Building (Township)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	74.4		
2. Particulate Matter (PM _{2.5})		µg / m ³	50	CPCB (GMAAP Vol. I)	39.1		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	18.3		
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	35.3		
4. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.11		
5. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	4.8		
7. Ozone (O ₃)		µg / m ³	130	IS 5182 (Part-9)	15.5		

SHIVA TEST HOUSE
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SHIBESHWAR PRASAD
Date: 2023.01.13
13:35:13 +05'30'

Verified by
Technical Manager

Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.13
13:43:07 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5279(A) Dt: 13.01.2023 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 06.01.23			
[d] Sampling Location		Collected from Near at the top of Tefasavi Building (Township)			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp. (°C)	18	Humidity (%)	72
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-1, FPM-1			
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-5279			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		07.01.23			
[o] Analysis Start Date / Analysis Completion Date		07.01.23 / 09.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tefasavi Building (Township)	
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.11	
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.10	
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.15	
4. Arsenic (As)	ng / m ³	6	AAS Method	0.07	
Nickel as Ni	ng / m ³	20	AAS Method	8.59	
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.25	

SHIVA TEST HOUSE
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Website: www.shivatest.com, www.shivatesthouse.com



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SHIBESHVAR PRASAD
Date: 2023.01.13
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Verified by:
Technical Manager

Shreyasee
Prasad

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Shreyasee Prasad
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10342

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TEST REPORT

Ref. No.: STH/TR/22-23/5399 Dt: 21.01.2023 Your Work Order No. 4000285087-037-1019 Dt: 31.07.2022					
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 11.01.23			
[d] Sampling Location		Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp. (°C)	14	Humidity (%)	75
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-1, FPM-1			
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-5399			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		12.01.23			
[o] Analysis Start Date / Analysis Completion Date		12.01.23 / 14.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.1	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.7	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	11.8	
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.6	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.16	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.5	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.4	

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.21
16:58:53 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.21
17:03:10 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5399(A)		Dt: 21.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by				SHIVA TEST HOUSE on 11.01.23				
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)				
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition				Temp. (°C)		14	Humidity (%)	75
[g] No. & Type of Container				One poly Jar				
[h] Instrument ID				RDS-1, FPM-1				
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code				A-5399				
[k] Sample Condition on Receipt				Fit for Analysis				
[l] Items required to be tested				As per contract				
[m] Whether any specific Method of Test has been suggested by the party				No				
[n] Date of receiving the sample				12.01.23				
[o] Analysis Start Date / Analysis Completion Date				12.01.23 / 14.01.23				
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)		0.23		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)		0.08		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)		0.16		
4. Arsenic (As)		ng / m ³	6	AAS Method		0.38		
Nickel as Ni		ng / m ³	20	AAS Method		1.42		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 1631)		0.20		

Shri. Shri. Sanjay Kumar
 122-C, Azila, Road No. 5A, Patliputra Colony, Patna - 800 013 (Bihar)
 Dr. Shreshth Prasad (A) 107 107
 Dr. Shreshth Prasad (A) 107 107
 Dr. Shreshth Prasad (A) 107 107
 Dr. Shreshth Prasad (A) 107 107

SHIBESHWAR PRASAD

Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2023.01.21
 16:59:03 +05'30'

Verified by :
 Technical Manager



Shreyasee Prasad

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 Shreyasee Prasad
 Date: 2023.01.21
 17:12:43 +05'30'
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 Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/5439		DI: 31.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 13.01.23			
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	17	Humidity (%)	73
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5439			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				14.01.23			
[o] Analysis Start Date / Analysis Completion Date				14.01.23 / 16.01.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Tejasvi Building (Township)	
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		71.1	
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol I)		39.7	
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		16.7	
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		33.1	
4. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.04	
5. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		4.9	
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		17.1	

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.01.21
17:00:51 +05'30'

Verified by
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.21
17:14:32 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5439(A)		Dt: 21.01.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by				SHIVA TEST HOUSE on 13.01.23				
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)				
[e] Method of Sampling				IS 11253 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition				Temp. (°C)		17	Humidity (%)	73
[g] No. & Type of Container				One poly Jar				
[h] Instrument ID				RDS-1, FPM-1				
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code				A-5439				
[k] Sample Condition on Receipt				Fit for Analysis				
[l] Items required to be tested				As per contract				
[m] Whether any specific Method of Test has been suggested by the party				No				
[n] Date of receiving the sample				14.01.23				
[o] Analysis Start Date / Analysis Completion Date				14.01.23 / 16.01.23				
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)			
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34			
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.04			
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.14			
4. Arsenic (As)		ng / m ³	6	AAS Method	0.07			
Nickel as Ni		ng / m ³	20	AAS Method	2.84			
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-6)	0.33			



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.01.21 17:01:03 +05'30'

Verified by :
Technical Manager

Shreyasee
Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.01.31 17:18:44 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-19882

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TEST REPORT

Ref. No. STH/TR/22-23/5888 Dt: 02.02.2023 Your Work Order No. 4000286067-037-1019 Dt: 31.07.2022				
(a) Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Châtra Jharkhand- 825 321	
(b) Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)	
(c) Sample Collected by			SHIVA TEST HOUSE on 25.01.23	
(d) Sampling Location			Collected from Near at the top of Tejasvi Building (Township)	
(e) Method of Sampling			IS 11255 (Part-1,2,3 & 7)	
(f) Sampling Environmental Condition			Temp. (°C)	19 Humidity (%) 71
(g) No. & Type of Container			One poly Jar	
(h) Instrument ID			RDS-1, FPM-1	
(i) Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)	
(j) Sample Code			A-5888	
(k) Sample Condition on Receipt			Fit for Analysis	
(l) Items required to be tested			As per contract	
(m) Whether any specific Method of Test has been suggested by the party			No	
(n) Date of receiving the sample			28.01.23	
(o) Analysis Start Date / Analysis Completion Date			28.01.23/ 30.01.23	
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	76.6
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	41.0
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.9
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.6
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.16
8. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.1
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	21.0

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SHIBESHWAR PRASAD
Date: 2023.02.02
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SHIBESHWAR PRASAD
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SHIBESHWAR PRASAD
Date: 2023.02.02
15:06:05 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
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Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5888(A) Dt: 02.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by		SHIVA TEST HOUSE on 25.01.23			
(d) Sampling Location		Collected from Near at the top of Tejasvi Building (Township)			
(e) Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition		Temp. (°C)	19	Humidity (%)	71
(g) No. & Type of Container		One poly Jar			
(h) Instrument ID		RDS-1, FPM-1			
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code		A-5888			
(k) Sample Condition on Receipt		Fit for Analysis			
(l) Items required to be tested		As per contract			
(m) Whether any specific Method of Test has been suggested by the party		No			
(n) Date of receiving the sample		28.01.23			
(o) Analysis Start Date / Analysis Completion Date		28.01.23/ 30.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)	
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34	
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.10	
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16	
4. Arsenic (As)	ng / m ³	6	AAS Method	0.39	
Nickel as Ni	ng / m ³	20	AAS Method	2.84	
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-9)	0.21	

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.02
15:06:17 +05'30'

SHIBESHWAR PRASAD

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.02
15:16:32 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10582

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TEST REPORT

Ref. No. SIH/TR/22-23/5893 Dt: 02.02.2023		Your Work Order No. 4000285007-037-1010 Dt: 31.07.2022			
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 27.01.23			
[d] Sampling Location		Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp. (°C)	19	Humidity (%)	70
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-1, FPM-1			
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-5893			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		28.01.23			
[o] Analysis Start Date / Analysis Completion Date		29.01.23 / 30.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.1	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	36.3	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	17.1	
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.6	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.03	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.9	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	15.3	

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.02
15:08:07 +05'30'

SHIBESHWAR PRASAD

Verified by:
Technical Manager



Shreyasee Prasad

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Shreyasee Prasad
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/3893(A) Dt: 02.02.2023		Your Work Order No: 000020067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project. At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 27.01.23			
[d] Sampling Location		Collected from Near at the top of Tejasavi Building (Township)			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp. (°C)	19	Humidity (%)	70
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-1, FPM-1			
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-5893			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		28.01.23			
[o] Analysis Start Date / Analysis Completion Date		28.01.23 / 30.01.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasavi Building (Township)	
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.56	
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.04	
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.15	
4. Arsenic (As)	ng / m ³	6	AAS Method	0.21	
5. Nickel as Ni	ng / m ³	20	AAS Method	4.9	
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.08	

Shiveshwar Prasad / Sanjay Kumar
Jr. General Manager (EMO)
Tejasvi Bldg, 1st Floor, 825321
NTPC Limited, North Karanpura, Jharkhand

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.02 15:06:21 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad
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Date: 2023.02.02 15:20:30 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5931		Dt: 04.02.2023		Your Work Order No. 4000285087-087-1010		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 30.01.23			
(d) Sampling Location				Collected from Near at the top of Tejasvi Building (Township)			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp: (°C)	19	Humidity (%)	71
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-1, FPM-1			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-5931			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				01.02.23			
(o) Analysis Start Date / Analysis Completion Date				01.02.23 / 04.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	77.1		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	40.1		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	12.1		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.0		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.13		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.4		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	22.2		

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.04
13:29:58 +05'30'

SHIBESHWAR PRASAD

Verified by:
Technical Manager



Shreyasee Prasad

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Shreyasee Prasad
Date: 2023.02.04
13:48:54 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/5931(A)		Dt : 04.02.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022		
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
(c) Sample Collected by				SHIVA TEST HOUSE on 30.01.23				
(d) Sampling Location				Collected from Near at the top of Tejaswi Building (Township)				
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)				
(f) Sampling Environmental Condition				Temp. (°C)		19	Humidity (%)	71
(g) No. & Type of Container				One poly Jar				
(h) Instrument ID				RDS-1, FPM-1				
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
(j) Sample Code				A-5931				
(k) Sample Condition on Receipt				Fit for Analysis				
(l) Items required to be tested				As per contract				
(m) Whether any specific Method of Test has been suggested by the party				No				
(n) Date of receiving the sample				01.02.23				
(o) Analysis Start Date / Analysis Completion Date				01.02.23 / 04.02.23				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswi Building (Township)				
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.23				
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11				
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19				
4. Arsenic (As)	ng / m ³	6	AAS Method	0.37				
5. Nickel as Ni	ng / m ³	20	AAS Method	4.26				
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.18				

SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.04
13:30:14 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.04 13:46:12 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/23-23/5936		Dt : 04.02.2023		Your Work Order No. 4040285067-037-1019		Dt : 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 31.01.23			
[d]	Sampling Location			Collected from Near at the top of Tejasvi Building (Township)			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	19	Humidity (%)	70
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-1, FPM-1			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-5936			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			01.02.23			
[o]	Analysis Start Date / Analysis Completion Date			01.02.23 / 04.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	73.2		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	37.2		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	17.5		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	33.8		
Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.03		
5. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	5.1		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	15.6		

Shri. Shri. Sanjay Kumar
General Manager (Tech)
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SHRIBESHWAR PRASAD
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Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.04 13:52:04 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5936(A)		DI : 04.02.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 31.07.23			
(d) Sampling Location				Collected from Near at the top of Tejasvi Building (Township)			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)		19 Humidity (%) 70	
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-1, FPM-1			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-5936			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				01.02.23			
(o) Analysis Start Date / Analysis Completion Date				01.02.23 / 04.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.68		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.03		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.16		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.28		
5. Nickel as Ni		ng / m ³	20	AAS Method	5.1		
Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-6)	0.16		

SHIVA TEST HOUSE
107, Pailiputra Colony, Patna-800 013
Dr. General Manager (EMAS)
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SHIBESHWAR PRASAD

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Date: 2023.02.04
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Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.04
13:52:28 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5945		Dt: 10.02.2023		Your Work Order No. 4000205067-037-1010		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 01.02.23			
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)	22	Humidity (%)	67
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-2, FPM-2			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-5945			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				03.02.23			
(o) Analysis Start Date / Analysis Completion Date				03.02.23 / 06.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.8			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol I)	42.1			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.3			
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.4			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.09			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.8			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.6			

SHIVA TEST HOUSE / Shreyasee Prasad
Dy. General Manager (Lab) & Quality Control
Mobile: 9886768462, 9886768463
Email: info@shivatesthouse.com

AR PRASAD

Verified by:
Technical Manager



Shreyasee
Prasad

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5945(A) Dt: 10.02.2023 Year Work Order No. 4000285067-037-1019 Dt: 31.07.2022					
[a]	Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b]	Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c]	Sample Collected by		SHIVA TEST HOUSE on 01.02.23		
[d]	Sampling Location		Collected from Near at the top of Time Office (Main Plant)		
[e]	Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f]	Sampling Environmental Condition		Temp. (°C)	22 Humidity (%) 67	
[g]	No. & Type of Container		One poly Jar		
[h]	Instrument ID		RDS-2, FPM-2		
[i]	Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j]	Sample Code		A-5945		
[k]	Sample Condition on Receipt		Fit for Analysis		
[l]	Items required to be tested		As per contract		
[m]	Whether any specific Method of Test has been suggested by the party		No		
[n]	Date of receiving the sample		03.02.23		
[o]	Analysis Start Date / Analysis Completion Date		03.02.23 / 06.02.23		
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.23
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.08
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.19
4. Arsenic (As)		ng / m ³	8	AAS Method	0.32
Nickel as Ni		ng / m ³	20	AAS Method	2.80
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)	0.20

Shriyashree / Sanjay Kumar
Jyoti Shrivastava (M. Tech. Env.)
Dr. Girish Kumar (M. Tech. Env.)
Rajesh Singh, Jyoti Shrivastava
Shriyashree, Sanjay Kumar
Shriyashree, Sanjay Kumar

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.10
15:44:14 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.10
16:24:30 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10142

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TEST REPORT

Ref. No. STH/TR/22-23/5957	DI: 16.02.2023	Your Work Order No. 4000285067-037-1019	DI: 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 02.02.23		
[d] Sampling Location		Collected from Near at the top of Time Office (Main Plant)		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	22 Humidity (%) 68	
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-2, FPM-2		
[i] Sample Quantity		30 ml x 6 for each (NO _x , SO ₂ , NH ₃)		
[j] Sample Code		A-5957		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		03.02.23		
[o] Analysis Start Date / Analysis Completion Date		03.02.23 / 06.02.23		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.1
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	41.3
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.5
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.7
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.09
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.1
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.0

Shiva Test House / Sanjay Kumar
Sr. Supervisor (A) (Gen. Cat.)
By General Manager (EMCH)
Project 6622, 1st Floor, 6622
North Karanpura, Jharkhand - 825321

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2023.02.10
15:47:01 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

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Shreyasee Prasad
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5957(A)		Dt: 10.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 02.02.23			
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)	22	Humidity (%)	68
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-2, FPM-2			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-5957			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				03.02.23			
(o) Analysis Start Date / Analysis Completion Date				03.02.23 / 06.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.10			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.32			
Nickel as Ni	ng / m ³	20	AAS Method	1.40			
5. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 1631)	0.21			

Signature
 Shreshth Kumar
 Dy. General Manager (QA/QC)
 Mobile: 98267886249, 98267886250
 Email: shreshth@shivatest.com

SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2023.02.10 15:47:20 +05'30'

Verified by:
 Technical Manager



Shreyasee Prasad
 Digitally signed by Shreyasee Prasad
 Date: 2023.02.10 16:27:12 +05'30'
 Authorized Signatory
 Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/6199 Dt: 22.02.2023		Your Work Order No. 4000285067-837-1019		Dt: 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by		SHIVA TEST HOUSE on 09.02.23			
[d] Sampling Location		Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition		Temp. (°C)	23	Humidity (%)	66
[g] No. & Type of Container		One poly Jar			
[h] Instrument ID		RDS-1, FPM-1			
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code		A-6199			
[k] Sample Condition on Receipt		Fit for Analysis			
[l] Items required to be tested		As per contract			
[m] Whether any specific Method of Test has been suggested by the party		No			
[n] Date of receiving the sample		10.02.23			
[o] Analysis Start Date / Analysis Completion Date		10.02.23 / 13.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)	
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	72.9	
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	41.3	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	10.7	
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.6	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.09	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	13.7	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.0	

Shreyasee
Shreyasee / Santosh Kumar
By General Manager (EMO)
Mobile: 98382 44 889, 98382 44 889
Email: shreyasee@shivatest.com

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2023.02.23
15:41:42 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

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Shreyasee Prasad
Date: 2023.02.23
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Quality Manager

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TEST REPORT

Ref. No. STH/IR/22-23/6199(A)		Dt: 22.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 09.02.23			
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp: (°C)	23	Humidity (%)	66
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-2, FPM-2			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-6199			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				10.02.23			
(o) Analysis Start Date / Analysis Completion Date				10.02.23 / 13.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.01			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.32			
Nickel as Ni	ng / m ³	20	AAS Method	4.20			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.20			

Shyamsunder
 Dy. General Manager (QA)
 Shyamsunder, 1st floor, 1st wing, 1st floor
 HPPC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD
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Verified by :
 Technical Manager



Shreyasee Prasad
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 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6266		Dt: 22.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 11.02.23			
[d]	Sampling Location			Collected from Near at the top of Time Office (Main Plant)			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	23	Humidity (%)	66
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-2, FPM-2			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6266			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			13.02.23			
[o]	Analysis Start Date / Analysis Completion Date			13.02.23/ 16.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	72.9		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	40.9		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.0		
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	35.0		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.08		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	7.2		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	21.6		

Dr. Shreyasee Prasad / Sanjay Kumar
Dr. Shreyasee Prasad (Etd)
Dr. Sanjay Kumar (Etd)
Dr. Shreyasee Prasad (Etd)
Dr. Sanjay Kumar (Etd)

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
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Shreyasee Prasad

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TEST REPORT

Ref. No. STH/TR/22-23/6266(A)		Dt: 22.02.2023		Your Work Order No. 4000285087-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by			SHIVA TEST HOUSE on 11.02.23				
[d] Sampling Location			Collected from Near at the top of Time Office (Main Plant)				
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition			Temp. (°C)	23	Humidity (%)	68	
[g] No. & Type of Container			One poly Jar				
[h] Instrument ID			RDS-2, FPM-2				
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code			A-6266				
[k] Sample Condition on Receipt			Fit for Analysis				
[l] Items required to be tested			As per contract				
[m] Whether any specific Method of Test has been suggested by the party			No				
[n] Date of receiving the sample			13.02.23				
[o] Analysis Start Date / Analysis Completion Date			13.02.23/ 16.02.23				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.18			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.27			
Nickel as Ni	ng / m ³	20	AAS Method	1.40			
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.18			

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Jr. General Manager
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Verified by:
Technical Manager



Shreyasee Prasad

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Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6380		Dt: 23.02.2023		Your Work Order No. 4000286087-437-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 14.02.23			
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)	22	Humidity (%)	68
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-1, FPM-1			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-6380			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				15.02.23			
(o) Analysis Start Date / Analysis Completion Date				16.02.23 / 19.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.0			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.2			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.8			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.8			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.06			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.1			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	17.1			

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.23
16:43:52 +05'30'

SHIBESHWAR PRASAD

Verified by:
Technical Manager



Shreyasee Prasad

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Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6380(A) Dt.: 23.02.2023 Your Work Order No. 4000285067-037-1019 Dt.: 31.07.2022					
[a]	Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b]	Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c]	Sample Collected by		SHIVA TEST HOUSE on 14.02.23		
[d]	Sampling Location		Collected from Near at the top of Time Office (Main Plant)		
[e]	Method of Sampling		IS 11255 (Part-1,2,3 & 7)		
[f]	Sampling Environmental Condition		Temp. (°C)	22 Humidity (%) 68	
[g]	No. & Type of Container		One poly Jar		
[h]	Instrument ID		RDS-2, FPM-2		
[i]	Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j]	Sample Code		A-6380		
[k]	Sample Condition on Receipt		Fit for Analysis		
[l]	Items required to be tested		As per contract		
[m]	Whether any specific Method of Test has been suggested by the party		No		
[n]	Date of receiving the sample		15.02.23		
[o]	Analysis Start Date / Analysis Completion Date		16.02.23/ 19.02.23		
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.10
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.16
4. Arsenic (As)		ng / m ³	6	AAS Method	0.19
Nickel as Ni		ng / m ³	20	AAS Method	2.75
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)	0.20

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SHIBESHWAR PRASAD

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Verified by:
Technical Manager



Shreyasee Prasad

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Shreyasee Prasad
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TEST REPORT

Ref. No. STH/TR/22-23/6407	Dr: 23.02.2023	Your Work Order No. 4000285067-037-1010	Dr: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 15.02.23			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	24	Humidity (%) 66	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-2, FPM-2			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-6407			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	16.02.23			
[o] Analysis Start Date / Analysis Completion Date	17.02.23/ 20.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.2
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol I)	38.7
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.8
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.8
6. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.05
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.6
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.0

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SHIBESHWAR PRASAD
Date: 2023.02.23
16:55:22 +05'30'



Shreyasee
Prasad
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TEST REPORT

Ref. No. STH/TR/22-23/6407(A)	Dt : 23.02.2023	Your Work Order No. 4000285067-037-1019	Dt : 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 15.02.23			
(d) Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	24	Humidity (%) 66	
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-2, FPM-2			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-6407			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	16.02.23			
(o) Analysis Start Date / Analysis Completion Date	17.02.23/ 20.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.18
Nickel as Ni	ng / m ³	20	AAS Method	4.12
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 1631)	0.17

Shri. Smt. Sanjay Kumar
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Shreyasee Prasad
Date: 2023.02.23
16:46:17 +05'30'
Authorized Signatory
Quality Manager

- END OF TEST REPORT -

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Mob: +91867686249 ; +919431847908 Email : shivatesthouse@gmail.com ; info@shivatest.com
Website : www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC-10482

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TEST REPORT

Ref. No. SIH/TR/22-23/6509		Dt: 27.02.2023		Your Work Order No. 4000285067-837-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 20.02.23			
[d]	Sampling Location			Collected from Near at the top of Time Office (Main Plant)			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	24	Humidity (%)	65
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-1, FPM-1			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6309			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			21.02.23			
[o]	Analysis Start Date / Analysis Completion Date			21.02.23/ 24.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	73.4		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol: I)	38.9		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	12.6		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	32.6		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.09		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.7		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	23.4		

Shri. Shri. Sanjay Kumar
and Shri. Shri. Prasad
Dr. Chandra Prasad (EMG)
Jointed Sign. and Stamp- 2023

SHIBESH
AR PRASAD

Digitally signed by
SHIBESH AR PRASAD
Date: 2023.03.03
18:13:29 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.03
18:24:12 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6509(A) Dt: 27.02.2023 Your Work Order No. 4000285067-037-1010 Dt: 31.07.2023				
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 20.02.23			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C) 24 Humidity (%) 65			
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-2, FPM-2			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-6509			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	21.02.23			
[o] Analysis Start Date / Analysis Completion Date	21.02.23/ 24.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.57
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.28
4. Arsenic (As)	ng / m ³	6	AAS Method	0.20
Nickel as Ni	ng / m ³	20	AAS Method	1.42
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.23

Shiva Test House
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Website: www.shivatest.com ; www.shivameasure.com

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.03
13:13:56 +05'30'
Verified by:
Technical Manager



Shreyasee
Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.03.03
18:24:32 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



TC-10842

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TEST REPORT

Ref. No. STH/TR/22-23/6563	Dt: 27.02.2023	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2023	
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
(c) Sample Collected by		SHIVA TEST HOUSE on 22.02.23		
(d) Sampling Location		Collected from Near at the top of Time Office (Main Plant)		
(e) Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
(f) Sampling Environmental Condition		Temp. (°C)	24 Humidity (%) 68	
(g) No. & Type of Container		One poly Jar		
(h) Instrument ID		RDS-2, FPM-2		
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
(j) Sample Code		A-6563		
(k) Sample Condition on Receipt		Fit for Analysis		
(l) Items required to be tested		As per contract		
(m) Whether any specific Method of Test has been suggested by the party		No		
(n) Date of receiving the sample		23.02.23		
(o) Analysis Start Date / Analysis Completion Date		23.02.23/26.02.23		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.8
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.7
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.6
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.9
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.08
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	8.1
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	21.0

SHIVESHWAR PRASAD
General Manager (EHS)
18.12.28 +05:30

Digitally signed by
SHIVESHWAR PRASAD
Date: 2023.03.03
18:13:28 +05:30



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.03 18:26:40
+05:30
Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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TEST REPORT

Ref. No. STH/IR/22-23/6563(A)		Dt : 27.02.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022				
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321							
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)							
[c] Sample Collected by			SHIVA TEST HOUSE on 22.02.23							
[d] Sampling Location			Collected from Near at the top of Time Office (Main Plant)							
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)							
[f] Sampling Environmental Condition			Temp. (°C)		24		Humidity (%)		66	
[g] No. & Type of Container			One poly Jar							
[h] Instrument ID			RDS-2, FPM-2							
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)							
[j] Sample Code			A-6563							
[k] Sample Condition on Receipt			Fit for Analysis							
[l] Items required to be tested			As per contract							
[m] Whether any specific Method of Test has been suggested by the party			No							
[n] Date of receiving the sample			23.02.23							
[o] Analysis Start Date / Analysis Completion Date			23.02.23/ 26.02.23							
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Time Office (Main Plant)				
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)		0.46				
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)		0.09				
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)		0.28				
4. Arsenic (As)		ng / m ³	6	AAS Method		0.20				
Nickel as Ni		ng / m ³	20	AAS Method		1.42				
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA (Method 10-6)		0.26				

Shreya / Shreyasee Prasad
By General Manager (Analyst)
Date: 2023.03.03
18:27:04 +05:30

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.03
18:15:39 +05:30

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.03
18:27:04 +05:30
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10582

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TEST REPORT

Ref. No. STH/TR/22-23/5946		Dt: 10.02.2023		Your Work Order No. 4000286067-037-1018		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 01.02.23			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	22	Humidity (%)	67
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5946			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				03.02.23			
[o] Analysis Start Date/ Analysis Completion Date				03.02.23 / 06.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	72.5		
2. Particulate Matter (PM _{2.5})		µg / m ³	50	CPCB (GMAAP Vol. I)	42.6		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.8		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	33.9		
Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.16		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	5.6		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	16.4		

Digitally signed by
Dr. General Manager (EMG)
Date: 2023.02.10
17:45:06 +05'30'

SHREYASEE
AR PRASAD

Verified by :
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.10
16:24:42 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5946(A)	Dt: 18.02.2023	Your Work Order No. 4000285067-037-1019	Dt. 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 01.02.23			
[d] Sampling Location	Collected from Near at the top of DM Plant			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	22	Humidity (%) 67	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-3, FPM-3			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-5946			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	03.02.23			
[o] Analysis Start Date / Analysis Completion Date	03.02.23 / 06.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.15
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17
4. Arsenic (As)	ng / m ³	6	AAS Method	0.31
5. Nickel as Ni	ng / m ³	20	AAS Method	1.49
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 1631)	0.28

SHIVA TEST HOUSE
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Website: www.shivatest.com ; www.shivatesthouse.com

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.10
15:45:25 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.10
16:25:27 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5956	Dt: 10.02.2023		Your Work Order No. 4000285067-437-1019		Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by	SHIVA TEST HOUSE on 02.02.23					
[d] Sampling Location	Collected from Near at the top of DM Plant					
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)					
[f] Sampling Environmental Condition	Temp. (°C)	22	Humidity (%)	68		
[g] No. & Type of Container	One poly Jar					
[h] Instrument ID	RDS-3, FPM-3					
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code	A-5956					
[k] Sample Condition on Receipt	Fit for Analysis					
[l] Items required to be tested	As per contract					
[m] Whether any specific Method of Test has been suggested by the party	No					
[n] Date of receiving the sample	03.02.23					
[o] Analysis Start Date / Analysis Completion Date	03.02.23 / 06.02.23					
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	71.7		
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	43.5		
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.5		
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.6		
Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.20		
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.3		
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	17.3		

Digitally signed by
SHREYASEE PRASAD
Date: 2023.02.10
16:27:32 +05'30'

SHREYASEE
AR PRASAD

Verified by :
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.10
16:27:32 +05'30'

Authorized Signatory
Quality Manager

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Website: www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)

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TEST REPORT

Ref. No. STH/TR/22-23/5958(A)	Di: 10.02.2023	Your Work Order No. 4000285067-037-1010	Di: 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 02.02.23			
(d) Sampling Location	Collected from Near at the top of DM Plant			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	22	Humidity (%)	68
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-3, FPM-3			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-5958			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	03.02.23			
(o) Analysis Start Date / Analysis Completion Date	03.02.23 / 06.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.23
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17
4. Arsenic (As)	ng / m ³	6	AAS Method	0.32
5. Nickel as Ni	ng / m ³	20	AAS Method	4.40
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-S)	0.28

Handwritten signature of Shreshwar Prasad
 Digitally signed by Shreshwar Prasad
 Date: 2023.02.10 15:17:43 +05'30'

SHRESHWAR PRASAD

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
 Date: 2023.02.10 16:27:46 +05'30'
 Authorized Signatory
 Quality Manager

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SHIVA TEST HOUSE

(Serving since 1988)



TC-10482

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TEST REPORT

Ref. No. <i>STH/TR/22-23/6200</i>		Dt: <i>22.02.2023</i>		Your Work Order No. <i>4000289067-037-1019</i>		Dt: <i>31.07.2022</i>	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tardwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				<i>Ambient Air Quality Monitoring (As per NAAQS)</i>			
(c) Sample Collected by				SHIVA TEST HOUSE on <i>09.02.23</i>			
(d) Sampling Location				<i>Collected from Near at the top of DM Plant</i>			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)	23	Humidity (%)	66
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-3, FPM-3			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-6200			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				<i>10.02.23</i>			
(o) Analysis Start Date / Analysis Completion Date				<i>10.02.23/13.02.23</i>			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result: Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	72.9		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	39.7		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	10.6		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	33.7		
Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.12		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	18.4		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	21.6		

Shiva Test House / Sanjay Kumar
122-C, Aashra Road No. 5A, Patliputra Colony, Patna - 800 013
Dist. Patna, Bihar
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Email: shivahouse@gmail.com, shivahouse@yahoo.com

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
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Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.23
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10002

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TEST REPORT

Ref. No. 5TH/TR/22-23/6267		Dt: 22.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by			SHIVA TEST HOUSE on 11.02.23					
[d] Sampling Location			Collected from Near at the top of DM Plant					
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)					
[f] Sampling Environmental Condition			Temp. (°C)		23		Humidity (%)	68
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-3, FPM-3					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-6267					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			13.02.23					
[o] Analysis Start Date / Analysis Completion Date			13.02.23/ 16.02.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		74.2		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		43.0		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		14.1		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		34.1		
Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.13		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		6.5		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		18.0		

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SHIBESHWAR PRASAD

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Date: 2023.02.23
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Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.23
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Quality Manager

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TEST REPORT

Ref. No. STH/TH/22-23/6267(A)		Dt.: 22.02.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by			SHIVA TEST HOUSE on 11.02.23				
[d] Sampling Location			Collected from Near at the top of DM Plant				
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition			Temp. (°C)	23	Humidity (%)	68	
[g] No. & Type of Container			One poly Jar				
[h] Instrument ID			RDS-3, FPM-3				
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code			A-6267				
[k] Sample Condition on Receipt			Fit for Analysis				
[l] Items required to be tested			As per contract				
[m] Whether any specific Method of Test has been suggested by the party			No				
[n] Date of receiving the sample			12.02.23				
[o] Analysis Start Date / Analysis Completion Date			13.02.23/ 16.02.23				
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result		
					Near at the top of DM Plant		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.48		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.20		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.18		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.25		
5. Nickel as Ni		ng / m ³	20	AAS Method	2.93		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 1631)	0.24		

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SHIBESHWAR PRASAD
Date: 2023.02.23
15:45:08 +05'30'



SHIBESHWAR PRASAD
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.23
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Verified by :
Technical Manager

Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.23
15:59:18 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/IR/22-23/6381		Dt : 23.02.2023		Your Work Order No. 4000286067-037-1019		Dt : 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 14.02.23			
[d]	Sampling Location			Collected from Near at the top of DM Plant			
[e]	Method of Sampling			IS 11255 (Part-1, 2, 3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	22	Humidity (%)	68
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-3, FPM-3			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6381			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			15.02.23			
[o]	Analysis Start Date / Analysis Completion Date			18.02.23/ 19.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant	
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		76.1	
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		38.8	
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		14.8	
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		35.0	
Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.08	
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		6.5	
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		19.8	

Shreya / Soniya Kumar
Dy. General Manager (QA)
SHIVA TEST HOUSE
122-C, Ashta Road No. 5A, Patna - 800 013 (Bihar)

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.23 16:32:42 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
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Authorized Signatory
Quality Manager

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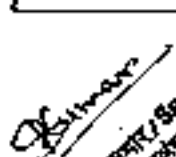
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TEST REPORT

Ref. No. STH/TR/22-23/6381(A)	Dt : 13.02.2023	Year Work Order No. 4000285067-037-1019	Dt : 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 14.02.23			
[d] Sampling Location	Collected from Near at the top of DM Plant			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7).			
[f] Sampling Environmental Condition	Temp. (°C)	22	Humidity (%) 68	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-3, FPM-3			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-6381			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	16.02.23			
[o] Analysis Start Date / Analysis Completion Date	16.02.23/ 19.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.12
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.18
5. Nickel as Ni	ng / m ³	20	AAS Method	4.20
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA Method 1631	0.18


 Mr. Shiveshwar Prasad
 Dy. General Manager (E&E)
 Jharkhand Pollution Control Board
 122-C, Ashta Road, North Karanpura, Patna-800013

SHIBESHWAR PRASAD
 Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2023.02.23
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Verified by :
 Technical Manager



Shreyasee Prasad
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Authorized Signatory
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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/6408		Dt: 23.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 15.02.23			
[d]	Sampling Location			Collected from Near at the top of DM Plant			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	24	Humidity (%)	66
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-3, FPM-3			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6408			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			16.02.23			
[o]	Analysis Start Date/ Analysis Completion Date			17.02.23/ 20.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant	
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		75.3	
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. II)		39.2	
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		13.5	
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		34.1	
Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.07	
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		5.8	
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		21.7	

Signature of Shri. Bhanu Kumar
General Manager (E&O)
SHIVA TEST HOUSE
122-C, Azila, Road No. 5A, Patna - 800 013 (Bihar)

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
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Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.23
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Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6406(A)		Dt: 23.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by			SHIVA TEST HOUSE on 15.02.23					
[d] Sampling Location			Collected from Near at the top of DM Plant					
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)					
[f] Sampling Environmental Condition			Temp. (°C)		24	Humidity (%)		66
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-3, FPM-3					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-6406					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			16.02.23					
[o] Analysis Start Date / Analysis Completion Date			17.02.23/ 20.02.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)		0.46		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)		0.13		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)		0.19		
4. Arsenic (As)		ng / m ³	6	AAS Method		0.15		
5. Nickel as Ni		ng / m ³	20	AAS Method		2.80		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 1631)		0.19		

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.23
16:36:00 +05'30'

SHIBESHWAR PRASAD

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.23
16:46:50 +05'30'

Authorized Signatory
Quality Manager

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Mob : +918676886249 ; +919431047908 Email : shiva@shivatest.com ; info@shivatest.com
Website : www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

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PC-10882

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TEST REPORT

Ref. No. STH/TR/22-23/6510		Dt: 17.02.2023		Your Work Order No. 4000205067-437-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 20.02.23			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	65
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-6510			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				21.02.23			
[o] Analysis Start Date / Analysis Completion Date				21.02.23 / 24.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	76.2		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	39.7		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.5		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	33.5		
Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.08		
5. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.6		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	22.0		

SHIVA TEST HOUSE
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Website: www.shivatest.com, www.shivahouse.com



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.03 18:14:07 +05'30'

Verified by:
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.03.03 18:24:44 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/IR/22-23/6510(A)	Dt: 27.02.2023	Your Work Order No. 4000286067-037-1019	Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 20.02.23			
[d] Sampling Location	Collected from Near at the top of DM Plant			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	24	Humidity (%)	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-3, FPM-3			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-6510			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	21.02.23			
[o] Analysis Start Date / Analysis Completion Date	21.02.23 / 24.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19
4. Arsenic (As)	ng / m ³	6	AAS Method	0.15
5. Nickel as Ni	ng / m ³	20	AAS Method	4.20
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.19

SHIVA TEST HOUSE
At: Tandwa / North Karanpura
Dist: Chatra
Jharkhand - 825 321
Dy. General Manager (EMO)
Pollution Control Board
HTEC Unit, North Karanpura - 825 321



SHIBESHWAR PRASAD
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.23
18:14:18 +05'30'

Verified by:
Technical Manager

Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.02.23
18:24:59 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. 5TH/TR/22-23/6564		Dt : 27.02.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 22.02.23			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	66
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-6564			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				23.02.23			
[o] Analysis Start Date / Analysis Completion Date				23.02.23/ 26.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant	
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		77.4	
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		40.9	
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		13.3	
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		34.4	
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.07	
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		9.3	
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		27.2	

SHIVA TEST HOUSE
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SHIBESHWAR PRASAD
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18:15:50 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.02.03
18:22:24 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5564(A)		Dt: 27.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by		SHIVA TEST HOUSE on 22.02.23					
[d] Sampling Location		Collected from Near at the top of DM Plant					
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)					
[f] Sampling Environmental Condition		Temp. (°C)		24		Humidity (%)	
[g] No. & Type of Container		One poly Jar					
[h] Instrument ID		RDS-3, FPM-3					
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code		A-5564					
[k] Sample Condition on Receipt		Fit for Analysis					
[l] Items required to be tested		As per contract					
[m] Whether any specific Method of Test has been suggested by the party		No					
[n] Date of receiving the sample		23.02.23					
[o] Analysis Start Date / Analysis Completion Date		23.02.23/ 26.02.23					
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.15			
5. Nickel as Ni	ng / m ³	20	AAS Method	4.20			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.21			

Shiva Test House
 122-C, Azad, Road No. 5A, Paliputra Colony, Patna - 800 013 (Bihar)
 Dt. General Manager (EM&S)
 1827-39 40530
 NTPC Limited, North Karanpura, Jharkhand

SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2023.03.03 18:16:10 +05'30'

Verified by:
 Technical Manager



Shreyasee Prasad
 Digitally signed by Shreyasee Prasad
 Date: 2023.03.03 18:27:39 +05'30'
 Authorized Signatory
 Quality Manager

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SHIVA TEST HOUSE

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TC-10482

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TEST REPORT

Ref. No. STH/TR/22-23/5947		Dt.: 10.02.2023		Your Work Order No. 4000285067-037-1019		Dt.: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project. At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 01.02.23			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 11255 (Part-I, 2, 3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	22	Humidity (%)	67
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-4, FPM-4			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-5947			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No.			
[n] Date of receiving the sample				03.02.23			
[o] Analysis Start Date / Analysis Completion Date				03.02.23 / 06.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	75.6		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	41.6		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.7		
Nitrogen Dioxide as NO ₂		µg / m ³	60	IS 5182 (Part-6)	37.3		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.12		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	5.2		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	21.3		

Shiva Test House
At: Tandwa, Dist- Chatra, Jharkhand- 825 321
Contact: 0358-2551111, 0358-2551112
Email: info@shivatesthouse.com
Website: www.shivatesthouse.com



Verified by:
Technical Manager

Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.10
16:25:40 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5947(A)	Di: 10.02.2023	Your Work Order No. 4000285067-037-1019	Di: 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 01.02.23			
(d) Sampling Location	Collected from Near at the top of Switch Yard Office Building			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	22	Humidity (%) 67	
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-4, FPM-4			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-5947			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	03.02.23			
(o) Analysis Start Date / Analysis Completion Date	03.02.23 / 06.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.23
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19
4. Arsenic (As)	ng / m ³	6	AAS Method	0.36
Nickel as Ni	ng / m ³	20	AAS Method	4.30
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-B)	0.21

Dr. Shreshth Kumar
General Manager (QA)
Kolkata 700022, Tel: 98501 78331
MTC Limited, North Karanpura, Jharkhand

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.10 15:46:08 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.02.10 16:25:59 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/IR/12-23/5959	Dt: 10.02.2023	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2022	
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
(c) Sample Collected by		SHIVA TEST HOUSE on 02.02.23		
(d) Sampling Location		Collected from Near at the top of Switch Yard Office Building		
(e) Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
(f) Sampling Environmental Condition		Temp. (°C)	22 Humidity (%) 68	
(g) No. & Type of Container		One poly Jar		
(h) Instrument ID		RDS-4, FPM-4		
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
(j) Sample Code		A-5959		
(k) Sample Condition on Receipt		Fit for Analysis		
(l) Items required to be tested		As per contract		
(m) Whether any specific Method of Test has been suggested by the party		No		
(n) Date of receiving the sample		03.02.23		
(o) Analysis Start Date / Analysis Completion Date		03.02.23 / 06.02.23		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.6
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. II)	40.7
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.4
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	36.6
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.13
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.1
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.7

Digitally signed by
SHREYASEE PRASAD
Date: 2023.02.10
15:47:58 +05'30'



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.10
16:28:04 +05'30'

Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5959(A)		Dt: 10.02.2023		Your Work Order No. 4000205067-037-4010		Dt: 31.07.2022				
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321							
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)							
[c] Sample Collected by			SHIVA TEST HOUSE on 02.02.23							
[d] Sampling Location			Collected from Near at the top of Switch Yard Office Building							
[e] Method of Sampling			IS 11253 (Part-1,2,3 & 7)							
[f] Sampling Environmental Condition			Temp. (°C)		22		Humidity (%)		68	
[g] No. & Type of Container			One poly Jar							
[h] Instrument ID			RDS-4, FPM-4							
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)							
[j] Sample Code			A-5959							
[k] Sample Condition on Receipt			Fit for Analysis							
[l] Items required to be tested			As per contract							
[m] Whether any specific Method of Test has been suggested by the party			No							
[n] Date of receiving the sample			03.02.23							
[o] Analysis Start Date / Analysis Completion Date			03.02.23 / 06.02.23							
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building					
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34					
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.13					
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.19					
4. Arsenic (As)		ng / m ³	6	AAS Method	0.29					
Nickel as Ni		ng / m ³	20	AAS Method	1.43					
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA (Method 10-5)	0.29					

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2023.02.10
15:48:10 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

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Shreyasee Prasad
Date: 2023.02.10
16:28:22 +05'30'

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Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6201		Dt: 22.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 09.02.23			
[d]	Sampling Location			Collected from Near at the top of Switch Yard Office Building			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	23	Humidity (%)	66
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6201			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			10.02.23			
[o]	Analysis Start Date / Analysis Completion Date			10.02.23/ 13.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building.		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	75.2		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. II)	39.9		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.5		
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.2		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.14		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	15.9		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	21.6		



SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2023.02.23
15:42:43 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad

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Shreyasee Prasad
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Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6201(A)		Dt: 22.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 09.02.23			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	23	Humidity (%)	66
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-4, FPM-4			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-6201			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				10.02.23			
[o] Analysis Start Date / Analysis Completion Date				10.02.23/ 13.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.23		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.01		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.19		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.37		
Nickel as Ni		ng / m ³	20	AAS Method	4.30		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)	0.24		

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Verified by :
Technical Manager



Shreyasee Prasad
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TC-10002

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TEST REPORT

Ref. No. STH/TR/22-23/6268		Dt: 22.02.2023		Your Work Order No. 4000255007-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 11.02.23			
(d) Sampling Location				Collected from Near at the top of Switch Yard Office Building			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)	23	Humidity (%)	68
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-4, FPM-4			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-6268			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				13.02.23			
(o) Analysis Start Date / Analysis Completion Date				13.02.23/ 16.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	74.3		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. II)	40.7		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	12.4		
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	36.4		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.10		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.0		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	23.7		

Shri. Shri. Sanjay Kumar
General Manager (E&E)
NHPC, New Mangalore
Dist. North Mangalore- 575021

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
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Verified by:
Technical Manager



Shreyasee Prasad

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TEST REPORT

Ref. No. STH/TR/22-23/6268(A)	DI: 22.02.2023	Your Work Order No. 4000285087-037-1019	DI: 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 11.02.23			
(d) Sampling Location	Collected from Near at the top of Switch Yard Office Building			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	23	Humidity (%) 68	
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-4, FPM-4			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-6268			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	13.02.23			
(o) Analysis Start Date / Analysis Completion Date	13.02.23/ 16.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.20
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19
4. Arsenic (As)	ng / m ³	6	AAS Method	0.24
Nickel as Ni	ng / m ³	20	AAS Method	2.86
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-6)	0.17

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SHIBESHWAR PRASAD
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Shreyasee Prasad

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Technical Manager

Authorized Signatory
Quality Manager

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TC-10402

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TEST REPORT

Ref. No. STH/TR/22-23/6382	Dt: 23.02.2023	Your Work Order No. 4000285067-037-1010	Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 14.02.23			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	22	Humidity (%) 68	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-6362			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	15.02.23			
[o] Analysis Start Date / Analysis Completion Date	16.02.23/ 19.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.6
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.3
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.4
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	31.2
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.07
8. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.9
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	23.1

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SHIBESHWAR PRASAD

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Technical Manager

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SHIBESHWAR PRASAD
Date: 2023.02.23
16:33:06 +05'30'



Shreyasee Prasad

Authorized Signatory
Quality Manager

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TC-10882

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TEST REPORT

Ref. No. STH/IR/22-23/6409		DI: 23.02.2023		Your Work Order No. 4000286067-037-1019		DI: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 15.02.23			
[d]	Sampling Location			Collected from Near at the top of Switch Yard Office Building			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	24	Humidity (%)	66
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6409			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			16.02.23			
[o]	Analysis Start Date / Analysis Completion Date			17.02.23/ 20.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	72.7		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	39.3		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	12.9		
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	32.4		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.08		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.1		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	21.9		

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SHIBESHWAR PRASAD

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TEST REPORT

Ref. No. STH/TR/22-23/6409(A)		Dt : 23.02.2023		Your Work Order No. 4000285067-037-1019		Di : 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 15.02.23			
[d]	Sampling Location			Collected from Near at the top of Switch Yard Office Building			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	24	Humidity (%)	66
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			ROS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6409			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			16.02.23			
[o]	Analysis Start Date / Analysis Completion Date			17.02.23/ 20.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.46		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.13		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.21		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.20		
Nickel as Ni		ng / m ³	20	AAS Method	1.42		
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA Method 10-5	0.23		

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.23
16:36:22 +05'30'

SHIBESHWAR
PRASAD

Verified by :
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.23
10:47:26 +05'30'

Authorized Signatory
Quality Manager

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Contact us : 122-C, Ansha, Road No. 5A, Patliputra Colony, Patna - 800 013 (Bihar)
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Website : www.shivatesthouse.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

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TC-10002

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TEST REPORT

Ref. No. STH/TR/22-23/6511	Di: 27.02.2023	Your Work Order No. 4000285067-437-1019	Di: 31.07.2022	
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321		
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)		
[c] Sample Collected by		SHIVA TEST HOUSE on 20.02.23		
[d] Sampling Location		Collected from Near at the top of Switch Yard Office Building		
[e] Method of Sampling		IS 11255 (Part-1, 2, 3 & 7)		
[f] Sampling Environmental Condition		Temp. (°C)	24 Humidity (%) 65	
[g] No. & Type of Container		One poly Jar		
[h] Instrument ID		RDS-4, FPM-4		
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)		
[j] Sample Code		A-6511		
[k] Sample Condition on Receipt		Fit for Analysis		
[l] Items required to be tested		As per contract		
[m] Whether any specific Method of Test has been suggested by the party		No		
[n] Date of receiving the sample		21.02.23		
[o] Analysis Start Date / Analysis Completion Date		21.02.23 / 24.02.23		
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	75.9
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	40.4
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.7
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.2
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.05
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.0
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	21.9

SHIVA TEST HOUSE
122-C, Astha Road, Patna
Bihar 800013

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.03 10:14:31 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.03 18:25:12 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6511(A)	DI : 27.02.2023	Your Work Order No. 4000285067-037-1019	De : 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 20.02.23			
(d) Sampling Location	Collected from Near at the top of Switch Yard Office Building			
(e) Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition	Temp. (°C)	24	Humidity (%) 65	
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-4, FPM-4			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-6511			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	21.02.23			
(o) Analysis Start Date / Analysis Completion Date	21.02.23 / 24.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.18
5. Nickel as Ni	ng / m ³	20	AAS Method	4.12
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 1631)	0.17

Shri. Shri. / Sanjay Kumar
122-C, Azad, Road No. 5A, Padma Colony, Patna - 800 013 (Bihar)
Off. General Manager (STH)
Shri. Shri. / Sanjay Kumar
122-C, Azad, Road No. 5A, Padma Colony, Patna - 800 013 (Bihar)

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.03 18:14:42 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.03.03 18:25:37 +05'30'

Authorized Signatory:
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6566		Dt: 27.02.2023		Your Work Order No. 4040285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by			SHIVA TEST HOUSE on 22.02.23					
[d] Sampling Location			Collected from Near at the top of Switch Yard Office Building					
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)					
[f] Sampling Environmental Condition			Temp. (°C)		24	Humidity (%)		66
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-4, FPM-4					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-6565					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			23.02.23					
[o] Analysis Start Date / Analysis Completion Date			23.02.23/ 26.02.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	76.6			
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	38.3			
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.1			
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.5			
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.05			
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	7.1			
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	25.8			

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.03
18:16:21 +05'30'



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.03
18:27:54 +05'30'

Verified by:
Technical Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6565(A) Dt: 27.02.2023 Your Work Order No. 4000285067-037-1019 Dt: 31.07.2022

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 22.02.23			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	24	Humidity (%)	66
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-6565			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	23.02.23			
[o] Analysis Start Date / Analysis Completion Date	23.02.23/ 26.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.19
Nickel as Ni	ng / m ³	20	AAS Method	2.75
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.17

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 SHIBESHWAR PRASAD
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 SHIBESHWAR PRASAD
 Date: 2023.03.03
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Verified by :
 Technical Manager



Shreyasee
 Prasad
 Digitally signed by
 Shreyasee Prasad
 Date: 2023.03.03
 18:28:11 +05'30'
 Authorized Signatory
 Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. **STH/TP/22-23/3948** Dt: **10.02.2023**

Your Work Order No. **4000285067-037-1019** Dt: **31.07.2022**
Project **North Karampura Super Thermal Power**
At: **Tandwa**
Dist: **Chhatra**
Jharkhand- **825 321**
Ambient Air Quality Monitoring (As per NAAQS)
SHIVA TEST HOUSE on 01.02.23
Collected from **Near at the top of Television Building (Township)**
IS 11255 (Part-1, 2, 3 & 7) 22 Humidity (%) 87
Temp. (°C)
One poly Jar
RDS-1, FPM-1
30 ml x 6 for each (NO₂, SO₂, NH₃)
A-5948
FR for Analysis
As per contract

(a) Name and address of the Customer

(b) Details of Sample
(c) Sample Collected by
(d) Sampling Location
(e) Method of Sampling
(f) Sampling Environmental Condition
(g) No. & Type of Container
(h) Instrument ID
(i) Sample Quantity
(j) Sample Code
(k) Sample Condition on Receipt
(l) Items required to be tested
(m) Whether any specific Method of Test has been suggested by the party

(n) Date of receiving the sample
(o) Analysis Start Date / Analysis Completion Date

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Point
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	Near at the Building
2. Particulate Matter (PM _{2.5})	µg / m ³	80	CPCB (GMAAP Vol. I)	
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	

Parameters

1. Carbon Monoxide (CO)
2. Benzene (C₆H₆)
3. Benzo(a) Pyrene
4. Arsenic (As)
- Nickel as Ni
6. Mercury (Hg)

SHIBESHWAR PRASAD
General Manager (TPC)
122-C, Aashu, Road No. 3A, Patliputra Colony, Patna - 800 013 (Bihar)
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Email: shibeshwar@shiva-testhouse.com

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Verified by:
Technical Manager

SHIBESHWAR PRASAD
General Manager (TPC)
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Verified by:
Technical Manager

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END OF TEST

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5960		Dt: 10.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022			
[a] Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist: Chatra Jharkhand- 825 321							
[b] Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)							
[c] Sample Collected by		SHIVA TEST HOUSE on 02.02.23							
[d] Sampling Location		Collected from Near at the top of Tejasvi Building (Township)							
[e] Method of Sampling		IS 11255 (Part-1,2,3 & 7)							
[f] Sampling Environmental Condition		Temp. (°C)		22		Humidity (%)		68	
[g] No. & Type of Container		One poly Jar							
[h] Instrument ID		RDS-1, FPM-1							
[i] Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)							
[j] Sample Code		A-5960							
[k] Sample Condition on Receipt		Fit for Analysis							
[l] Items required to be tested		As per contract							
[m] Whether any specific Method of Test has been suggested by the party		No							
[n] Date of receiving the sample		03.02.23							
[o] Analysis Start Date / Analysis Completion Date		03.02.23 / 06.02.23							
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)				
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	74.7				
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	39.3				
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	12.7				
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	39.3				
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.12				
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-6)	5.9				
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	21.0				

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.10
15:48:21 +05'30'



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.10
16:28:40 +05'30'
Authorized Signatory
Quality Manager

Verified by:
Technical Manager

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TEST REPORT

Ref. No. STH/TR/22-23/5960(A)		Dt : 10.02.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 02.02.23			
[d]	Sampling Location			Collected from Near at the top of Tejasvi Building (Township)			
[e]	Method of Sampling			IS 11255 (Part-12,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	22	Humidity (%)	68
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-1, FPM-1			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-5960			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			03.02.23			
[o]	Analysis Start Date / Analysis Completion Date			03.02.23 / 06.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.46		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.10		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.18		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.24		
Nickel as Ni		ng / m ³	20	AAS Method	4.26		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)	0.20		

Shreya Prasad
 Dy. General Manager (EHS)
 16:28:56 +05:30
 15:48:35 +05:30

SHIBESHWAR PRASAD

Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2023.02.10
 15:48:35 +05:30



Shreyasee Prasad
 Digitally signed by
 Shreyasee Prasad
 Date: 2023.02.10
 16:28:56 +05:30
 Authorized Signatory
 Quality Manager

Verified by :
 Technical Manager

- END OF TEST REPORT -

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 Mob: +918676886249 ; +919431047908 Email : shivatest@shiva.co.in ; info@shivatest.com
 Website : www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)

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TEST REPORT

Ref. No. STH/TR/22-23/5948(A)	Dt: 18.02.2023		Your Work Order No. 4000286067-037-1018		Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by	SHIVA TEST HOUSE on 01.02.23					
[d] Sampling Location	Collected from Near at the top of Tejasvi Building (Township)					
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)					
[f] Sampling Environmental Condition	Temp. (°C)	22	Humidity (%)	67		
[g] No. & Type of Container	One poly Jar					
[h] Instrument ID	RDS-1, FPM-1					
[i] Sample Quantity	30 ml. x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code	A-5948					
[k] Sample Condition on Receipt	Fit for Analysis					
[l] Items required to be tested	As per contract					
[m] Whether any specific Method of Test has been suggested by the party	No					
[n] Date of receiving the sample	03.02.23					
[o] Analysis Start Date / Analysis Completion Date	03.02.23 / 06.02.23					
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.23		
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.12		
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17		
4. Arsenic (As)	ng / m ³	6	AAS Method	0.31		
Nickel as Ni	ng / m ³	20	AAS Method	6.1		
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-S)	0.20		

Shiva Test House / Sample Manager
Dr. Shreyasee Prasad (A 224 211)
Dist. General Manager (EPMG)
Patna Bldg. 2nd Floor- 800013
MTC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.10 15:40:37 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.02.10 16:26:25 +05'30'
Authorized Signatory
Quality Manager

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Website: www.shivatest.com; www.shivatesthouse.com



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TEST REPORT

Ref. No. STH/TR/22-23/6202		Dt: 22.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 09.02.23			
[d]	Sampling Location			Collected from Near at the top of Tejasvi Building (Township)			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	23	Humidity (%)	66
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-1, FPM-1			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6202			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			10.02.23			
[o]	Analysis Start Date / Analysis Completion Date			10.02.23/ 13.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	73.0		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	42.6		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.3		
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	33.5		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.16		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	16.8		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	17.6		

By: **SHIBESHWAR PRASAD**
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.23 15:47:30 +05'30'

Verified by :
Technical Manager



By: **Shreyasee Prasad**
Digitally signed by Shreyasee Prasad
Date: 2023.02.23 15:57:44 +05'30'

Authorized Signatory
Quality Manager

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Website : www.shivatest.com ; www.shivatesthouse.com



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TEST REPORT

Ref. No. STH/TR/22-23/6202(A)	Dt: 22.02.2023	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 09.02.23			
[d] Sampling Location	Collected from Near at the top of Tejaswi Building (Township)			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	23	Humidity (%)	66
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-1, FPM-1			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-6202			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	10.02.23			
[o] Analysis Start Date / Analysis Completion Date	10.02.23/ 13.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswi Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.01
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.17
4. Arsenic (As)	ng / m ³	6	AAS Method	0.31
Nickel as Ni	ng / m ³	20	AAS Method	1.47
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.28

Dr. Shriyashree Prasad
Dy. General Manager (Quality)
Shiva Test House, North Karanpura, Jharkhand

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.23
15:43:13 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.23
15:58:06 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. SIH/TR/22-23/6269		Dt: 22.02.2023		Your Work Order No. 4000286067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 11.02.23			
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	23	Humidity (%)	68
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-6269			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				13.02.23			
[o] Analysis Start Date / Analysis Completion Date				13.02.23/16.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	76.3			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.3			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.7			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.1			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.11			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	7.7			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	23.7			

Shiva Test House
122-C, Aisha, Road No. 5A, Padiputa Colony, Patna - 800 013 (Bihar)
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Website: www.shivatest.com, www.shivatesthouse.com

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.23
15:45:50 +05'30'



Shreyasee
Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.23 15:45:50 +05'30'

Verified by:
Technical Manager

Authorized Signatory:
Quality Manager

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TEST REPORT

Ref. No	STH/TR/22-23/6269(A)	Di	22.02.2023	Your Work Order No.	4400285067-037-1019	De	31.07.2022
[a]	Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b]	Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)					
[c]	Sample Collected by	SHIVA TEST HOUSE on 11.02.23					
[d]	Sampling Location	Collected from Near at the top of Tejasvi Building (Township)					
[e]	Method of Sampling	IS 11255 (Part-1,2,3 & 7)					
[f]	Sampling Environmental Condition	Temp. (°C)	23	Humidity (%)	68		
[g]	No. & Type of Container	One poly Jar					
[h]	Instrument ID	RDS-1, FPM-1					
[i]	Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j]	Sample Code	A-6269					
[k]	Sample Condition on Receipt	Fit for Analysis					
[l]	Items required to be tested	As per contract					
[m]	Whether any specific Method of Test has been suggested by the party	No					
[n]	Date of receiving the sample	13.02.23					
[o]	Analysis Start Date / Analysis Completion Date	13.02.23/ 16.02.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result. Near at the top of Tejasvi Building (Township)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.10		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.15		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.27		
Nickel as Ni		ng / m ³	20	AAS Method	4.26		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)	0.19		

Shiva Test House / Shreyasee Kumar
 100, Ashoka Road, Patna - 800 013
 Dist. Patna, Bihar - 800 013
 Tel: 061-2555555, 2555556, 2555557
 Fax: 061-2555558, 2555559, 2555560

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.23
15:46:05 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.23
16:00:21 +05'30'
Authorized Signatory
Quality Manager

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TC-10692

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TEST REPORT

Ref. No	STH/TR/22-23/6383	Dt.	23.02.2023	Your Work Order No.	4000285047-037-1010	Dt.	31.07.2022
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Taudwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air (Quality Monitoring (As per NAAQS))			
[c]	Sample Collected by			SHIVA TEST HOUSE on 14.02.23			
[d]	Sampling Location			Collected from Near at the top of Tejasvi Building (Township)			
[e]	Method of Sampling			IS 11255 (Part-1,2,3 & 7)			
[f]	Sampling Environmental Condition			Temp. (°C)	22	Humidity (%)	68
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-1, FPM-1			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6383			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			15.02.23			
[o]	Analysis Start Date / Analysis Completion Date			16.02.23/ 19.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	75.5			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol I)	41.6			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	13.9			
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.8			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.07			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	7.3			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.7			

For STH / Shreyasee Kumar
for Shreyasee (S. 104 Jn)
Dr. General Manager (EHS)
Shreyasee Kumar
16/04/23 16:45:17 +05'30'

SHIBESH
AR PRASAD
Digitally signed by
SHIBESH AR PRASAD
Date: 2023.02.23
16:04:12 +05'30'

Verified by :
Technical Manager



Shreyasee
Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.02.23
16:45:17 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6383(A)		Dt : 23.02.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022		
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by				SHIVA TEST HOUSE on 14.02.23				
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)				
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)				
[f] Sampling Environmental Condition				Temp. (°C)		22	Humidity (%)	68
[g] No. & Type of Container				One poly Jar				
[h] Instrument ID				RDS-1, FPM-1				
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code				A-6383				
[k] Sample Condition on Receipt				Fit for Analysis				
[l] Items required to be tested				As per contract				
[m] Whether any specific Method of Test has been suggested by the party				No				
[n] Date of receiving the sample				15.02.23				
[o] Analysis Start Date / Analysis Completion Date				16.02.23/ 19.02.23				
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)		0.34		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)		0.15		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)		0.19		
4. Arsenic (As)		ng / m ³	6	AAS Method		0.18		
Nickel as Ni		ng / m ³	20	AAS Method		2.75		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)		0.19		

Shri. Smt. Sanjay Kumar
and Shri. Smt. (V. V. V. V.)
Dr. General Manager (E&E)
Bihar State Pollution Control Board
B-1, 1st Floor, North Karanpura- 825021

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.23
16:24:59 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.02.23
16:45:30 +05'30'

Authorized Signatory
Quality Manager

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Contact us : 122-C, Ansha, Road No. 5A, Patliputra Colony, Patna - 800 013 (Bihar)
Mob. +918676886249, +919431047908 Email : shivatesthouse@gmail.com, info@shivatest.com
Website : www.shivatest.com, www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC-10662

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TEST REPORT

Ref. No. STH/TR/22-23/6410	Di: 23.02.2023	Your Work Order No. 4000285567-037-1019	Di: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 15.02.23			
[d] Sampling Location	Collected from Near at the top of Tejaswini Building (Township)			
[e] Method of Sampling	IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition	Temp. (°C)	24	Humidity (%)	86
[g] No. & Type of Container	One poly Jar.			
[h] Instrument ID	RDS-1, FPM-1			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-6410			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	16.02.23			
[o] Analysis Start Date / Analysis Completion Date	17.02.23/ 20.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswini Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	74.8
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	40.7
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.7
Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	34.1
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.06
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.9
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.7

SHIVA TEST HOUSE
1ST FLOOR, SANKAR NAGAR
Dy. General Manager (TECH)
Patna-800013
Tel: 061-2333333, 2333334
Fax: 061-2333335

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.02.23 16:36:37 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.02.23 16:47:43 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6410(A)		Dt : 23.02.2023		Your Work Order No. 4090285067-037-1019		Dt : 31.07.2022		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by			SHIVA TEST HOUSE on 15.02.23					
[d] Sampling Location			Collected from Near at the top of Tejasvi Building (Township)					
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)					
[f] Sampling Environmental Condition			Temp. (°C)		24		Humidity (%)	66
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-1, FPM-1					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-6410					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			16.02.23					
[o] Analysis Start Date / Analysis Completion Date			17.02.23/ 20.02.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)		0.23		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)		0.14		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)		0.17		
4. Arsenic (As)		ng / m ³	6	AAS Method		0.14		
Nickel as Ni		ng / m ³	20	AAS Method		4.13		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)		0.16		

SHRUTI / Sanjay Kumar
3rd Floor, 1st Floor, 2nd Floor
Dr. Gaurav / Manager (EMIS)
3rd Floor, 1st Floor, 2nd Floor
3rd Floor, 1st Floor, 2nd Floor

SHIBESHWAR PRASAD
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.02.23
16:58:50 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.02.23
16:48:01 +05'30'

Authorized Signatory
Quality Manager

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Website : www.shivatst.com ; www.shivatsthouse.com



SHIVA TEST HOUSE

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TC-10342

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TEST REPORT

Ref. No. STH/TR/22-23/5512		Dt: 27.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 20.02.23			
(d) Sampling Location				Collected from Near at the top of Tejasvi Building (Township)			
(e) Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
(f) Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	65
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-1, FPM-1			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-6512			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				21.02.23			
(o) Analysis Start Date / Analysis Completion Date				21.02.23/ 24.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Tejasvi Building (Township)	
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		76.1	
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		42.0	
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		14.9	
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		34.5	
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.06	
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		7.4	
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		23.4	

Shreyasee Prasad
 Digitally signed by
 Shreyasee Prasad
 Date: 2023.03.03
 18:26:01 +05'30'

SHRESHWAR PRASAD
 Digitally signed by
 SHRESHWAR PRASAD
 Date: 2023.03.03
 18:14:52 +05'30'

Verified by:
 Technical Manager



Shreyasee
 Prasad

Digitally signed by
 Shreyasee Prasad
 Date: 2023.03.03
 18:26:01 +05'30'
 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6512(A)		Dt: 27.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by			SHIVA TEST HOUSE on 20.02.23					
[d] Sampling Location			Collected from Near at the top of Tejasvi Building (Township)					
[e] Method of Sampling			IS 11255 (Part-1,2,3 & 7)					
[f] Sampling Environmental Condition			Temp. (°C)		24		Humidity (%)	65
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-1, FPM-1					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-6512					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			21.02.23					
[o] Analysis Start Date / Analysis Completion Date			21.02.23/ 24.02.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)		0.34		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)		0.14		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)		0.17		
4. Arsenic (As)		ng / m ³	6	AAS Method		0.14		
Nickel as Ni		ng / m ³	20	AAS Method		4.13		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)		0.16		

Shiv Kumar
General Manager (ENH)
Rajendra Nagar, Patna - 800 013
MTC Limited, North Karanpura - 825321

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.03
10:15:03 +05'30'



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.03
12:26:17 +05'30'

Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10542

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TEST REPORT

Ref. No. STH/TR/22-23/6566		Dt: 27.02.2023		Your Work Order No. 4808255007-037-1049		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 22.02.23			
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling				IS 11255 (Part-1,2,3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)	24	Humidity (%)	66
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-6566			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				23.02.23			
[o] Analysis Start Date / Analysis Completion Date				23.02.23/ 26.02.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	76.9		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	42.0		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.4		
Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.0		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.06		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	8.5		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	23.7		

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.03
18:16:47 +05'30'



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.03
18:28:27 +05'30'

Verified by:
Technical Manager

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6566(A)		Dt: 27.02.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 22.02.23			
[d] Sampling Location				Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling				IS 11255 (Part-1, 2, 3 & 7)			
[f] Sampling Environmental Condition				Temp. (°C)		24	Humidity (%)
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml. x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-6566			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				23.02.23			
[o] Analysis Start Date / Analysis Completion Date				23.02.23 / 26.02.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.48			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.14			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.15			
Nickel as Ni	ng / m ³	20	AAS Method	2.75			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.17			

Shuman
 Dy. General Manager (EHS)
 Shiva Test House, North Karanpura - 825321

SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2023.03.03 18:17:01 +05'30'

Verified by :
 Technical Manager



Shreyasee Prasad
 Digitally signed by Shreyasee Prasad
 Date: 2023.03.03 18:28:43 +05'30'
 Authorized Signatory
 Quality Manager

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 Website : www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

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TC-10482

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TEST REPORT

Ref. No: STH/TK/22-23/6917		Dt: 11.03.2023		Your Work Order No. 4000205067-037-1010		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 02.03.23			
(d) Sampling Location				Collected from Near at the top of Switch Yard Office Building			
(e) Method of Sampling				IS 5182 (Part-14)			
(f) Sampling Environmental Condition				Temp. (°C)	25	Humidity (%)	54
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-1, FPM-1			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-6917			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				03.03.23			
(o) Analysis Start Date / Analysis Completion Date				03.03.23/06.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	71.0		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	37.6		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	15.2		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	35.4		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.06		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	7.2		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	23.4		

Signature

संजय कुमार / Sanjay Kumar
उप महाप्रबंधक (ई एम जी)
Dy. General Manager (EMG)
राजदीप इंडिया, नई दिल्ली- 110021
NTPC Limited, North Karanpura Colony



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.21 15:55:27 +05'30'

Verified by:
Technical Manager

Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.21 16:09:37 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6917(A)		Dt : 21.03.2023		Your Work Order No. 4004205067-037-1019		Dt : 31.07.2022		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by			SHIVA TEST HOUSE on 02.03.23					
[d] Sampling Location			Collected from Near at the top of Switch Yard Office Building					
[e] Method of Sampling			IS 5182 (Part-14)					
[f] Sampling Environmental Condition			Temp. (°C)		25	Humidity (%)		54
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-1, FPM-1					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-6917					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			03.03.23					
[o] Analysis Start Date / Analysis Completion Date			03.03.23/ 06.03.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)		0.34		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)		0.13		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)		0.19		
4. Arsenic (As)		ng / m ³	6	AAS Method		0.18		
5. Nickel as Ni		ng / m ³	20	AAS Method		4.27		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)		0.21		

SHIBESHWAR PRASAD
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.21
15:55:15 +05'30'

Verified by :
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.07.21
16:08:51 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

(Serving since 1989)



TC-10882

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TEST REPORT

Ref. No. STII/TR/22-23/6979		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 03.03.23			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 5182 (Part-14)			
[f] Sampling Environmental Condition				Temp. (°C)	26	Humidity (%)	52
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-6979			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				04.03.23			
[o] Analysis Start Date / Analysis Completion Date				04.03.23/ 07.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	74.6		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	37.4		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	12.9		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	35.8		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.09		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	5.8		
7. Ozone (O ₃)		µg / m ³	130	IS 5182 (Part-9)	21.9		

SHIBESWAR PRASAD
General Manager (EMIS)
Digitally signed by SHIBESWAR PRASAD
Date: 2023.03.21 15:57:45 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.21 16:10:45 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/6979(A)		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 03.03.23			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 5182 (Part-14)			
[f] Sampling Environmental Condition				Temp. (°C)	26	Humidity (%)	62
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-6979			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				04.03.23			
[o] Analysis Start Date / Analysis Completion Date				04.03.23/07.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.23		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.20		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.20		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.20		
5. Nickel as Ni		ng / m ³	20	AAS Method	2.86		
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA (Method 10-6)	0.29		

SHIBESHWAR PRASAD
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.21
15:57:57 +05'30'

SHIBESHWAR
AR PRASAD

Verified by:
Technical Manager



Shreyasee
Prasad

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Shreyasee Prasad
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10662

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TEST REPORT

Ref. No. STH/TR/22-23/7109		Dt: 21.03.2023		Your Work Order No.- 4000285047-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 06.03.23			
[d]	Sampling Location			Collected from Near at the top of Switch Yard Office Building			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	28	Humidity (%)	52
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-1, FPM-1			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-7109			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			07.03.23			
[o]	Analysis Start Date / Analysis Completion Date			07.03.23/ 10.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	69.8		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	35.5		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.5		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	36.3		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.10		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.7		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	22.2		

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.21
16:00:11 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.21
16:22:54 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7109(A)		Dt : 21.03.2023		Your Work Order No. 4000285097-037-1019		Dt : 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by			SHIVA TEST HOUSE on 06.03.23				
[d] Sampling Location			Collected from Near at the top of Switch Yard Office Building				
[e] Method of Sampling			IS 5182 (Part-14)				
[f] Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	62	
[g] No. & Type of Container			One poly Jar				
[h] Instrument ID			RDS-1, FPM-1				
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code			A-7109				
[k] Sample Condition on Receipt			Fit for Analysis				
[l] Items required to be tested			As per contract				
[m] Whether any specific Method of Test has been suggested by the party			No				
[n] Date of receiving the sample			07.03.23				
[o] Analysis Start Date / Analysis Completion Date			07.03.23/ 10.03.23				
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.46		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.13		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.21		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.16		
5. Nickel as Ni		ng / m ³	20	AAS Method	2.84		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 1631)	0.23		

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By: Shreyasee Prasad
General Manager (E&E)
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SHIBESHVAR PRASAD
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SHIBESHVAR PRASAD
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16:00:25 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad
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Shreyasee Prasad
Date: 2023.03.21
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SHIVA TEST HOUSE

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TC-10342

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TEST REPORT

Ref. No. STH/TR/22-23/7116		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 07.03.23			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 5182 (Part-14)			
[f] Sampling Environmental Condition				Temp. (°C)	26	Humidity (%)	52
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-7116			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				08.03.23			
[o] Analysis Start Date / Analysis Completion Date				08.03.23/ 11.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	73.5		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	36.1		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.2		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.9		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.13		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.2		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	22.5		

CV
Digitally signed by
SHIBESHVAR PRASAD
Date: 2023.03.21
10:02:59 +05'30'

SHIBESHVAR
AR PRASAD

Verified by:
Technical Manager



Shreyasee
Prasad

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TEST REPORT

Ref. No. STH/TR/22-23/7116(A)		Dt : 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by			SHIVA TEST HOUSE on 07.03.23					
[d] Sampling Location			Collected from Near at the top of Switch Yard Office Building					
[e] Method of Sampling			IS 5182 (Part-14)					
[f] Sampling Environmental Condition			Temp. (°C)		26		Humidity (%)	52
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-3, FPM-3					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-7116					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			08.03.23					
[o] Analysis Start Date / Analysis Completion Date			08.03.23/ 11.03.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34			
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.18			
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.19			
4. Arsenic (As)		ng / m ³	6	AAS Method	0.22			
5. Nickel as Ni		ng / m ³	20	AAS Method	1.43			
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA (Method 10-5)	0.36			

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SHIBRASHW
AR PRASAD
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Verified by:
Technical Manager



Shreyasee
Prasad

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SHIVA TEST HOUSE

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TC-18502

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TEST REPORT

Ref. No. STH/TR/22-23/7369		Dt: 27.03.2023		Your Work Order No. 0000285067-037-1019		Ln: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 17.03.23			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 5182 (Part-14)			
[f] Sampling Environmental Condition				Temp. (°C)		26 Humidity (%) 58	
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-4, FPM-4			
[i] Sample Quantity				30-ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-7369			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				18.03.23			
[o] Analysis Start Date / Analysis Completion Date				18.03.23/20.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	70.0			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	37.6			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.2			
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	36.6			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.07			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	7.0			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	23.1			

Shreyasee Prasad
General Manager (EMIS)
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.27
12:53:57 +05'30'

SHIBESHWAR PRASAD

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.27
13:21:10 +05'30'
Authorized Signatory
Quality Manager

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Website : www.shivahouse.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)

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TEST REPORT

Ref. No. STH/TR/22-23/7369(A)		Dt: 27.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 17.03.23			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 5182 (Part-14)			
[f] Sampling Environmental Condition				Temp. (°C)		26	Humidity (%)
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-4, FPM-4			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-7369			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				18.03.23			
[o] Analysis Start Date / Analysis Completion Date				18.03.23/ 20.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.28			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.22			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.14			
5. Nickel as Ni	ng / m ³	20	AAS Method	1.42			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 1631)	0.17			

SHIBESHW AR PRASAD
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Shibeshw Ar Prasad
Date: 2023.03.27
12:54:12 +05'30'



Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.03.27
13:31:27 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-18843

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TEST REPORT

Ref. No. STH/TR/22-23/7398	Dt.: 27.03.2023	Year Work Order No. 4000285067-037-1010	Dt.: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 18.03.23			
[d] Sampling Location	Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling	IS 5182 (Part-14)			
[f] Sampling Environmental Condition	Temp. (°C)	26	Humidity (%) 52	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-4, FPM-4			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-7398			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	19.03.23			
[o] Analysis Start Date / Analysis Completion Date	19.03.23/ 22.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	75.1
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	36.5
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.5
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	36.3
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.09
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	8.9
7. Ozone (O ₃)	µg / m ³	160	IS 5182 (Part-9)	23.1

SHIBESHVAR PRASAD
Digitally signed by SHIBESHVAR PRASAD
Date: 2023.03.27 12:55:59 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.27 13:33:44 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/7396(A)		Dt : 27.03.2023		Your Work Order No. 400285467-037-1019		Dt : 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 18.03.23			
[d]	Sampling Location			Collected from Near at the top of Switch Yard Office Building			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	52
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-7396			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			19.03.23			
[o]	Analysis Start Date / Analysis Completion Date			19.03.23/ 22.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.57		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.19		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.21		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.29		
5. Nickel as Ni		ng / m ³	20	AAS Method	2.86		
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA (Method 10-5)	0.20		

Shiv Kumar
Gen. Manager (Env. & Safety)
P.O. Box 1024, North Karanpura, Jharkhand-825321

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.27 12:56:11 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.27 13:34:00 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10682

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TEST REPORT

Ref. No. STH/TR/22-23/7536		DI: 28.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanjura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 22.03.23			
[d]	Sampling Location			Collected from Near at the top of Switch Yard Office Building			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	28	Humidity (%)	52
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-7536			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			23.03.23			
[o]	Analysis Start Date / Analysis Completion Date			23.03.23/ 26.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	69.6		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. II)	33.2		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	16.4		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.8		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.16		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	7.3		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	22.2		

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.28
12:43:27 +05'30'

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.01.28
13:25:11 +05'30'

Authorized Signatory
Quality Manager

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Website: www.shivatest.com or www.shivatesthouse.com



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TEST REPORT

Ref. No. STH/TR/22-23/7536(A)		Dt: 28.03.2023		Your Work Order No. 4000285087-037-1010		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 22.03.23			
[d] Sampling Location				Collected from Near at the top of Switch Yard Office Building			
[e] Method of Sampling				IS 5182 (Part-14)			
[f] Sampling Environmental Condition				Temp. (°C)	28	Humidity (%)	52
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-4, FPM-4			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-7536			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				23.03.23			
[o] Analysis Start Date / Analysis Completion Date				23.03.23/26.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result: Near at the top of Switch Yard Office Building			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.16			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.36			
5. Nickel as Ni	ng / m ³	20	AAS Method	1.43			
6. Mercury (Hg)	ng / m ³	Not Specified	USEPA (Method 10-5)	0.28			

Digitally signed by
Shibeshwar Prasad
On 2023.03.28
12:43:38 +05'30'

SHIBESHWAR PRASAD

Verified by
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
On 2023.03.28
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Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-106A2

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TEST REPORT

Ref. No. 5TH/TR/22-23/7585		DI : 28.03.2023		Your Work Order No. 4080285867-037-1019		Dt : 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 23.03.23			
[d]	Sampling Location			Collected from Near at the top of Switch Yard Office Building			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	29	Humidity (%)	51
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-7585			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			24.03.23			
[o]	Analysis Start Date / Analysis Completion Date			24.03.23/ 27.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result : Near at the top of Switch Yard Office Building		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	67.9		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	35.3		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.9		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	33.9		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.09		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	8.2		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	23.1		

SHIBESHWAR PRASAD

Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.28
12:45:09 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.28
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7585(A)		Dt: 28.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022				
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321							
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)							
[c] Sample Collected by			SHIVA TEST HOUSE on 23.03.23							
[d] Sampling Location			Collected from Near at the top of Switch Yard Office Building							
[e] Method of Sampling			IS 5182 (Part-14)							
[f] Sampling Environmental Condition			Temp. (°C)		29		Humidity (%)		51	
[g] No. & Type of Container			One poly Jar							
[h] Instrument ID			RDS-4, FPM-4							
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)							
[j] Sample Code			A-7585							
[k] Sample Condition on Receipt			Fit for Analysis							
[l] Items required to be tested			As per contract							
[m] Whether any specific Method of Test has been suggested by the party			No							
[n] Date of receiving the sample			24.03.23							
[o] Analysis Start Date / Analysis Completion Date			24.03.23/ 27.03.23							
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Switch Yard Office Building					
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.23					
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.18					
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.21					
4. Arsenic (As)		ng / m ³	6	AAS Method	0.18					
5. Nickel as Ni		ng / m ³	20	AAS Method	4.30					
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA (Method 10-5)	0.36					

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.28
12:45:21 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.28
13:56:19 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10342

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TEST REPORT

Ref. No: STH/TR/22-23/6916		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by			SHIVA TEST HOUSE on 02.03.23				
[d] Sampling Location			Collected from Near at the top of DM Plant				
[e] Method of Sampling			IS 5182 (Part-14)				
[f] Sampling Environmental Condition			Temp. (°C)	25	Humidity (%)	64	
[g] No. & Type of Container			One poly Jar				
[h] Instrument ID			RDS-3, FPM-3				
[i] Sample Quantity			30 ml x 6 for each (NO _x , SO ₂ , NH ₃)				
[j] Sample Code			A-6916				
[k] Sample Condition on Receipt			Fit for Analysis				
[l] Items required to be tested			As per contract				
[m] Whether any specific Method of Test has been suggested by the party			No				
[n] Date of receiving the sample			03.03.23				
[o] Analysis Start Date / Analysis Completion Date			03.03.23/ 06.03.23				
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	73.8		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	38.8		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.1		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.2		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.08		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.2		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	20.7		

SHIBESHWAR PRASAD
General Manager (EMG)
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Verified by:
Technical Manager

Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.21 16:08:09 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TK/22-23/6916(A)		Dt : 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 02.03.23			
[d]	Sampling Location			Collected from Near at the top of DM Plant			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	25	Humidity (%)	64
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-3, FPM-3			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6916			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			03.03.23			
[o]	Analysis Start Date / Analysis Completion Date			03.03.23/ 06.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.46		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.12		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.18		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.18		
5. Nickel as Ni		ng / m ³	20	AAS Method	4.20		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 1631-5)	0.23		

Digitally signed by
Dr. General Manager (EIA/G)
SHIVA TEST HOUSE, 122 C, Ashta Road No. 5A,
Patna, Bihar, India - 800 013



SHIBESHWAR PRASAD
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SHIBESHWAR PRASAD
Date: 2023.03.21
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Verified by :
Technical Manager

Shreyasee
Prasad
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Prasad
Date: 2023.07.31 10:00:23 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/IR/22-23/6978		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 03.03.23			
(d) Sampling Location				Collected from Near at the top of DM Plant			
(e) Method of Sampling				IS 5182 (Part-14)			
(f) Sampling Environmental Condition				Temp. (°C)	26	Humidity (%)	52
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-2, FPM-2			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-6978			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				04.03.23			
(o) Analysis Start Date / Analysis Completion Date				04.03.23/07.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of DM Plant	
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)		73.9	
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)		36.3	
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)		14.3	
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)		35.2	
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)		0.12	
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)		6.5	
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)		18.9	

SHIBESHWAR / Sanjay Kumar
Oy. General Manager (E&S)
Mobile: 9818676886/249 / +919431047908
NTPC Limited, North Karanpura-825321



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Technical Manager

Shreyasee Prasad
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6978(A)	Dt: 21.03.2023	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 03.03.23			
(d) Sampling Location	Collected from Near at the top of DM Plant			
(e) Method of Sampling	IS 5182 (Part-14)			
(f) Sampling Environmental Condition	Temp. (°C).	26	Humidity (%).	52
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-2, FPM-2			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-6978			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	04.03.23			
(o) Analysis Start Date / Analysis Completion Date	04.03.23/07.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.46
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.20
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.24
5. Nickel as Ni	ng / m ³	20	AAS Method	2.93
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.28

SHIBESHWAR PRASAD / Sanjay Kumar
Dy. General Manager (EMO)
RTPC Limited, North Karanpura-825321



SHIBESHWAR PRASAD
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Verified by:
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/23-23/7108		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by			SHIVA TEST HOUSE on 06.03.23				
[d] Sampling Location			Collected from Near at the top of DM Plant				
[e] Method of Sampling			IS 5182 (Part-14)				
[f] Sampling Environmental Condition			Temp. (°C)	28	Humidity (%)	62	
[g] No. & Type of Container			One poly Jar				
[h] Instrument ID			RDS-3, FPM-3				
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code			A-7108				
[k] Sample Condition on Receipt			Fit for Analysis				
[l] Items required to be tested			As per contract				
[m] Whether any specific Method of Test has been suggested by the party			No				
[n] Date of receiving the sample			07.03.23				
[o] Analysis Start Date / Analysis Completion Date			07.03.23/ 10.03.23				
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	71.6		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	37.6		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.8		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	35.3		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.09		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	5.2		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	21.4		

Shiveshwar / Sanjay Kumar
Dy. General Manager (EMO)
Rajendra Prasad, North Karanpura-825321
HTPC Limited, North Karanpura-825321



SHIBESHWAR PRASAD
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Technical Manager

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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7108(A)	Di : 21.03.2023	Your Work Order No. 4000285087-037-1019	Di : 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 06.03.23			
[d] Sampling Location	Collected from Near at the top of DM Plant			
[e] Method of Sampling	IS 5182 (Part-14)			
[f] Sampling Environmental Condition	Temp. (°C)	28	Humidity (%)	52
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-3, FPM-3			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-7108			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	07.03.23			
[o] Analysis Start Date / Analysis Completion Date	07.03.23/ 10.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16
4. Arsenic (As)	ng / m ³	6	AAS Method	0.16
5. Nickel as Ni	ng / m ³	20	AAS Method	2.80
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.21

SHIVA TEST HOUSE
 122-C, Ashoka Road No-5A, Patna-800 013
 Dy. General Manager (EMG)
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 Email: shivahouse@gmail.com ; info@shivatest.com



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Verified by :
 Technical Manager

Shreyasee Prasad
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 Authorized Signatory
 Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7115		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 07.03.23			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 5182 (Part-14)			
[f] Sampling Environmental Condition				Temp. (°C)	26	Humidity (%)	52
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-2, FPM-2			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-7115			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				08.03.23			
[o] Analysis Start Date / Analysis Completion Date				08.03.23/ 11.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	73.1		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	35.4		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.8		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	35.4		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.12		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	7.2		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	19.5		

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Verified by:
Technical Manager



Shreyasee Prasad

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Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No: STH/TR/22-23/7115(A)		Dt : 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by			SHIVA TEST HOUSE on 07.03.23				
[d] Sampling Location			Collected from Near at the top of DM Plant				
[e] Method of Sampling			IS 5182 (Part-14)				
[f] Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	52	
[g] No. & Type of Container			One poly Jar				
[h] Instrument ID			RDS-2, FPM-2				
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code			A-7115				
[k] Sample Condition on Receipt			Fit for Analysis				
[l] Items required to be tested			As per contract				
[m] Whether any specific Method of Test has been suggested by the party			No				
[n] Date of receiving the sample			08.03.23				
[o] Analysis Start Date / Analysis Completion Date			08.03.23/ 11.03.23				
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.23		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.19		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.31		
5. Nickel as Ni		ng / m ³	20	AAS Method	1.47		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 1631)	0.28		

Signature
 Dr. Sanjay Kumar
 Dr. Sanjay Kumar (P. No. 10)
 Dy. General Manager (QA/QC)
 Shiva Test House, North Karanpura Project
 HPPCL, North Karanpura Project



SHIBESHWAR PRASAD
 Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2023.03.21
 16:02:47 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad
 Digitally signed by
 Shreyasee Prasad
 Date: 2023.03.21
 16:25:14 +05'30'
 Authorized Signatory
 Quality Manager

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4. Test Report can not be reproduced partially or full for legal/court purpose without written permission of the Laboratory.

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 Website: www.shivatsh.com; www.shivatstesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC-16882

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TEST REPORT

Ref. No. STH/TR/22-23/7368	Date: 17.03.2023	Your Work Order No. 4000235067-037-1019	Date: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 17.03.23			
[d] Sampling Location	Collected from Near at the top of DM Plant			
[e] Method of Sampling	IS 5182 (Part-14)			
[f] Sampling Environmental Condition	Temp. (°C)	26	Humidity (%)	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-3, FPM-3			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-7368			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	18.03.23			
[o] Analysis Start Date / Analysis Completion Date	18.03.23/ 20.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	72.1
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.4
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.1
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	36.0
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.09
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	4.8
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	22.6

By Shiveshwar Ar Prasad
Dy. General Manager (EMO)
MPPCL, North Karanpura-825321

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.27 12:53:34 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.27 13:30:42 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/7368(A)		Dt : 27.03.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 17.03.23			
[d]	Sampling Location			Collected from Near at the top of DM Plant			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	58
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-3, FPM-3			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-7368			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			18.03.23			
[o]	Analysis Start Date / Analysis Completion Date			18.03.23/ 20.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.46		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.12		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.18		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.19		
5. Nickel as Ni		ng / m ³	20	AAS Method	4.20		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)	0.23		

Dr. Sanjay Kumar
Dr. General Manager (EMG)
NHPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
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SHIBESHWAR PRASAD
Date: 2023.03.27
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Verified by:
Technical Manager

Shreyasee Prasad
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Shreyasee Prasad
Date: 2023.03.27
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Quality Manager

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SHIVA TEST HOUSE

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TC-10542

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TEST REPORT

Ref. No. STH/TR/22-23/7397		DI: 27.03.2023		Your Work Order No. 4000285667-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 18.03.23			
[d]	Sampling Location			Collected from Near at the top of DM Plant			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	52
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-2, FPM-2			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-7397			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			19.03.23			
[o]	Analysis Start Date / Analysis Completion Date			19.03.23/ 22.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	76.5		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	36.8		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	12.8		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	35.7		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.09		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	10.1		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	26.0		

Dr. Shreshth Kumar / Sanjay Kumar
Dy. General Manager (EMG)
परीक्षण विभाग, नई दिल्ली- 825321
NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
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SHIBESHWAR PRASAD
Date: 2023.03.27
12:55:28 +05'30'
Verified by:
Technical Manager

Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.03.27
13:33:12 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7397(A)		Dt: 27.03.2023		Your Work Order No. 4000285067-037-1019		Dr: 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by			SHIVA TEST HOUSE on 18.03.23				
[d] Sampling Location			Collected from Near at the top of DM Plant				
[e] Method of Sampling			IS 5182 (Part-14)				
[f] Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	52	
[g] No. & Type of Container			One poly Jar				
[h] Instrument ID			RDS-2, FPM-2				
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code			A-7397				
[k] Sample Condition on Receipt			Fit for Analysis				
[l] Items required to be tested			As per contract				
[m] Whether any specific Method of Test has been suggested by the party			No				
[n] Date of receiving the sample			19.03.23				
[o] Analysis Start Date / Analysis Completion Date			19.03.23/ 22.03.23				
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.19		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.17		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.17		
5. Nickel as Ni		ng / m ³	20	AAS Method	4.40		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-6)	0.20		

Shivam
Shivam Singh / Sanjay Kumar
Jr. Assistant CE, ITC, Ltd.
Dy. General Manager (ES&S)
Industrial Park, ITC, Ltd. 825321
HPO, Chatra, Jharkhand (Jharkhand)



SHIBESHWAR PRASAD
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.27
12:55:41 +05'30'

Verified by:
Technical Manager

Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.27
13:33:28 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10302

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TEST REPORT

Ref. No. STH/TR/22-23/7535		Dt: 18.03.2023		Your Work Order No. 4000285087-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra. Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 22.03.23			
[d] Sampling Location				Collected from Near at the top of DM Plant			
[e] Method of Sampling				IS 5182 (Part-14)			
[f] Sampling Environmental Condition				Temp. (°C)	28	Humidity (%)	52
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-3, FPM-3			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-7535			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				23.03.23			
[o] Analysis Start Date / Analysis Completion Date				23.03.23/26.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	74.3		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	35.4		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	11.3		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	36.5		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.10		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	10.7		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	27.9		

SHIVA TEST HOUSE
At: Tandwa, Dist- Chatra, Jharkhand- 825 321
By General Manager (EM-3)
Mobile: 91867685249, 919431047908
Email: shivatesthouse@gmail.com, info@shivatesthouse.com

SHIBESHWAR PRASAD
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Date: 2023.03.28
12:43:04 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.03.28
13:52:25 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7535(A) Dt.: 28.03.2023 Your Work Order No. 4000285067-037-1019 Dt.: 31.07.2022

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 22.03.23			
[d] Sampling Location	Collected from Near at the top of DM Plant			
[e] Method of Sampling	IS 5182 (Part-14)			
[f] Sampling Environmental Condition	Temp. (°C)	28	Humidity (%)	52
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-3, FPM-3			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-7535			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	23.03.23			
[o] Analysis Start Date / Analysis Completion Date	23.03.23/ 26.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.48
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.21
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.20
4. Arsenic (As)	ng / m ³	6	AAS Method	0.31
5. Nickel as Ni	ng / m ³	20	AAS Method	2.93
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.28

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.28
12:43:16 +05'30'

SHIBESHWAR
AR PRASAD

Verified by:
Technical Manager



Shreyasee
Prasad

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Shreyasee Prasad
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13:52:38 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10582

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TEST REPORT

Ref. No. 8TH/TR/22-23/7584		Dt : 28.03.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 23.03.23			
[d]	Sampling Location			Collected from Near at the top of DM Plant			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	29	Humidity (%)	51
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-2, FPM-2			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-7584			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			24.03.23			
[o]	Analysis Start Date / Analysis Completion Date			24.03.23/ 27.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	72.6		
2. Particulate Matter (PM _{2.5})		µg / m ³	50	CPCB (GMAAP Vol. I)	34.2		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	12.6		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	35.8		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.07		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	10.2		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	26.9		

Shiva Kumar / Sanjay Kumar
Dy. General Manager (E&C)
Mobile: 9876543210, 9876543211
NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.28 12:44:47 +05'30'

Verified by:
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.03.28 13:55:27 +05'30'
Authorized Signatory
Quality Manager

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Website: www.shivatest.com, www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)

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TEST REPORT

Ref. No. STH/TR/22-23/7584(A)	Dt: 28.03.2023	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 23.03.23			
[d] Sampling Location	Collected from Near at the top of DM Plant			
[e] Method of Sampling	IS 5182 (Part-14)			
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%) 51	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-2, FPM-2			
[i] Sample Quantity	30 ml x 6 for each (NO _x , SO ₂ , NH ₃)			
[j] Sample Code	A-7584			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	24.03.23			
[o] Analysis Start Date / Analysis Completion Date	24.03.23/ 27.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of DM Plant
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.57
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.20
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.22
4. Arsenic (As)	ng / m ³	6	AAS Method	0.24
5. Nickel as Ni	ng / m ³	20	AAS Method	4.40
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-6)	0.20

SHIVA TEST HOUSE
सर्व प्रकार के पर्यावरणीय प्रयोग
Dy. General Manager (EMO)
राज्य प्रदूषण नियंत्रण बोर्ड, बिहार
HPC Limited, North Karanpura-825321

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.28
12:44:59 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.28
13:55:43 +05'30'
Authorized Signatory
Quality Manager

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Website : www.shivatest.com , www.shivatesthouse.com



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TEST REPORT

Ref. No. STH/TR/22-23/6818		Dt: 21.03.2023		Your Work Order No. 4000235067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 02.03.23			
[d]	Sampling Location			Collected from Near at the top of Tejaswini Building (Township)			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	25	Humidity (%)	54
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6918			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			03.03.23			
[o]	Analysis Start Date / Analysis Completion Date			03.03.23/ 06.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswini Building (Township)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	69.2		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	37.8		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.0		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.3		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.08		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	5.3		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	21.6		

SHIBESHWAR PRASAD
General Manager (EMO)
NTPC Limited, North Karanpura-825321

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.21 15:56:07 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.21 16:09:08 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6918(A)		Dt. 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt. 31.07.2022				
(a) Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321							
(b) Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)							
(c) Sample Collected by			SHIVA TEST HOUSE on 02.03.23							
(d) Sampling Location			Collected from Near at the top of Tejasvi Building (Township)							
(e) Method of Sampling			IS 5182 (Part-14)							
(f) Sampling Environmental Condition			Temp. (°C)		25		Humidity (%)		54	
(g) No. & Type of Container			One poly Jar							
(h) Instrument ID			RDS-4, FPM-4							
(i) Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)							
(j) Sample Code			A-6918							
(k) Sample Condition on Receipt			Fit for Analysis							
(l) Items required to be tested			As per contract							
(m) Whether any specific Method of Test has been suggested by the party			No							
(n) Date of receiving the sample			03.03.23							
(o) Analysis Start Date / Analysis Completion Date			03.03.23/06.03.23							
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)					
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34					
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.15					
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.16					
4. Arsenic (As)		ng / m ³	6	AAS Method	0.19					
5. Nickel as Ni		ng / m ³	20	AAS Method	2.75					
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-6)	0.24					

Dr. Shreshwar Kumar / Santoy Kumar
Dr. Shreshwar Kumar (Dr. Santoy Kumar)
Dr. Shreshwar Kumar (Dr. Santoy Kumar)
Dr. Shreshwar Kumar (Dr. Santoy Kumar)
Dr. Shreshwar Kumar (Dr. Santoy Kumar)
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Dr. Shreshwar Kumar (Dr. Santoy Kumar)
Dr. Shreshwar Kumar (Dr. Santoy Kumar)
Dr. Shreshwar Kumar (Dr. Santoy Kumar)
Dr. Shreshwar Kumar (Dr. Santoy Kumar)



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.21 15:56:19 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.03.21 16:09:17 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6980		Dt: 21.03.2023		Your Work Order No. 4000285087-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 03.03.23			
[d]	Sampling Location			Collected from Near at the top of Tejasvi Building (Township)			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	52
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6980			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			04.03.23			
[o]	Analysis Start Date / Analysis Completion Date			04.03.23/ 07.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	75.4		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	40.6		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.7		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	33.8		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.09		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	7.7		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	22.2		

Digitally signed by
Dr. General Manager (EIA/G)
SHIBESHWAR PRASAD
MPC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.21
15:58:09 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.21
16:11:15 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/6980(A)		Dt. 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt. 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 03.03.23			
[d]	Sampling Location			Collected from Near at the top of Tejasvi Building (Township)			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	52
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6980			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			04.03.23			
[o]	Analysis Start Date / Analysis Completion Date			04.03.23/ 07.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.23		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.19		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.17		
5. Nickel as Ni		ng / m ³	20	AAS Method	2.84		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)	0.37		

Digitally signed by
Dr. General Manager (EMG)
SHIBESHWAR PRASAD
155521
NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.21
15:58:21 +05'30'

Verified by :
Technical Manager

Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.21
16:11:31 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7110		Dt.: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt.: 31.07.2023		
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)				
(c) Sample Collected by				SHIVA TEST HOUSE on 06.03.23				
(d) Sampling Location				Collected from Near at the top of Tejasvi Building (Township)				
(e) Method of Sampling				IS 5182 (Part-14)				
(f) Sampling Environmental Condition				Temp. (°C)		28	Humidity (%)	52
(g) No. & Type of Container				One poly Jar				
(h) Instrument ID				RDS-4, FPM-4				
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
(j) Sample Code				A-7110				
(k) Sample Condition on Receipt				Fit for Analysis				
(l) Items required to be tested				As per contract				
(m) Whether any specific Method of Test has been suggested by the party				No				
(n) Date of receiving the sample				07.03.23				
(o) Analysis Start Date / Analysis Completion Date				07.03.23 / 10.03.23				
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)				
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	70.1				
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.6				
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	14.9				
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	35.7				
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.10				
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.0				
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	23.4				

SHIBESHWAR PRASAD (E) एम जी
Dy. General Manager (EMG)
एनपीसी लिमिटेड, नवी कारापुरा- 825321
NTPC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.21 16:00:38 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.21 16:20:26 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7110(A)		Dt : 21.03.2023		Your Work Order No. 4000285047-037-1019		Dt : 31.07.2022		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by			SHIVA TEST HOUSE on 06.03.23					
[d] Sampling Location			Collected from Near at the top of Tejasvi Building (Township)					
[e] Method of Sampling			IS 5182 (Part-14)					
[f] Sampling Environmental Condition			Temp. (°C)		28	Humidity (%)		52
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-4, FPM-4					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-7110					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			07.03.23					
[o] Analysis Start Date / Analysis Completion Date			07.03.23/ 10.03.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test		Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)		0.46		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)		0.14		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)		0.17		
4. Arsenic (As)		ng / m ³	6	AAS Method		0.20		
5. Nickel as Ni		ng / m ³	20	AAS Method		4.13		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)		0.22		

Dr. Sanjay Kumar
 Dy. General Manager (EMG)
 NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2023.03.21 16:01:43 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad
 Digitally signed by Shreyasee Prasad
 Date: 2023.03.21 16:23:55 +05'30'
 Authorized Signatory
 Quality Manager

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SHIVA TEST HOUSE

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TC-10482

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TEST REPORT

Ref. No. STH/IR/22-23/7117		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
(a)	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b)	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
(c)	Sample Collected by			SHIVA TEST HOUSE on 07.03.23			
(d)	Sampling Location			Collected from Near at the top of Tejasvi Building (Township)			
(e)	Method of Sampling			IS 5182 (Part-14)			
(f)	Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	52
(g)	No. & Type of Container			One poly Jar			
(h)	Instrument ID			RDS-4, FPM-4			
(i)	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j)	Sample Code			A-7117			
(k)	Sample Condition on Receipt			Fit for Analysis			
(l)	Items required to be tested			As per contract			
(m)	Whether any specific Method of Test has been suggested by the party			No			
(n)	Date of receiving the sample			08.03.23			
(o)	Analysis Start Date / Analysis Completion Date			08.03.23/ 11.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	74.9		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	39.3		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.4		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.2		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.09		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.9		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	21.6		

Shreyasee
श्रेयासे प्रसाद / Shreyasee Prasad
Dy. General Manager (EMG)
पब्लिक रिले, नॉर्थ कार्णपुर- 825321
NTPC Unaid, North Karanpura- 825321

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.21 16:03:23 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.21 16:26:08 +05'30'

Authorized Signatory
Quality Manager

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Website : www.shivahouse.com, www.shivatesthouse.com



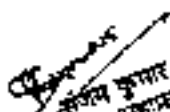
SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/7117(A)		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 07.03.23			
[d]	Sampling Location			Collected from Near at the top of Tejasvi Building (Township)			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	52
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-4, FPM-4			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-7117			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			08.03.23			
[o]	Analysis Start Date / Analysis Completion Date			08.03.23/ 11.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.46		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.19		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.19		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.18		
5. Nickel as Ni		ng / m ³	20	AAS Method	1.42		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)	0.17		


 Santoy Kumar / Santoy Kumar
 Dy. General Manager (EMG)
 KITEC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
 Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2023.03.21
 16:09:36 +05'30'

Verified by :
 Technical Manager

Shreyasee Prasad
 Digitally signed by
 Shreyasee Prasad
 Date: 2023.03.21
 16:26:22 +05'30'
 Authorized Signatory
 Quality Manager

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SHIVA TEST HOUSE

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TC-10082

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TEST REPORT

Ref. No. STH/TR/22-23/7370	Di: 27.03.2023	Your Work Order No. 4090285067-037-1019	Di: 31.07.2023	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 17.03.23			
(d) Sampling Location	Collected from Near at the top of Tejasvi Building (Township)			
(e) Method of Sampling	IS 5182 (Part-14)			
(f) Sampling Environmental Condition	Temp. (°C)	26	Humidity (%) 58	
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-1, FPM-1			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-7370			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	18.03.23			
(o) Analysis Start Date / Analysis Completion Date	18.03.23/ 20.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	70.8
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	39.1
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.2
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	36.2
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.09
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.6
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	18.5

Shreyasee Prasad / Senior Kumar
Sr. Manager (E & T) STH
Dr. General Manager (EMG)
Mobile: 98263 26521
ATPC Limited, North Karanpura-825321

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.27
12:54:28 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.27
13:31:46 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7370(A)	Dt: 27.03.2023	Your Work Order No. 4000285067-037-1019	Dt: 31.07.2022	
(a) Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by	SHIVA TEST HOUSE on 17.03.23			
(d) Sampling Location	Collected from Near at the top of Tejaswini Building (Township)			
(e) Method of Sampling	IS 5182 (Part-14)			
(f) Sampling Environmental Condition	Temp. (°C)	26	Humidity (%) 68	
(g) No. & Type of Container	One poly Jar			
(h) Instrument ID	RDS-1, FPM-1			
(i) Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code	A-7370			
(k) Sample Condition on Receipt	Fit for Analysis			
(l) Items required to be tested	As per contract			
(m) Whether any specific Method of Test has been suggested by the party	No			
(n) Date of receiving the sample	18.03.23			
(o) Analysis Start Date / Analysis Completion Date	18.03.23/ 20.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswini Building (Township)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.18
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.16
4. Arsenic (As)	ng / m ³	6	AAS Method	0.17
5. Nickel as Ni	ng / m ³	20	AAS Method	2.75
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.16

Dr. Shreyasee Prasad / Sanjay Kumar
 Dr. General Manager (E&S)
 NTPC Limited, North Karanpura-825321



SHIBESHWAR PRASAD
 Digitally signed by
 SHIBESHWAR PRASAD
 Date: 2023.03.27
 12:58:39 +05'30'

Verified by:
 Technical Manager

Shreyasee Prasad
 Digitally signed by
 Shreyasee Prasad
 Date: 2023.03.27
 13:32:05 +05'30'
 Authorized Signatory
 Quality Manager

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 Website: www.shivatest.com, www.shivahouse.com



SHIVA TEST HOUSE

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TC-10582

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TEST REPORT

Ref. No. STH/TR/22-23/7399 Dt: 17.03.2023 Your Work Order No. 4000285087-037-1019 Dt: 31.07.2022

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 18.03.23			
[d] Sampling Location	Collected from Near at the top of Tejasvi Building (Township)			
[e] Method of Sampling	IS 5182 (Part-14)			
[f] Sampling Environmental Condition	Temp. (°C)	28	Humidity (%)	52
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-1, FPM-1			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-7399			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	19.03.23			
[o] Analysis Start Date / Analysis Completion Date	19.03.23/ 22.03.23			

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.2
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	37.6
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.8
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	32.5
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.09
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	6.7
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	24.6

Dr. Shreshth Kumar / Sanjay Kumar
Dr. General Manager (E&E)
NTPC Limited, North Karanpura

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.27 12:56:24 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.03.27 13:34:27 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7399(A)		Dt: 27.03.2023		Your Work Order No. 400285007-037-1010.		Dt: 31.07.2022	
(a) Name and address of the Customer		North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
(b) Details of Sample		Ambient Air Quality Monitoring (As per NAAQS)					
(c) Sample Collected by		SHIVA TEST HOUSE on 18.03.23					
(d) Sampling Location		Collected from Near at the top of Tejaswini Building (Township)					
(e) Method of Sampling		IS 5182 (Part-14)					
(f) Sampling Environmental Condition		Temp. (°C)		26		Humidity (%)	
(g) No. & Type of Container		One poly Jar					
(h) Instrument ID		RDS-1, FPM-1					
(i) Sample Quantity		30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
(j) Sample Code		A-7399					
(k) Sample Condition on Receipt		Fit for Analysis					
(l) Items required to be tested		As per contract					
(m) Whether any specific Method of Test has been suggested by the party		No					
(n) Date of receiving the sample		19.03.23					
(o) Analysis Start Date / Analysis Completion Date		19.03.23/ 22.03.23					
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejaswini Building (Township)			
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34			
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.18			
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.21			
4. Arsenic (As)	ng / m ³	6	AAS Method	0.17			
5. Nickel as Ni	ng / m ³	20	AAS Method	2.84			
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 1631)	0.25			

SHIBESHWAR PRASAD / Sanjay Kumar
 Dy. General Manager (EMAG)
 HITEC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD
 Digitally signed by SHIBESHWAR PRASAD
 Date: 2023.03.27 12:56:41 +05'30'

Verified by:
 Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
 Date: 2023.03.27 12:55:56 +05'30'
 Authorized Signatory
 Quality Manager

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SHIVA TEST HOUSE

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TC-14682

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TEST REPORT

Ref. No. STH/TR/23-23/7537		Dt : 28.03.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022		
(a) Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
(b) Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
(c) Sample Collected by			SHIVA TEST HOUSE on 22.03.23					
(d) Sampling Location			Collected from Near at the top of Tejasvi Building (Township)					
(e) Method of Sampling			IS 5182 (Part-14)					
(f) Sampling Environmental Condition			Temp. (°C)		28		Humidity (%)	52
(g) No. & Type of Container			One poly Jar					
(h) Instrument ID			RDS-1, FPM-1					
(i) Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
(j) Sample Code			A-7537					
(k) Sample Condition on Receipt			Fit for Analysis					
(l) Items required to be tested			As per contract					
(m) Whether any specific Method of Test has been suggested by the party			No					
(n) Date of receiving the sample			29.03.23					
(o) Analysis Start Date / Analysis Completion Date			29.03.23/ 26.03.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)			
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	67.7			
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	36.3			
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	17.8			
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.2			
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.12			
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	5.8			
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	23.1			

Dr. Shreshth Kumar / Sanjay Kumar
Dr. General Manager (EMG)
SHIVA TEST HOUSE, North Karanpura- 825321
HTEC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.28 12:43:49 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.03.28 13:53:18 +05'30'
Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7537(A)		Dt: 28.03.2023		Your Work Order No. 4400285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 22.03.23			
[d]	Sampling Location			Collected from Near at the top of Tejasavi Building (Township)			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	28	Humidity (%)	62
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-1, FPM-1			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-7537			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			23.03.23			
[o]	Analysis Start Date / Analysis Completion Date			23.03.23/ 26.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasavi Building (Township)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.57		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.20		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.23		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.24		
5. Nickel as Ni		ng / m ³	20	AAS Method	4.26		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA Method 1631	0.29		

Digitally signed by
SHIBESHVAR PRASAD
Date: 2023.03.28
12:44:00 +05'30'

SHIBESHVAR
AR PRASAD

Verified by:
Technical Manager



Shreyasee
Prasad

Digitally signed by Shreyasee
Prasad
Date: 2023.03.28 12:43:31 +05'30'

Authorized Signatory
Quality Manager

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Contact us : 122-C, Aishya, Road No. 5A, Pallapura Colony, Patna - 800 013 (Bihar)
Mob: +918676886249 ; +919431047903 Email: shivetest@shiva-test.com ; info@shivetest.com
Website: www.shivetest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1983)



TC-10582

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TEST REPORT

Ref. No. STH/TR/22-23/7386		Dt: 28.03.2023		Your Work Order No. 4000286067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS).			
[c]	Sample Collected by			SHIVA TEST HOUSE on 23.03.23			
[d]	Sampling Location			Collected from Near at the top of Tejasvi Building (Township)			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	28	Humidity (%)	51
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-1, FPM-1			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-7386			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			24.03.23			
[o]	Analysis Start Date / Analysis Completion Date			24.03.23/ 27.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	65.5		
2. Particulate Matter (PM _{2.5})		µg / m ³	80	CPCB (GMAAP Vol. I)	34.2		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	16.5		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	35.1		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.16		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.2		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	24.3		

SHIBESHWAR / Sanjay Kumar
Dy. General Manager (EMO)
Patna Office, and contact- 825321
NTPC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.28
12:45:32 +05'30'

Verified by :
Technical Manager



Shreyasee
Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.28
13:56:37 +05'30'
Authorized Signatory
Quality Manager

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Mob.: +91 8570430249 ; +91 9431047908 Email : shivatesthouse@gmail.com, info@shivatest.com
Website : www.shivatest.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

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TEST REPORT

Ref. No. SIH/TR/22-23/7586(A)		Dt : 28.03.2023		Your Work Order No. 4000285057-037-1019		Dt : 31.07.2022		
(a) Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
(b) Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
(c) Sample Collected by			SHIVA TEST HOUSE on 23.03.23					
(d) Sampling Location			Collected from Near at the top of Tejasvi Building (Township)					
(e) Method of Sampling			IS 5182 (Part-14)					
(f) Sampling Environmental Condition			Temp. (°C)		29		Humidity (%)	51
(g) No. & Type of Container			One poly Jar					
(h) Instrument ID			RDS-1, FPM-1					
(i) Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
(j) Sample Code			A-7586					
(k) Sample Condition on Receipt			Fit for Analysis					
(l) Items required to be tested			As per contract					
(m) Whether any specific Method of Test has been suggested by the party			No					
(n) Date of receiving the sample			24.03.23					
(o) Analysis Start Date / Analysis Completion Date			24.03.23/ 27.03.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Tejasvi Building (Township)			
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34			
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.22			
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.21			
4. Arsenic (As)		ng / m ³	6	AAS Method	0.17			
5. Nickel as Ni		ng / m ³	20	AAS Method	1.42			
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-6)	0.19			

Signature of Sanjay Kumar
Dy. General Manager (EQA)
HPPC Limited, Ranchi - 834 001



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.28 12:45:44 +05'30'

Verified by:
Technical Manager

Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.28 13:56:56 +05'30'
Authorized Signatory
Quality Manager

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Website: www.shivatesthouse.com ; www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC-10002

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TEST REPORT

Ref. No. STH/TR/22-23/6915		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 02.03.23			
[d]	Sampling Location			Collected from Near at the top of Time Office (Main Plant)			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	25	Humidity (%)	54
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-2, FPM-2			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6915			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			03.03.23			
[o]	Analysis Start Date / Analysis Completion Date			03.03.23/ 06.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	75.1		
2. Particulate Matter (PM _{2.5})		µg / m ³	50	CPCB (GMAAP Vol. I)	40.0		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.2		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.8		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.06		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.1		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	19.7		

Digitally signed by
SHIBESHVAR PRASAD
Date: 2023.03.21
15:54:19 +05'30'

SHIBESHVAR
AR PRASAD

Verified by
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.21
16:04:21 +05'30'

Authorized Signatory
Quality Manager

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Mob.: +918676836249, +919431047908 Email: sales@shivatesthouse.com, info@shivatesthouse.com
Website: www.shivatesthouse.com, www.shivatesthouse.com



SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/6915(A)		Dt : 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt : 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 02.03.23			
[d]	Sampling Location			Collected from Near at the top of Time Office (Main Plant)			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	25	Humidity (%)	54
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-2, FPM-2			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-6915			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			03.03.23			
[o]	Analysis Start Date / Analysis Completion Date			03.03.23/ 06.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.12		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.21		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.19		
5. Nickel as Ni		ng / m ³	20	AAS Method	2.75		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 1631)	0.19		

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.21
15:54:43 +05'30'

SHIBESHWAR PRASAD

Verified by :
Technical Manager



Shreyasee
Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.21
16:07:55 +05'30'

Authorized Signatory
Quality Manager

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Mob. : +918676886249 ; +919431047908 Email : shiva@shivatst.com ; info@shivatst.com
Website : www.shivatst.com ; www.shivatsthouse.com



SHIVA TEST HOUSE

(Serving since 1988)



TC-16992

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TEST REPORT

Ref. No. STH/TR/22-23/6977		Dt: 21.03.2023		Your Work Order No: 4000286047-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 03.03.23			
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling				IS 5182 (Part-14)			
(f) Sampling Environmental Condition				Temp. (°C)	26	Humidity (%)	62
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-1, FPM-1			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-6977			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				04.03.23			
(o) Analysis Start Date / Analysis Completion Date				04.03.23 / 07.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	72.4		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	39.6		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.3		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	33.8		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.12		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.8		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	22.6		

By: Shri. Sanjay Kumar
General Manager (EM/3)
Mobile: 9821 300 800-825321
NTPC Limited, North Karanpura- 825321

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.21
13:56:51 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.21
18:09:45 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/6977(A)		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022		
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
[c] Sample Collected by			SHIVA TEST HOUSE on 03.03.23					
[d] Sampling Location			Collected from Near at the top of Time Office (Main Plant).					
[e] Method of Sampling			IS 5182 (Part-14)					
[f] Sampling Environmental Condition			Temp. (°C)		26		Humidity (%)	52
[g] No. & Type of Container			One poly Jar					
[h] Instrument ID			RDS-1, FPM-1					
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
[j] Sample Code			A-6563					
[k] Sample Condition on Receipt			Fit for Analysis					
[l] Items required to be tested			As per contract					
[m] Whether any specific Method of Test has been suggested by the party			No					
[n] Date of receiving the sample			04.03.23					
[o] Analysis Start Date / Analysis Completion Date			04.03.23/ 07.03.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.23			
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.19			
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.17			
4. Arsenic (As)		ng / m ³	6	AAS Method	0.25			
5. Nickel as Ni		ng / m ³	20	AAS Method	1.40			
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA (Method 10-5)	0.21			

Digitally signed by
Shreyasee Prasad (श्रेयासे प्रसाद)
Dy. General Manager (E&ES)
SHIVA TEST HOUSE, North Karanpura- 825321
HPPCL Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.21 15:57:10 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.03.21 16:09:59 +05'30'
Authorized Signatory
Quality Manager

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Contact Us : 122-C, Aashika, Road No. 5A, Patliputra Colony, Patna - 800 013 (Bihar)
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SHIVA TEST HOUSE

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TEST REPORT

Ref. No. STH/TR/22-23/7107		Dt: 21.03.2023		Your Work Order No. 4000285067-037-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 06.03.23			
(d) Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
(e) Method of Sampling				IS 5182 (Part-14)			
(f) Sampling Environmental Condition				Temp. (°C)	28	Humidity (%)	52
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-2, FPM-2			
(i) Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-7207			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				07.03.23			
(o) Analysis Start Date / Analysis Completion Date				07.03.23 / 10.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	73.4			
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol. I)	38.7			
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	12.8			
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.7			
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.07			
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	5.7			
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	20.6			

Dr. Shreyasee Prasad / Sanjay Kumar
Dy. General Manager (EMS)
Bihar State Pollution Control Board
B-10/1, Patna, Bihar - 800 013

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.21
15:58:39 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.21
16:18:12 +05'30'
Authorized Signatory
Quality Manager

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Mob: +91 8676886249, +91 9431047908 Email: shivatesthouse@gmail.com, info@shivatesthouse.com
Website: www.shivatest.com, www.shivatesthouse.com



SHIVA TEST HOUSE

(Serving since 1988)

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TEST REPORT

Ref. No. STH/TR/22-23/7107(A)	DI : 21.03.2023	Your Work Order No. 4400285067-037-1019	DI : 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 06.03.23			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 5182 (Part-14)			
[f] Sampling Environmental Condition	Temp. (°C)	28	Humidity (%)	52
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-2, FPM-2			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-7107			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	07.03.23			
[o] Analysis Start Date / Analysis Completion Date	07.03.23/ 10.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.23
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.11
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.19
4. Arsenic (As)	ng / m ³	6	AAS Method	0.16
5. Nickel as Ni	ng / m ³	20	AAS Method	1.37
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-8)	0.16

Dr. Sanjay Kumar
Dy. General Manager (EMG)
PCCB, North Karanpura-825321

SHIBESHWAR PRASAD

Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.21
15:59:26 +05'30'

Verified by :
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.21
16:18:58 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10/882

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TEST REPORT

Ref. No. STH/IR/22-23/114		Dt: 21.03.2023		Your Work Order No. 4060285067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by				SHIVA TEST HOUSE on 07.03.23			
[d] Sampling Location				Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling				IS 5182 (Part-14)			
[f] Sampling Environmental Condition				Temp. (°C)	26	Humidity (%)	52
[g] No. & Type of Container				One poly Jar			
[h] Instrument ID				RDS-1, FPM-1			
[i] Sample Quantity				30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code				A-7114			
[k] Sample Condition on Receipt				Fit for Analysis			
[l] Items required to be tested				As per contract			
[m] Whether any specific Method of Test has been suggested by the party				No			
[n] Date of receiving the sample				08.03.23			
[o] Analysis Start Date / Analysis Completion Date				08.03.23/ 11.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	71.9		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	38.7		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.2		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.1		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.13		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	7.1		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	23.2		

Classified by Sanjay Kumar
Jr. Manager (E&O)
Dy. General Manager (E&O)
Mobile: 9836785749, 9819431147
Email: shivatesthouse@gmail.com

SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.21
16:02:06 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by Shreyasee Prasad
Date: 2023.03.21 16:24:23 +05'30'

Authorized Signatory
Quality Manager

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Website: www.shivatest.com ; www.shivatesthouse.com



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TEST REPORT

Ref. No. STH/TR/22-23/7114(A)		Dt : 21.03.2023		Your Work Order No. 4000235067-037-1019		Dt: 31.07.2022	
[a] Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321				
[b] Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)				
[c] Sample Collected by			SHIVA TEST HOUSE on 07.03.23				
[d] Sampling Location			Collected from Near at the top of Time Office (Main Plant)				
[e] Method of Sampling			IS 5182 (Part-14)				
[f] Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	62	
[g] No. & Type of Container			One poly Jar				
[h] Instrument ID			RDS-1, FPM-1				
[i] Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)				
[j] Sample Code			A-7114				
[k] Sample Condition on Receipt			Fit for Analysis				
[l] Items required to be tested			As per contract				
[m] Whether any specific Method of Test has been suggested by the party			No				
[n] Date of receiving the sample			08.03.23				
[o] Analysis Start Date / Analysis Completion Date			08.03.23/ 11.03.23				
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.18		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.16		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.24		
5. Nickel as Ni		ng / m ³	20	AAS Method	2.80		
6. Mercury (Hg)		µg / m ³	Not Specified	US EPA (Method 10-5)	0.20		

Shreyasee Prasad / Sanjay Kumar
General Manager (EHS)
SHIVA TEST HOUSE
NTPC Limited, North Karanpura- 825321



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.21 16:02:20 +05'30'

Verified by :
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.03.21 16:24:47 +05'30'

Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-18882

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TEST REPORT

Ref. No. STH/TR/22-23/7367		Dt: 27.03.2023		Your Work Order No. 4000285967-037-1019		Di: 31.07.2022	
[a]	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b]	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
[c]	Sample Collected by			SHIVA TEST HOUSE on 17.03.23			
[d]	Sampling Location			Collected from Near at the top of Time Office (Main Plant)			
[e]	Method of Sampling			IS 5182 (Part-14)			
[f]	Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	58
[g]	No. & Type of Container			One poly Jar			
[h]	Instrument ID			RDS-2, FPM-2			
[i]	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j]	Sample Code			A-7367			
[k]	Sample Condition on Receipt			Fit for Analysis			
[l]	Items required to be tested			As per contract			
[m]	Whether any specific Method of Test has been suggested by the party			No			
[n]	Date of receiving the sample			18.03.23			
[o]	Analysis Start Date / Analysis Completion Date			18.03.23/ 20.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	74.0		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	40.0		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.3		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	34.1		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.08		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	6.1		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	21.6		

Sanjay Kumar
Dy. General Manager (F&E)
North Karanpura Super Thermal Power Project
Jharkhand, North Karanpura 825321

SHIBESHWAR PRASAD

Digitally signed by
Shreyasee Prasad
Date: 2023.03.27
12:53:04 +05'30'

Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.27 13:30:08
+05'30'
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Quality Manager

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TEST REPORT

Ref. No. STH/IR/22-23/7367(A)		Dt: 27.03.2023		Your Work Order No. 4000285087-037-4019		Dt: 31.07.2022	
(a)	Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b)	Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)			
(c)	Sample Collected by			SHIVA TEST HOUSE on 17.03.23			
(d)	Sampling Location			Collected from Near at the top of Time Office (Main Plant)			
(e)	Method of Sampling			IS 5182 (Part-14)			
(f)	Sampling Environmental Condition			Temp. (°C)	26	Humidity (%)	58
(g)	No. & Type of Container			One poly Jar			
(h)	Instrument ID			RDS-2, FPM-2			
(i)	Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
(j)	Sample Code			A-7367			
(k)	Sample Condition on Receipt			Fit for Analysis			
(l)	Items required to be tested			As per contract			
(m)	Whether any specific Method of Test has been suggested by the party			No			
(n)	Date of receiving the sample			18.03.23			
(o)	Analysis Start Date / Analysis Completion Date			18.03.23/ 20.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Carbon Monoxide (CO)		mg / m ³	4	IS 5182 (Part-10)	0.34		
2. Benzene (C ₆ H ₆)		µg / m ³	5	IS 5182 (Part-11)	0.10		
3. Benzo(a) Pyrene		ng / m ³	1	IS 5182 (Part-12)	0.17		
4. Arsenic (As)		ng / m ³	6	AAS Method	0.15		
5. Nickel as Ni		ng / m ³	20	AAS Method	2.75		
6. Mercury (Hg)		ng / m ³	Not Specified	US EPA (Method 10-5)	0.18		

Shri. Shri. Sanjay Kumar
General Manager (E&S)
c/o. IIT, Patna, Bihar
NTPC Limited, North Karanpura & Co.



SHIBESHWAR PRASAD
Digitally signed by
SHIBESHWAR PRASAD
Date: 2023.03.27
12:33:19 +05'30'

Verified by:
Technical Manager

Shreyasee Prasad
Digitally signed by
Shreyasee Prasad
Date: 2023.03.27
13:30:27 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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TC-10582

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TEST REPORT

Ref. No. STH/TR/22-23/7396		DL: 27.03.2023		Your Work Order No. 4000285067-437-1019		Dt: 31.07.2022	
(a) Name and address of the Customer				North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
(b) Details of Sample				Ambient Air Quality Monitoring (As per NAAQS)			
(c) Sample Collected by				SHIVA TEST HOUSE on 18.03.23			
(d) Sampling Location				Collected from Nent at the top of Time Office (Main Plant)			
(e) Method of Sampling				IS 5182 (Part-14)			
(f) Sampling Environmental Condition				Temp. (°C)	28	Humidity (%)	52
(g) No. & Type of Container				One poly Jar			
(h) Instrument ID				RDS-1, FPM-1			
(i) Sample Quantity				30 ml x 5 for each (NO ₂ , SO ₂ , NH ₃)			
(j) Sample Code				A-7396			
(k) Sample Condition on Receipt				Fit for Analysis			
(l) Items required to be tested				As per contract			
(m) Whether any specific Method of Test has been suggested by the party				No			
(n) Date of receiving the sample				19.03.23			
(o) Analysis Start Date / Analysis Completion Date				19.03.23/ 22.03.23			
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)		
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	72.3		
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	38.3		
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	14.7		
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-6)	33.5		
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.09		
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	7.4		
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	24.2		

SHRUTI SHARMA / Ranjiv Kumar
General Manager (QA/QC)
Mob: 98222 22222, 98222 22222
Email: shivatest@shiva-test.com

SHIBESHWAR PRASAD

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SHIBESHWAR PRASAD
Date: 2023.03.27
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Verified by:
Technical Manager



Shreyasee Prasad

Digitally signed by
Shreyasee Prasad
Date: 2023.03.27
13:32:40 +05'30'

Authorized Signatory
Quality Manager

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TEST REPORT

Ref. No. STH/TR/22-23/7396(A)	Di: 27.03.2023	Your Work Order No. 4000285067-037-1019	Di: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project. At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 18.03.23			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 5182 (Part-14)			
[f] Sampling Environmental Condition	Temp. (°C)	26	Humidity (%)	52
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-1, FPM-1			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-7396			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	19.03.23			
[o] Analysis Start Date / Analysis Completion Date	19.03.23/22.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.57
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.13
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.20
4. Arsenic (As)	ng / m ³	6	AAS Method	0.32
5. Nickel as Ni	ng / m ³	20	AAS Method	1.40
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.28

Signature
Shri. Sanjay Kumar
General Manager (EQA)
MPC, North Karanpura-825321



SHIBESHWAR PRASAD
Digitally signed by SHIBESHWAR PRASAD
Date: 2023.03.27 12:55:16 +05'30'
Verified by:
Technical Manager

Shreyasee Prasad
Digitally signed by Shreyasee Prasad
Date: 2023.03.27 13:32:56 +05'30'
Authorized Signatory
Quality Manager

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SHIVA TEST HOUSE

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IC-10882

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TEST REPORT

Ref. No. STH/TR/22-23/7534		Dt : 28.03.2023		Your Work Order No. 4080285067-037-1019		Dt : 31.07.2022		
(a) Name and address of the Customer			North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321					
(b) Details of Sample			Ambient Air Quality Monitoring (As per NAAQS)					
(c) Sample Collected by			SHIVA TEST HOUSE on 22.03.23					
(d) Sampling Location			Collected from Near at the top of Time Office (Main Plant)					
(e) Method of Sampling			IS 5182 (Part-14)					
(f) Sampling Environmental Condition			Temp. (°C)		28		Humidity (%)	52
(g) No. & Type of Container			One poly Jar					
(h) Instrument ID			RDS-2, FPM-2					
(i) Sample Quantity			30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)					
(j) Sample Code			A-7534					
(k) Sample Condition on Receipt			Fit for Analysis					
(l) Items required to be tested			As per contract					
(m) Whether any specific Method of Test has been suggested by the party			No					
(n) Date of receiving the sample			23.03.23					
(o) Analysis Start Date / Analysis Completion Date			23.03.23/ 26.03.23					
Parameters		Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)			
1. Particulate Matter (PM ₁₀)		µg / m ³	100	IS 5182 (Part-23)	69.0			
2. Particulate Matter (PM _{2.5})		µg / m ³	60	CPCB (GMAAP Vol. I)	36.6			
3. Sulphur Dioxide as SO ₂		µg / m ³	80	IS 5182 (Part-2)	13.8			
4. Nitrogen Dioxide as NO ₂		µg / m ³	80	IS 5182 (Part-8)	35.1			
5. Lead (Pb)		µg / m ³	1	IS 5182 (Part-22)	0.13			
6. Ammonia as NH ₃		µg / m ³	400	IS 5182 (Part-5)	8.1			
7. Ozone (O ₃)		µg / m ³	180	IS 5182 (Part-9)	23.2			

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TEST REPORT

Ref. No. STH/TR/22-23/7534(A)	Dt: 28.03.2023	Your Work Order No. 4004286067-037-1010	Dt: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 22.03.23			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 5182 (Part-14)			
[f] Sampling Environmental Condition	Temp. (°C)	28	Humidity (%) 52	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-2, FPM-2			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-7534			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	23.03.23			
[o] Analysis Start Date / Analysis Completion Date	23.03.23/ 26.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.34
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.16
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.18
4. Arsenic (As)	ng / m ³	6	AAS Method	0.24
5. Nickel as Ni	ng / m ³	20	AAS Method	2.80
6. Mercury (Hg)	ng / m ³	Not Specified	US EPA (Method 10-5)	0.12

Signature of Sanjay Kumar
Sanjay Kumar / Sanjay Kumar
307, General Manager (E&G)
Bihar State Pollution Control Board, 122-C, Aashirwaad Road No. 5A, Patliputra Colony, Patna-800 013 (Bihar)

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TEST REPORT

Ref. No. STH/TR/22-23/7583	Di - 28.03.2023	Your Work Order No. 4000235067-037-1019	Di: 31.07.2022	
[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 23.03.23			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 5182 (Part-14)			
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%) 51	
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-1, FPM-1			
[i] Sample Quantity	30 ml x 6 for each (NO ₂ , SO ₂ , NH ₃)			
[j] Sample Code	A-7583			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	24.03.23			
[o] Analysis Start Date / Analysis Completion Date	24.03.23/ 27.03.23			
Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Particulate Matter (PM ₁₀)	µg / m ³	100	IS 5182 (Part-23)	88.5
2. Particulate Matter (PM _{2.5})	µg / m ³	60	CPCB (GMAAP Vol I)	34.5
3. Sulphur Dioxide as SO ₂	µg / m ³	80	IS 5182 (Part-2)	15.1
4. Nitrogen Dioxide as NO ₂	µg / m ³	80	IS 5182 (Part-6)	33.9
5. Lead (Pb)	µg / m ³	1	IS 5182 (Part-22)	0.16
6. Ammonia as NH ₃	µg / m ³	400	IS 5182 (Part-5)	8.6
7. Ozone (O ₃)	µg / m ³	180	IS 5182 (Part-9)	22.6

Signature
Shreyasee Prasad
General Manager (EMG)
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TEST REPORT

Ref. No. STH/TR/22-23/7583(A) Dt.: 28.03.2023 Your Work Order No. 4000285067-037-1019 Dt.: 31.07.2022

[a] Name and address of the Customer	North Karanpura Super Thermal Power Project At: Tandwa Dist- Chatra, Jharkhand- 825 321			
[b] Details of Sample	Ambient Air Quality Monitoring (As per NAAQS)			
[c] Sample Collected by	SHIVA TEST HOUSE on 23.03.23			
[d] Sampling Location	Collected from Near at the top of Time Office (Main Plant)			
[e] Method of Sampling	IS 5182 (Part-14)			
[f] Sampling Environmental Condition	Temp. (°C)	29	Humidity (%)	51
[g] No. & Type of Container	One poly Jar			
[h] Instrument ID	RDS-1, FPM-1			
[i] Sample Quantity	30 ml x 6 for each (NO _x , SO ₂ , NH ₃)			
[j] Sample Code	A-7583			
[k] Sample Condition on Receipt	Fit for Analysis			
[l] Items required to be tested	As per contract			
[m] Whether any specific Method of Test has been suggested by the party	No			
[n] Date of receiving the sample	24.03.23			
[o] Analysis Start Date / Analysis Completion Date	24.03.23/ 27.03.23			

Parameters	Unit	Limit as per NAAQS 2009	Method of Test	Sampling Station / Result Near at the top of Time Office (Main Plant)
1. Carbon Monoxide (CO)	mg / m ³	4	IS 5182 (Part-10)	0.57
2. Benzene (C ₆ H ₆)	µg / m ³	5	IS 5182 (Part-11)	0.16
3. Benzo(a) Pyrene	ng / m ³	1	IS 5182 (Part-12)	0.20
4. Arsenic (As)	ng / m ³	8	AAS Method	0.17
5. Nickel as Ni	ng / m ³	20	AAS Method	4.20
6. Mercury (Hg)	µg / m ³	Not Specified	US EPA (Method 10-5)	0.20

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Dy. General Manager (EMG)
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HPC Limited, North Karanpura-825321

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Technical Manager



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Final Report

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

(Based on Pre and post-monsoon data of 1st and 2nd year of monitoring)

Submitted to
NTPC North Karanpura Super Thermal Power Project
Post: Tandwa, District: Chatra, Jharkhand



Submitted by
Prof. Manoj Kumar Jain (PI)
Prof. Brijesh Kumar Yadav (Co-PI)



DEPARTMENT OF HYDROLOGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE (UTTARAKHAND), INDIA
JANUARY 2023



Hydrogeological study around ash dyke, plant site and monitoring of surface and ground water for North Karanpura Super Thermal Power Station

Doc. No. HYD-6007/2020-21/FR

Doc. Type: Final report

Issue date: January 27, 2023

Page: 0

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

A study conducted by the 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 No. HYD-6007/2020-21/FR

PO reference 5500036701-037-1028

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Department of Hydrology, Indian Institute of Technology Roorkee, Roorkee – 247667, Uttarakhand, India

Date 27 January 2023

EXECUTIVE SUMMARY


THE STUDY AREA

North Karanpura Super Thermal Power Project is located between the Magadh coal block and Garhi river near the village Kamta / Tandwa in the Simaria subdivision of the Chatra district, Jharkhand. at 23°51'02"N, 85°00'44"E. The area surrounding the power plant is fairly levelled and sparsely populated. The surrounding area is mostly a monsoon-fed agricultural area with a single crop. The geographic extent of the study area has been taken as an area within 10 km from the periphery of the project boundary. The study area is covered in Survey of India toposheets 73E/1 & 73A/1.

OBJECTIVES OF THE STUDY

The main objectives of the study consist of the following:

1. Identification and delineation of Aquifer geometry and Drainage pattern, Watershed of the study area
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.
3. Surface water level monitoring using already existing Scale/gauge at Check Dam site of Garhi Nadi monitoring on a 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 the 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).

	Hydrogeological study around ash dyke, plant site and monitoring of surface and ground water for North Karanpura Super Thermal Power Station	Doc. No. HYD-6007/2020-21/FR
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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 measures based upon the monitoring report of water samples for any deterioration observed during the sampling period.” unquote

SUMMARY OF THE STUDY

Drainage Pattern and Watershed of the Study Area

The drainage pattern of the study area was studied using Survey of India topographic sheets and satellite data/google earth images of the current year. A Digital Elevation Model (DEM) of the study area was also utilized to study the existing drainage pattern. The drainage network extracted from Survey of India toposheets was compared with recent drainage information derived from DEM and Google earth images/other available satellite images. No significant change in the drainage pattern was noticed. The plant area is drained by the Garhi Nadi, which is a tributary of the Damodar River. The Garhi Nadi is formed after the confluence of Barki Nadi and Chandru Nadi near the north-eastern boundary of the plant. The Garhi Nadi meets the Damodar river at about 5 km south of the project area near the village Kingra.

The watershed of the Garhi Nadi was delineated using SRTM DEM. The confluence of Garhi Nadi with the Damodar River was taken as the outlet of the watershed. The total area of the Garhi watershed at its outlet point at the confluence with the Damodar River is 559.68 km².



Establishment of groundwater level monitoring stations and their monitoring


The groundwater table was monitored directly in existing open wells and tube wells of the study area during pre-monsoon and post-monsoon seasons using a dipmeter. The water table contour maps of both the seasons of the study area show flow regimes similar to the previous groundwater flow regimes reported in the past. Also, the groundwater contour map of the entire Chatra district during pre- and post-monsoon seasons (2012-13) reported by CGWB shows a comparable groundwater fluctuation pattern with the current observations of the area. This indicates that the dynamic groundwater resources of the study area are not depleted during the past decade because of the plant development in the area. Due to differential groundwater extraction patterns, the groundwater flow pattern seems to change locally during the pre and post-monsoon periods. In general, the groundwater flow follows the surface drainage pattern and flows mostly in the south and southeast direction to the plant.

Surface water level monitoring at Check Dam site of Garhi Nadi

The existing staff gauge was monitored during pre and post-monsoon visits to record the status of stored water in the Check dam. A site photograph showing the staff gauge and water level was taken during each visit, and the same is provided in the report for the record.

Surface water and groundwater monitoring of heavy metals

Surface water and groundwater samples from the plant site and its surrounding areas were collected and brought to the laboratory of IIT Roorkee. The samples were analysed in the Institute Instrumentation centre of IIT Roorkee for monitoring heavy metals. The concentration of heavy metals in the pre and post-monsoon periods in the years 2021 and 2022 were analysed. Some trace metals show variations while comparing

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the yearly and seasonal data, such as arsenic (As) and Manganese (Mn). In comparison to the BIS (2012) limit, some traces of Arsenic (As) were reported in the post-monsoon period of 2021; however, in the other periods (pre-monsoon 2021, pre- and post-monsoon 2022), Arsenic was not observed or found within the prescribed BIS (2012) limits for drinking water. The concentration of Mn, Cd, and Pb reduced significantly in post-monsoon period sampling during both years showing the dilution impact. Major cations and anions, on the other hand, were studied before and after the monsoon season, and it was noticed that the majority of the ions were within the BIS permissible limit (2012). Although sulfate, fluoride, and nitrate concentrations were marginally higher in a few samples of the pre-monsoon period of 2021, they appear to be diluted in the post-monsoon period of 2021. A similar pattern was also observed for the year 2022. Overall, the geological formations of the area and the presence of coal mines in the near vicinity of the study area could be the possible reason for the presence of some trace metals in water samples.

No significant change in the water quality parameters is observed in the study area during the pre and post-monsoon seasons of the last two years (i.e. 2021 and 2022). The presence of trace metals like Al and Fe is found in some water samples. Fe was found mainly in the old hand pumps, which seems to be due to rusting of the well casing. The aggressive purging process reduced the Fe level in these sampling points. Aluminium seems to be high due to the geogenic formation of the area and shall be treated for potable water supply. No deterioration trend is observed from Pre-monsoon 2021 to pre-monsoon 2022 in the area.

Hydrogeology of the Area

The Chatra district's Tandwa region is surrounded by a complicated tectonic structure and a variety of geological formations. The lower and upper Gondwanas comprise the geological formations of carbonaceous shale, sandstone, coal seams, and red clay. Groundwater occurs mostly in



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phreatic conditions in all lithological units of the area and sometimes locally in semiconfined and confined conditions in deeper aquifers.

Specific remedial measures based upon the monitoring report of water samples for any deterioration observed during the sampling period

No deterioration trend of the water resources is observed from Pre-monsoon 2021 to post-monsoon 2022 in the area. Some of the sampling sites are observed to have poor maintenance conditions and need to be avoided for further sampling. Trace metals like Al and Fe have been present in some water samples during the last three seasons. An aggressive purging process is required for further monitoring of the area to avoid the possible existence of the Fe in well casings.





Hydrogeological study around ash dyke, plant
site and monitoring of surface and ground
water for North Karanpura Super Thermal
Power Station

Doc. No. HYD-6007/2020-21/FR

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1 INTRODUCTION


NTPC Ltd. is a Public Sector Undertaking (PSU) engaged in generating electricity and allied activities. It is the largest power company in India, with an electric power generation capacity of 68,961.68 MW. From fossil fuels, it has forayed into generating electricity via hydro, nuclear and renewable energy sources. NTPC currently operates 51 power stations, including 23 coal based, 7 gas based, 1 hydro, 1 wind, 18 solar, and 1 small hydro plant. Further, it has 9 coal and 4 gas station, 8 hydro-based and 5 renewable energy projects owned by joint ventures or subsidiaries. In May 2010, NTPC was conferred Maharatna status by the Union Government of India.

1.1 North Karanpura Super Thermal Power Project (NKSTPP)

North Karanpura Super Thermal Power Project (NKSTPP) of NTPC Limited is an upcoming coal-based thermal power plant located between the Magadh coal block and Garhi river near the 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 the power plant is fairly levelled and sparsely populated. The surrounding area is mainly a monsoon-fed agricultural area with a 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 of November 2022

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

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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 the 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 the Damodar River. The coal requirement for NKSTPP shall be met from the Magadh block of the North Karanpura coal fields of CCL. The coal would be transported from the coal block to the plant through the Pipe Conveyor system.

1.2 NTPC TERMS OF REFERENCE

NTPC has specified the following TOR for the hydrogeological study.

Quote *"The Scope of Services shall be "Hydrogeological study of the area around ash dyke and around plant site and monitoring of surface water and groundwater 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 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.*
3. *Surface water level monitoring using already existing Scale/gauge at Check Dam site of Garhi Nadi monitoring on a half-yearly basis.*
4. *Total 30 Nos of Sampling including surface water and groundwater regime for monitoring of heavy metals on half-yearly basis.*
 - e) *Local stream (natural drain)- flowing close to the eastern part of proposed ash pond- Upstream and Downstream*
 - f) *Garhi Nadi- Upstream and Downstream*
 - g) *Confluence of Local drainage and Garhi Nadi*



- h) 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 measures based upon the monitoring report of water samples for any deterioration observed during the sampling period.” unquote

1.2.1 Geographical Extent of the Study Area

The geographic extent of the study area shall consist of an area within 10 km from the periphery of the project boundary. Figure 1 shows the index map of the plant location, and Fig 2 shows the 10 km geographic extent of the study area drawn on Survey of India toposheets (73E/1 & 73A/1).

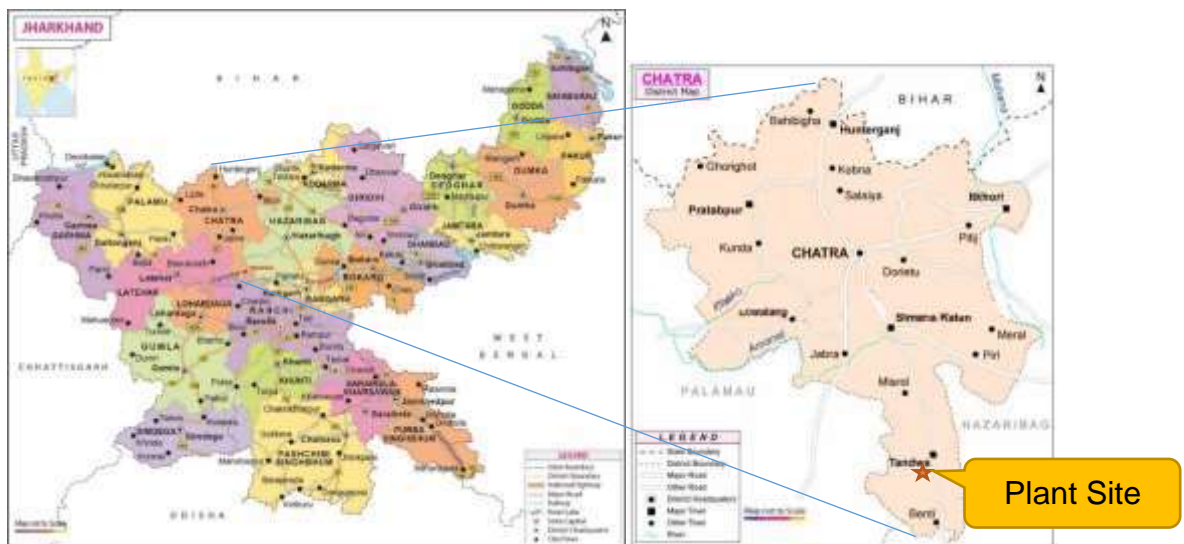


Figure 1. Index map showing the location of NTPC North Karanpura Plant

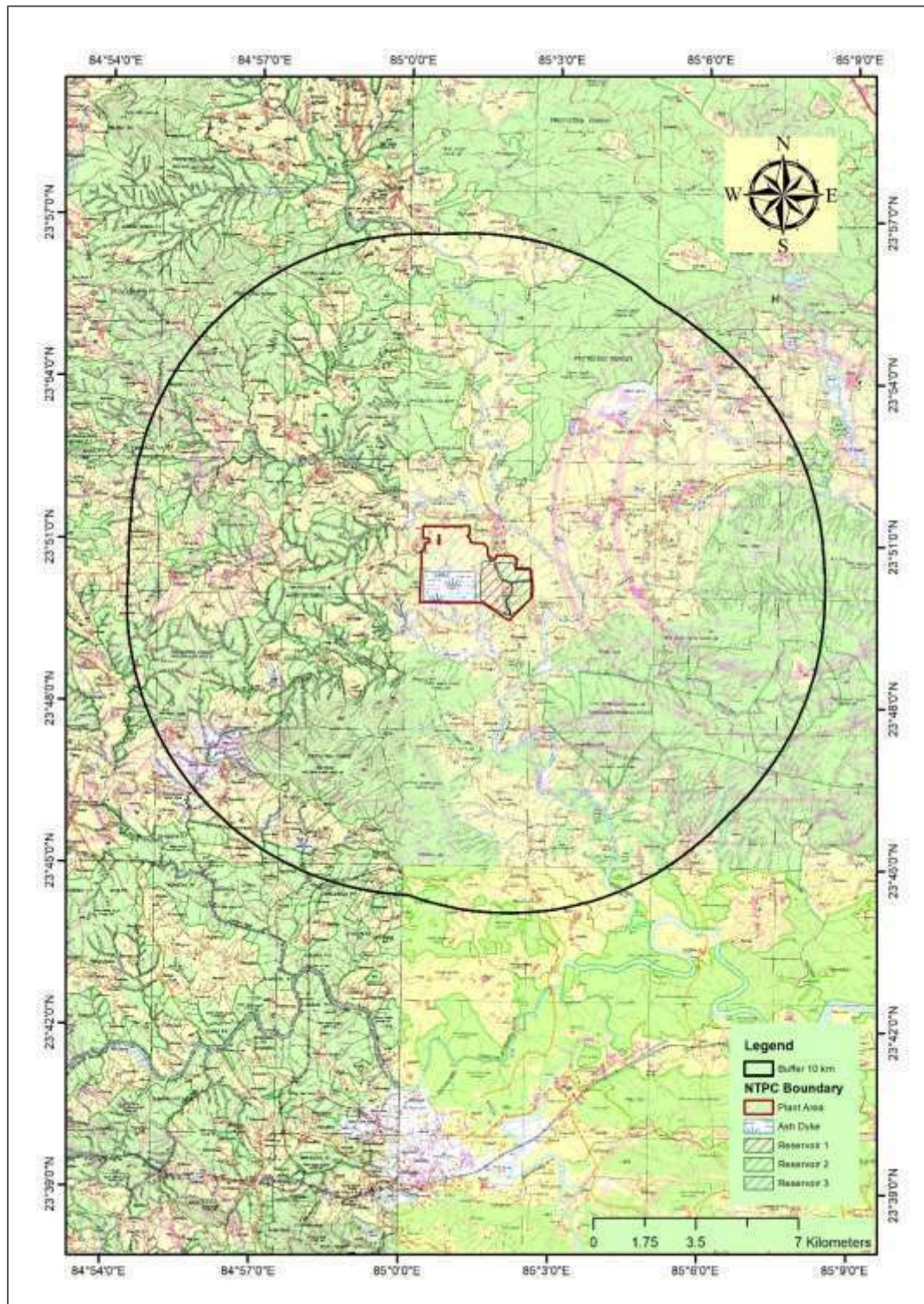



Figure 2. The geographic extent of study area shown on Survey of India toposheets.

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2 Drainage pattern and Watershed of the study area

2.1 *The drainage pattern of the study area*

The drainage pattern of the study area was studied using Survey of India topographic sheets (shown in Figure 2) and satellite data/google earth images of the current year. A Digital Elevation Model (DEM) of the study area was also utilized to study the existing drainage pattern. A DEM of the area is shown in Figure 3. As shown in Figure 3, the area in the vicinity of NTPC North Karanpura is hilly in its southeast and southwest directions. The eastern side of the plant also has a high elevation. The drainage network extracted from Survey of India toposheets was compared with recent drainage information derived from DEM and Google earth images/other available satellite images. No significant change in the drainage pattern was noticed. The plant area is drained by the Garhi Nadi, which is a tributary of the Damodar River. The Garhi Nadi is formed after the confluence of Barki Nadi and Chandru Nadi near the north-eastern boundary of plant. The drainage pattern of Garhi Nadi within a 10 km radius of the plant boundary is shown in Figure 4. As can be seen from Figure 4, the study area is located about 2 km from the right bank of the Garhi Nadi, and many minor drains originating in and around the study area finally meet the Garhi Nadi at its right bank. The Garhi Nadi meets the Damodar river at about 5 km south of the project area near the village Kingra.

2.2 *Watershed area*

The Garhi Nadi is the main river draining the area. The watershed of the Garhi Nadi was delineated using SRTM DEM, shown in Figure 3. The confluence of Garhi Nadi with the Damodar River was taken as the outlet of the watershed. The watershed of the Garhi Nadi is shown in Figure 5. The total area of the Garhi watershed at its outlet point at the confluence with the Damodar River is 559.68 km².



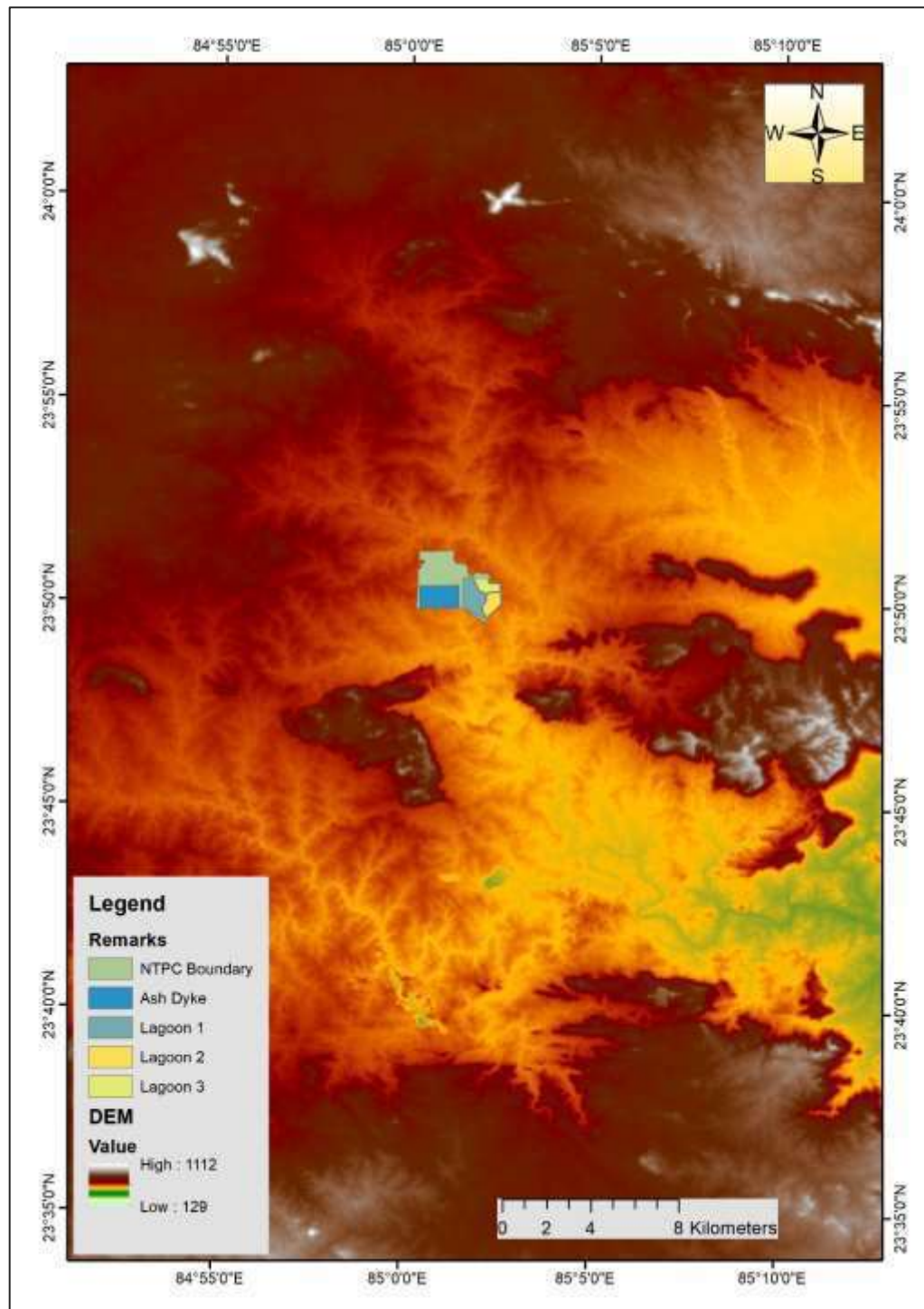
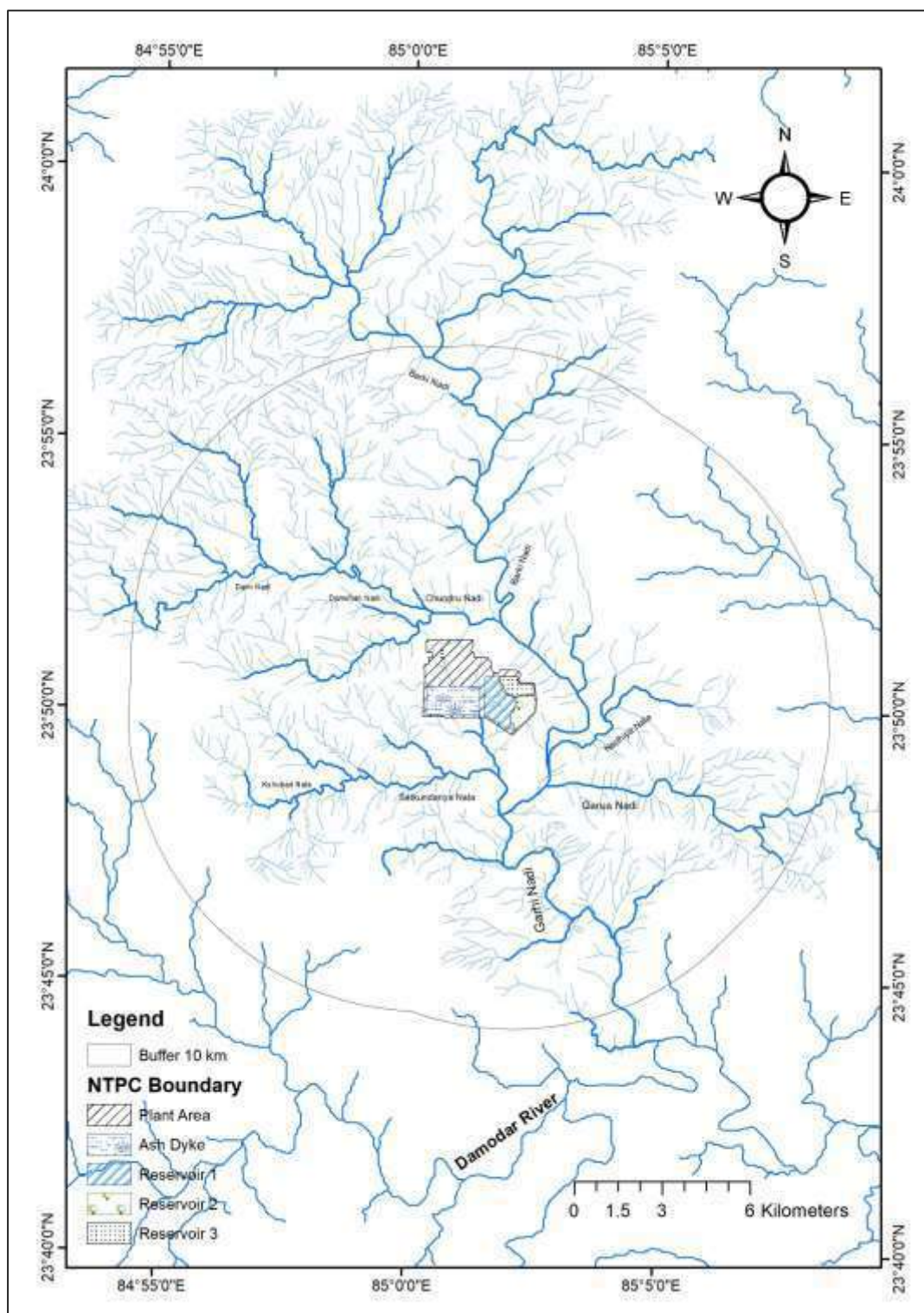


Figure 3. The DEM of the area surrounding the NTPC North Karanpura plant site.



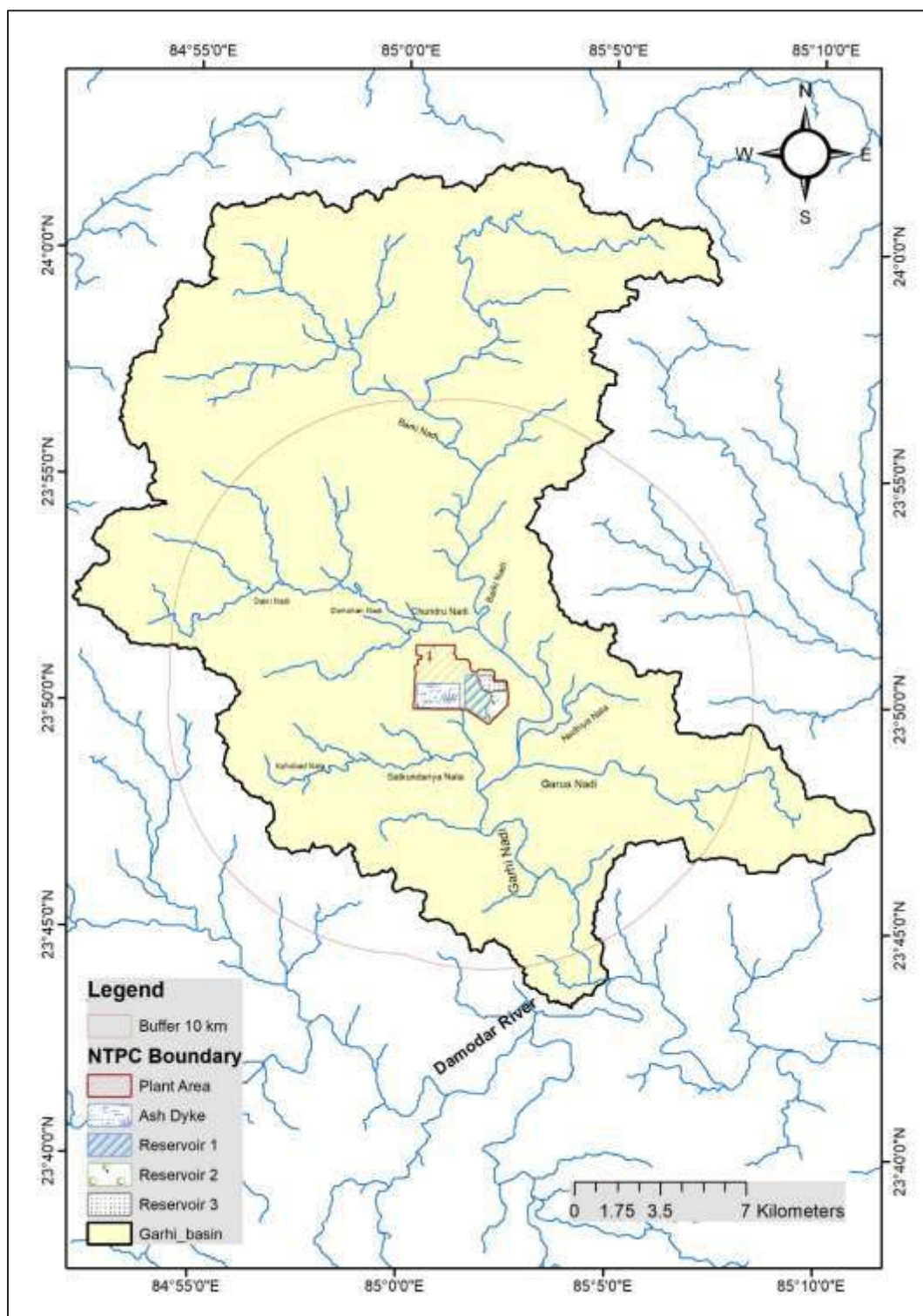


Figure 5. Watershed of the Garhi Nadi situated nearby of the plant site.

3 IDENTIFICATION AND SELECTION OF MONITORING POINTS

A reconnaissance survey of the NTPC North Karanpura (Tandwa, Jharkhand) plant area, ash dyke, and surrounding area of the plant, including the pumping station at Garhi Nadi, was undertaken. The team identified several observation points for data collection of surface and groundwater. Accordingly, water samples from surface ponds, rivers, open wells, hand pumps, and ash dyke areas were collected from the identified data collection points in and around the plant boundary. Identified sampling points with their locations are given in Table 2. The location of identified observation points is shown on a map in Figure 6.

Table 2. Sampling locations around NTPC North Karanpura plant site

S. No.	Site code	Type of site/location	Latitude	Longitude	Type of Analysis
1	OS-1	Open Well/Raham	23°49'29.46"	85°0'31.86"	In-situ/Water Level
2	OS-2	Hand pump/Raham	23°49'28.68"	85°0'33.66"	In-situ and Ex-situ
3	OS-3	Hot spring/Raham	23°49'16.14"	85°0'16.92"	In-situ and Ex-situ
4	OS-4	Open well/Raham	23°49'30"	85°0'12.96"	Water level
5	OS-5	Open well/Raham	23°49'30.9"	85°0'14.52"	Water level
6	OS-6	Open Well/Kamta	23°51'2.22"	85°0'13.98"	In-situ/Water Level
7	OS-7	NTPC solar pump/ Kamta	23°51'0.00"	85°0'12.48"	In-situ and Ex-situ
8	OS-8	Hand pump/Kamta	23°50'46.86"	85°0'2.88"	In-situ and Ex-situ
9	OS-9	Open Well/Garilaung	23°51'29.7"	85°0'40.98"	In-situ/Water Level
10	OS-10	Tube Well/Garilaung	23°51'29.7"	85°0'40.98"	In-situ and Ex-situ
11	OS-11	Reservoir (site for water level observation).	23° 51' 18.34"	85° 2' 6.13"	Water Level Gauge
12	OS-12	Garhi River/Tandwa	23°51'24.28"	85° 2'0.10"	Ex-situ
13	OS-13	Tandwa	23°51'10.08"	85°1'56.52"	Water Level
14	OS-14	Garhi River/Kasaha DPS	23°51'53.64"	85° 0'7.17"	In-situ and Ex-situ
15	OS-15	Open Well/Tandwa	23°50'49.92"	85°1'46.74"	In-situ and Ex-situ
16	OS-16	Open Well/Tandwa	23°50'51.54"	85°1'41.82"	In-situ
17	OS-17	Open Well/Tandwa	23°50'45.78"	85°1'46.86"	In-situ
18	OS-18	Inside plant/Tandwa	23°50'54.42"	85°1'33.3"	In-situ/Water Level
19	OS-19	Inside plant/Tandwa	23°50'54.42"	85°1'33.3"	Water Level
20	OS-20	Handpump/Asnatari	23°48' 45.72"	85°1'33.53"	In-situ and Ex-situ
21	OS-21	Handpump	23°47'40.74"	85°1'15.74"	In-situ and Ex-situ
22	OS-22	Handpump	23°46'28.52"	85°1'28.27"	In-situ and Ex-situ
23	OS-23	Garhi River	23°47'24.39"	85°2'35.59"	In-situ and Ex-situ

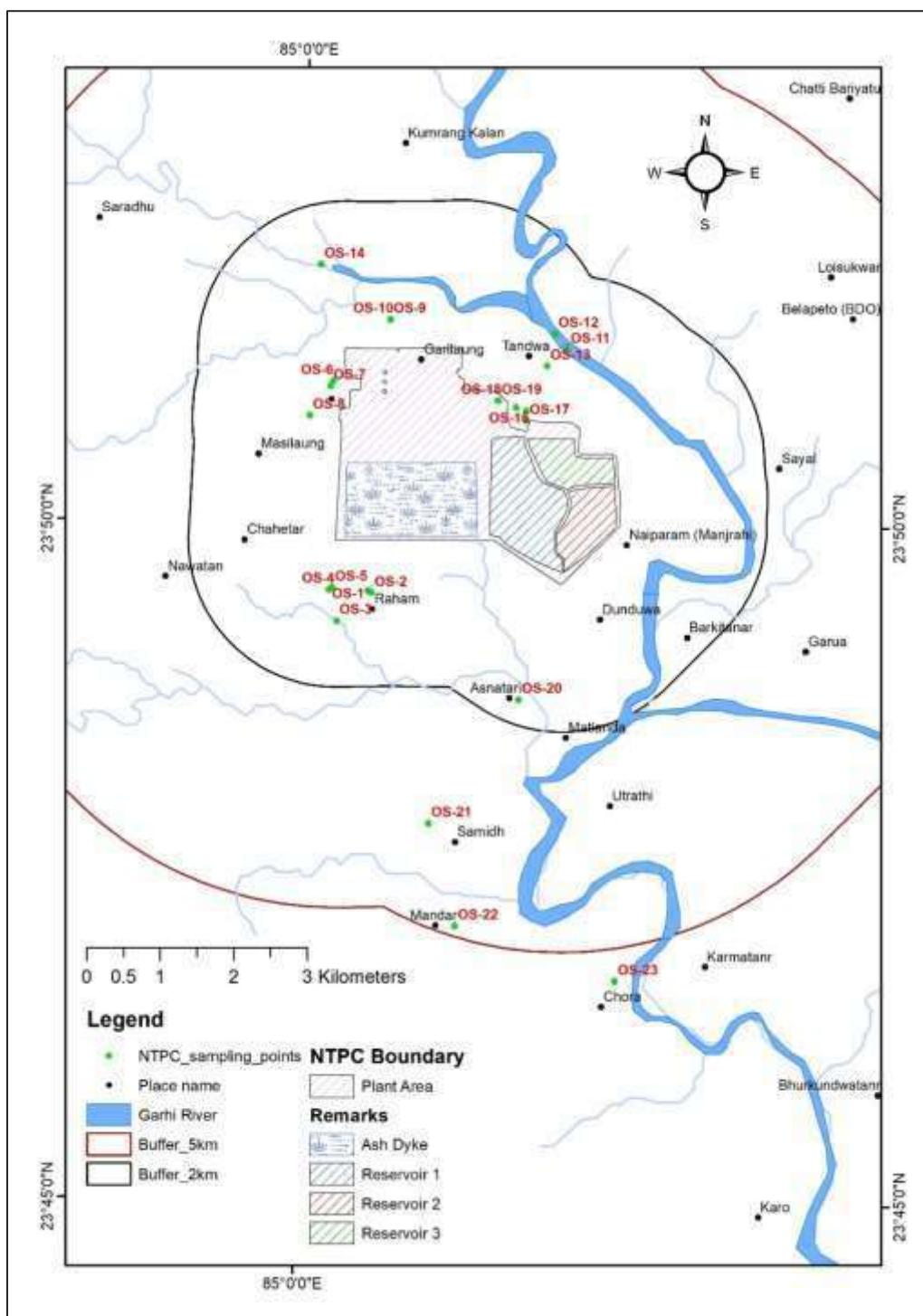


Figure 6. Sampling network used for this investigation for surface and groundwater resources monitoring.

4 Establishment of groundwater level monitoring stations 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 directions from the ash dyke area were established*, and the location of water level monitoring stations was identified. The identified locations are marked with codes OS-1, OS-20, and OS-22, 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 Figure 7.

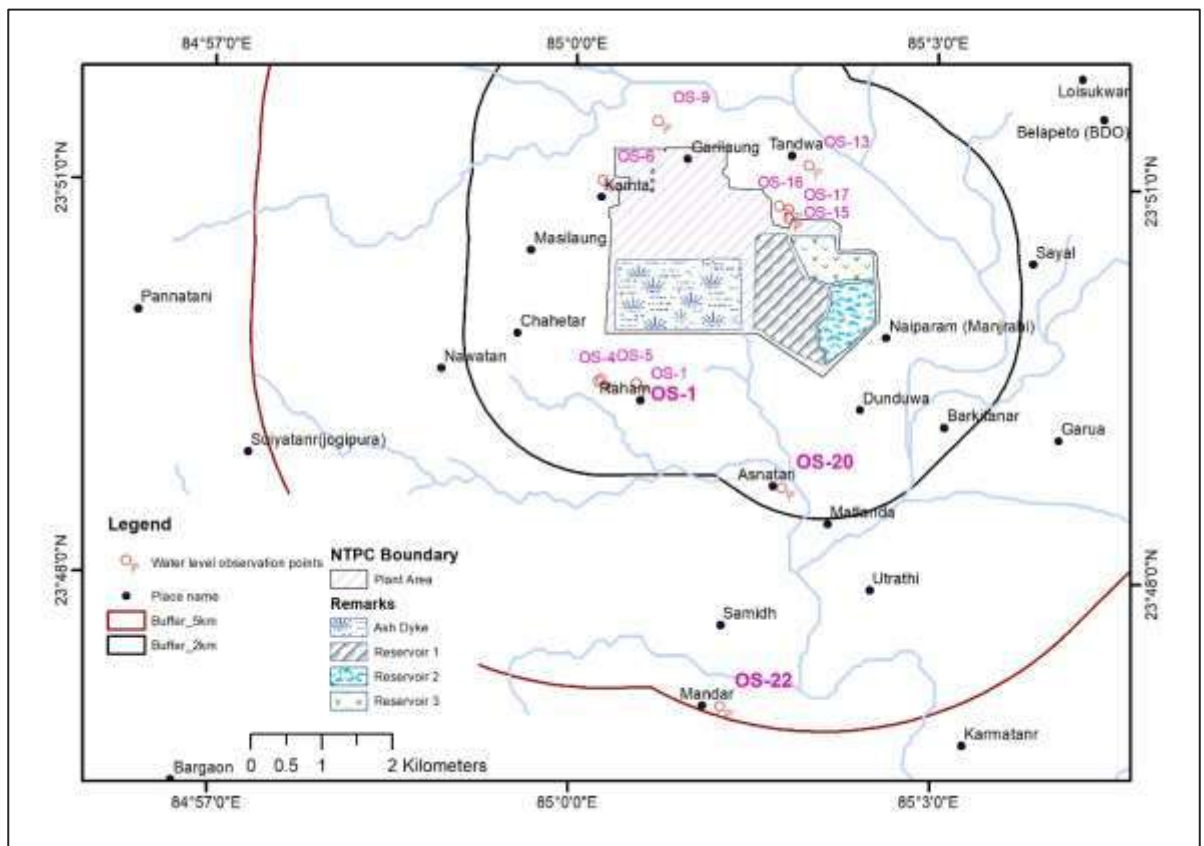



Figure 7. Groundwater level monitoring stations present in and around the plant site.

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4.1 Groundwater table monitoring during 1st year (pre-monsoon 2021)

During the pre-and post-monsoon site visits, groundwater table from various identified locations was observed using a dip meter. The observed groundwater level during the pre-monsoon 2021 period is listed in Table 3. The observed groundwater levels were plotted, and the groundwater flow direction was computed. The observed groundwater table and flow direction for pre-monsoon 2021 are shown in Figure 8. As can be seen from Figure 8, the groundwater flows mainly in the south and south-east direction to the plant.

Table 3. Groundwater level measured below ground level (BGL) in meters during the pre-monsoon period (Jan 2021).

Sr. No.	Name of Site (Location)	Latitude	Longitude	Type of site	Depth in BGL (m)
1	OS-1(Raham)	23°49'29.46"	85°0'31.86"	Open Well	4.60
2	OS-4 (Raham)	23°49'30"	85°0'12.96"	Open Well	5.12
3	OS-5 (Raham)	23°49'30.9"	85°0'14.52"	Open Well	5.52
4	OS-6 (Kamta)	23°51'2.22"	85°0'13.98"	Open Well	9.52
5	OS-9 (Garilaung)	23°51'29.7"	85°0'40.98"	Open Well	5.61
6	OS-13 (Tandwa)	23°51'10.08"	85°1'56.52"	Open Well	0.64
7	OS-15 (Tandwa)	23°50'49.92"	85°1'46.74"	Open Well	0.87
8	OS-16 (Tandwa)	23°50'51.54"	85°1'41.82"	Open Well	3.05
9	OS-17 (Tandwa)	23°50'45.78"	85°1'46.86"	Open Well	4.53
10	OS-18 (Tandwa)	23°50'54.42"	85°1'33.3"	Open Well	1.20
11	OS-19 (Tandwa)	23°50'54.42"	85°1'33.3"	Bore Well	21.59



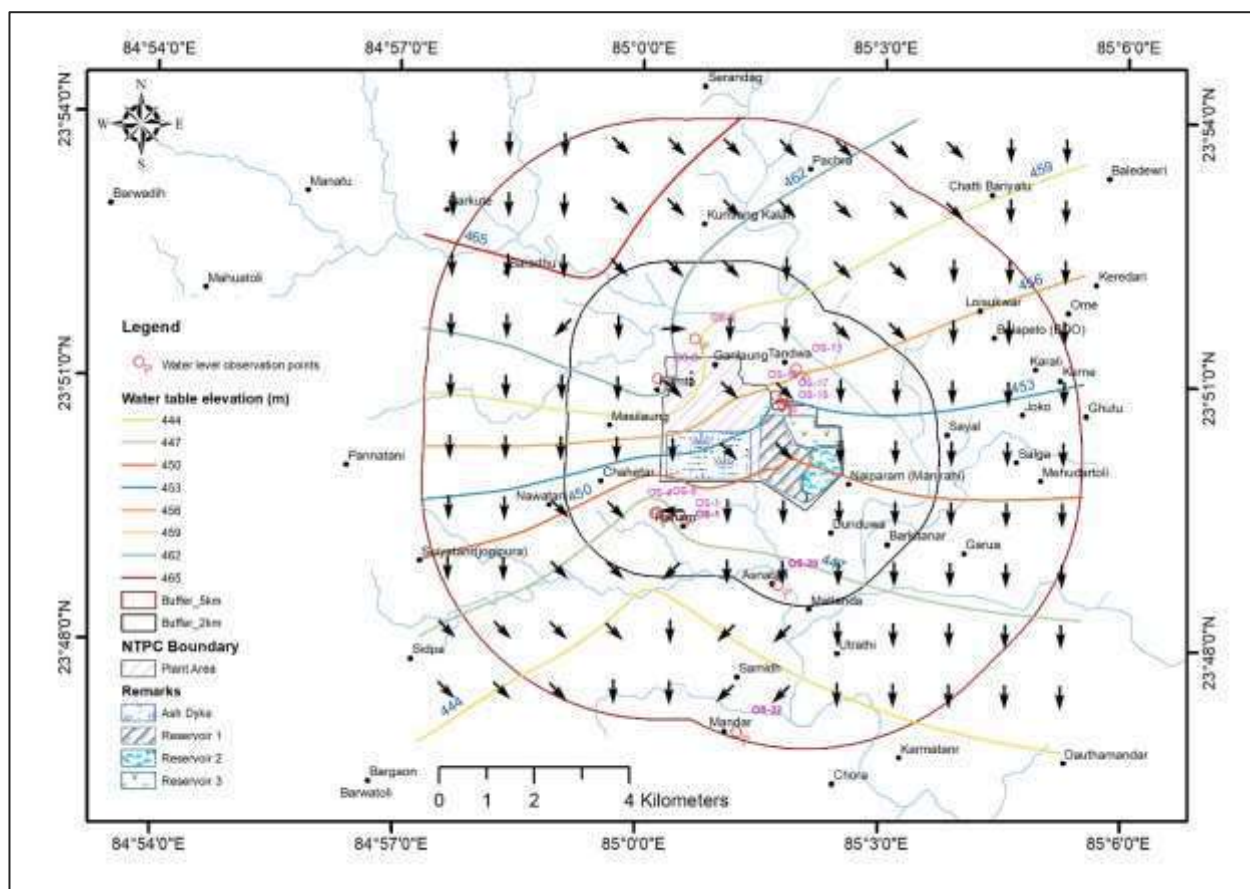


Figure 8. Groundwater level and flow direction in and around the plant area during pre-monsoon 2021.

4.2 Groundwater table monitoring during 1st year (post-monsoon 2021)

A post-monsoon visit during the first year of observation was undertaken during November 2021. The observed groundwater levels in identified wells are listed in Table 4. The observed groundwater levels were plotted, and the groundwater flow direction was computed. The observed groundwater table and flow direction for post-monsoon 2021 is shown in Figure 9. As seen from Figure 9, the groundwater flows mostly south and south-east direction to the plant. The groundwater contour map of the entire Chatra district during pre- and post-monsoon seasons (2012-13) reported by CGWB shows a comparable

groundwater fluctuation pattern with the current observations of the area. This indicates that the dynamic groundwater resources of the study area are not depleted during the past decade because of the plant development in the area. Due to differential groundwater extraction patterns, the groundwater flow pattern seems to change locally during the pre and post-monsoon periods.

Table 4. Groundwater level measured below ground level (BGL) in meters during the post-monsoon period (Nov 2021)

Sr. No.	Name of Site (Location)	Latitude	Longitude	Type of site	Depth BGL (m)
1	OS-1(Raham)	23°49'29.46"	85°0'31.86"	Open Well	3.46
2	OS-4 (Raham)	23°49'30"	85°0'12.96"	Open Well	2.9
3	OS-5 (Raham)	23°49'30.9"	85°0'14.52"	Open Well	3.4
4	OS-6 (Kamta)	23°51'2.22"	85°0'13.98"	Open Well	5.44
5	OS-9 (Garilaung)	23°51'29.7"	85°0'40.98"	Open Well	3.08
6	OS-13 (Tandwa)	23°51'10.08"	85°1'56.52"	Site skipped	
7	OS-15 (Tandwa)	23°50'49.92"	85°1'46.74"	Open Well	0.76
8	OS-16 (Tandwa)	23°50'51.54"	85°1'41.82"	Open Well	1.75
9	OS-17 (Tandwa)	23°50'45.78"	85°1'46.86"	Open Well	3.62

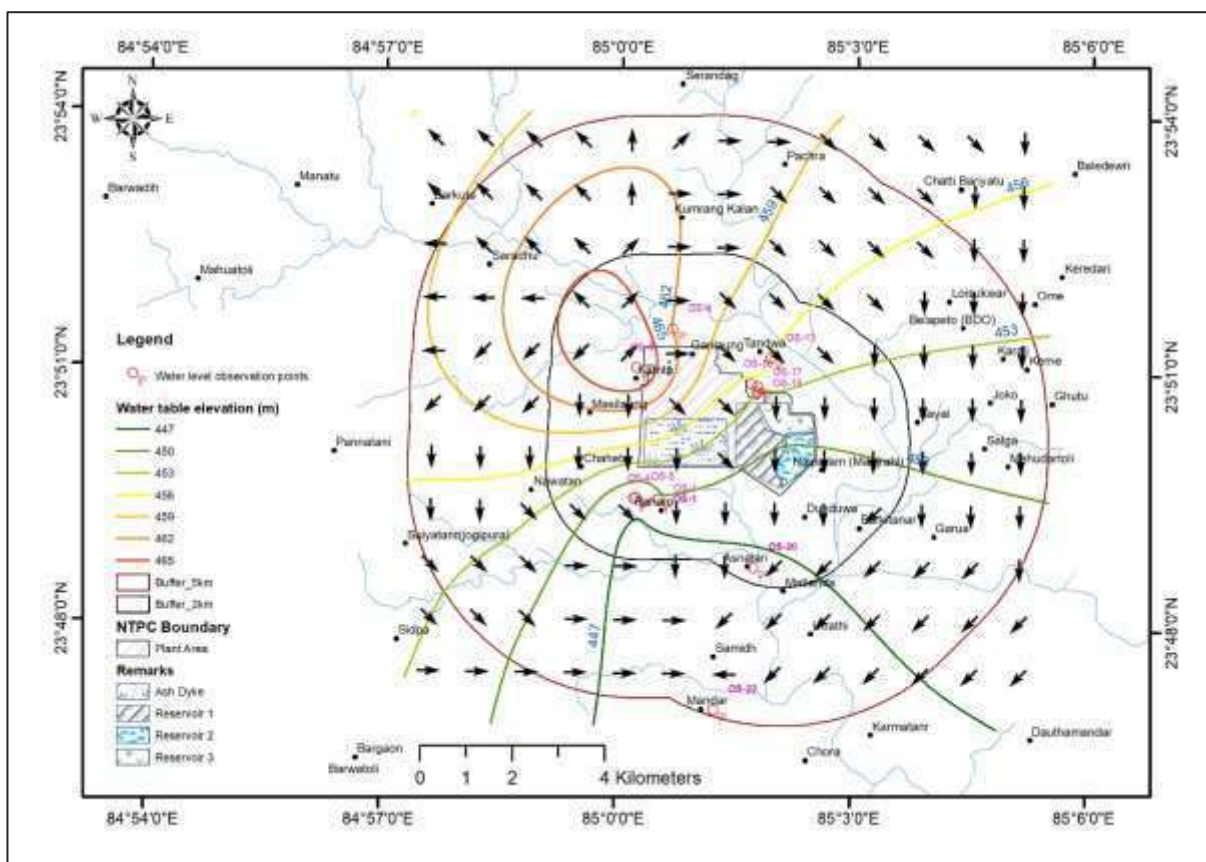


Figure 9. Groundwater level and flow direction in and around the plant area during post-monsoon 2021.

4.3 Groundwater level monitoring during 2nd year (pre-monsoon 2022)

The groundwater level was measured in the identified monitoring points during the pre-monsoon 2022 site visit during May 8-10, 2022. Observed groundwater levels are listed in Table 5. The observed groundwater levels were plotted, and the groundwater flow direction was computed. The observed groundwater table and flow direction for pre-monsoon 2022 is shown in Figure 10. As can be seen from Figure 10, the groundwater flows mostly to the south and south-east direction of the plant, and no significant change has been observed as compared to the groundwater flow regime of the year 2021.

Table 5. Groundwater level measured below ground level (BGL) in meters during the pre-monsoon period (May 8-10, 2022)

Sr. No.	Name of Site (Location)	Latitude	Longitude	Type of site	Ground elevation (m)	Depth BGL (m)
1	OS-1(Raham)	23°49'29.46"	85°0'31.86"	Open Well	453	6.4
2	OS-4 (Raham)	23°49'30"	85°0'12.96"	Open Well	451	6.11
3	OS-5 (Raham)	23°49'30.9"	85°0'14.52"	Open Well	468	1.19
4	OS-6 (Kamta)	23°51'2.22"	85°0'13.98"	Open Well	473	11.55
5	OS-9 (Garilaung)	23°51'29.7"	85°0'40.98"	Open Well	465	5.67
6	OS-13 (Tandwa)	23°51'10.08"	85°1'56.52"	Open well	457	2.4
7	OS-15 (Tandwa)	23°50'49.92"	85°1'46.74"	Open Well	456	2.05
8	OS-16 (Tandwa)	23°50'51.54"	85°1'41.82"	Open Well	457	1.83
9	OS-17 (Tandwa)	23°50'45.78"	85°1'46.86"	Open Well	456	4.17

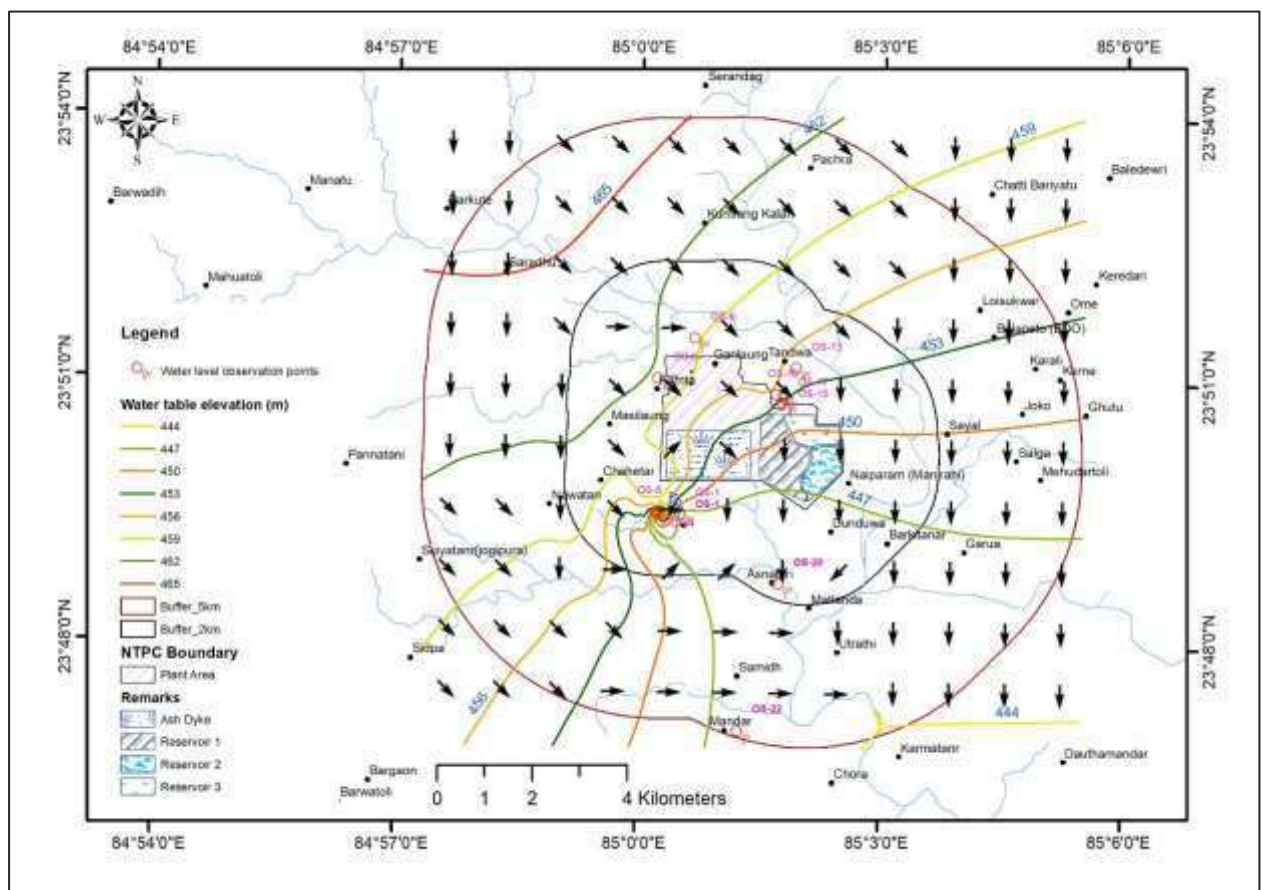


Figure 10. Groundwater level and flow direction in and around the plant area during pre-monsoon 2022.

4.4 Groundwater level monitoring during 2nd year (post-monsoon 2022)

The groundwater level was measured in the identified monitoring points during the pre-monsoon 2022 site visit during September 22-24, 2022. Observed groundwater levels are listed in Table 6. The observed groundwater levels were plotted, and the groundwater flow direction was computed. The observed groundwater table and flow direction for pre-monsoon 2022 are shown in Figure 11. As can be seen from Figure 11, the groundwater flows mostly to the south and south-east direction of the plant, and no significant change has been observed as compared to the groundwater flow regime of the year 2021.

Table 6. Groundwater level measured below ground level (BGL) in meters during the post-monsoon period (September 22-24, 2022)

Sr. No	Name of Site (Location)	Latitude	Longitude	Type of site	Ground elevation (m)	Depth BGL (m)
1	OS-1 (Raham)	23°49'29.46"	85°0'31.86"	Open Well	453	0.85
2	OS-4 (Raham)	23°49'30"	85°0'12.96"	Open Well	451	0.58
3	OS-5 (Raham)	23°49'30.9"	85°0'14.52"	Open Well	468	1.01
4	OS-6 (Kamta)	23°51'2.22"	85°0'13.98"	Open Well	473	0.7
5	OS-9 (Garilaung)	23°51'29.7"	85°0'40.98"	Open Well	465	1.67
6	OS-13 (Tandwa)	23°51'10.08"	85°1'56.52"	Open well	457	0.5
7	OS-15 (Tandwa)	23°50'49.92"	85°1'46.74"	Open Well	456	0.65
8	OS-16 (Tandwa)	23°50'51.54"	85°1'41.82"	Open Well	457	0.3
9	OS-17 (Tandwa)	23°50'45.78"	85°1'46.86"	Open Well	456	2.27
10	OS-19(Inside plant)	23°50'54.42"	85°1'33.3"	Borewell	457	13.75
11	OS-20 (Asnatari)	23°48' 45.72"	85°1'33.528"	Open Well	432	2.37
12	OS-22 (Mandar)	23°46'28.524"	85°1'28.272"	Open Well	442	2

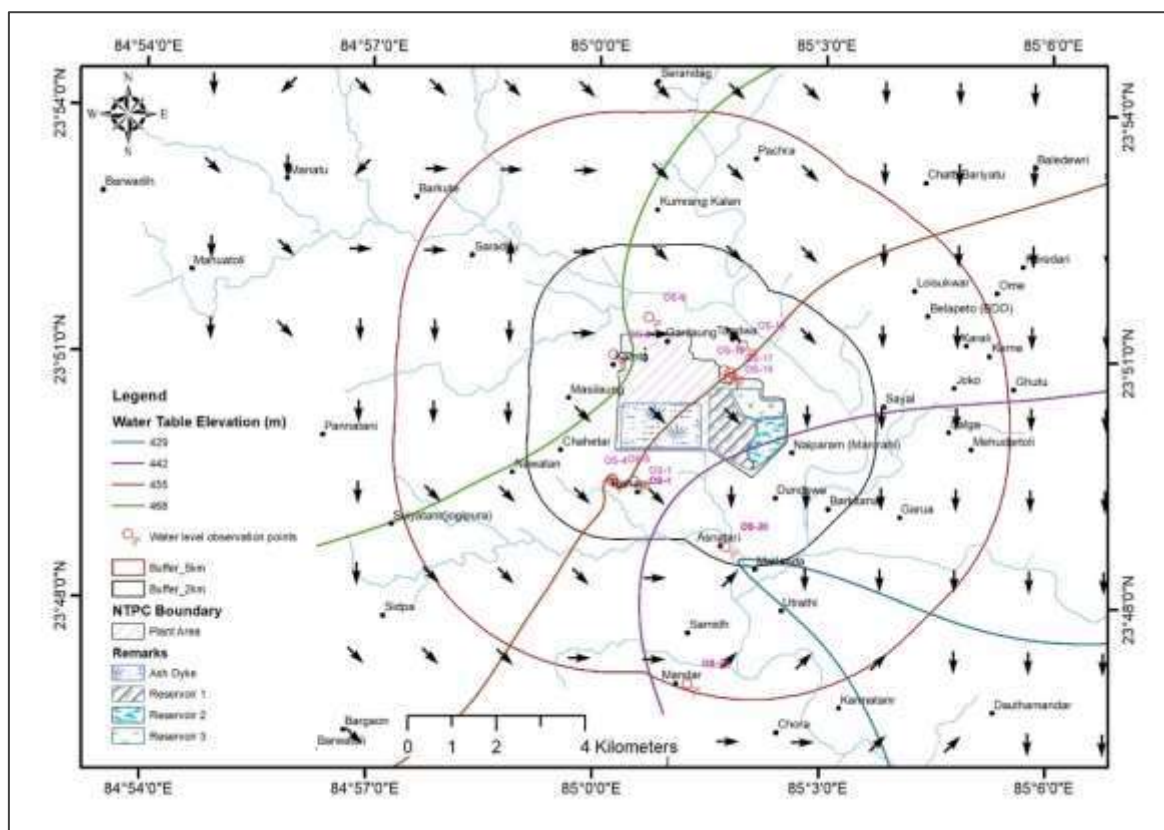


Figure 11. Groundwater level and flow direction in and around the plant area during post-monsoon 2022.

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

The surface water level in the Dam on Garhi Nadi was monitored during pre- and post-monsoon visits. The photograph taken during the site visit and the gauge reading are given below.

5.1 Surface water level during pre-monsoon 2021

The team visited the check dam site on January 25, 2021, and found the gates of the check dam open, allowing minor base flow 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 Figure 12. So, the dam was empty during the pre-monsoon 2021 visit, and the gauge reading was 433 m, which corresponds to ground level in the dam.



Figure 12. Site photograph of water level gauge and check dam on January 25, 2021, during the pre-monsoon period (1st year).

5.2 Surface water level during post-monsoon 2021

The team visited the check dam site on November 27, 2021, and the water level was found at the lowest marking level of the staff gauge installed in the check dam, as shown in Figure 13. So, the dam was empty during the post-monsoon 2021 visit, and the gauge reading was 433.0 m, which corresponds to the minimum water level/ground level in the dam.



Figure 13. Site photograph of water level gauge captured on November 27, 2021, during the post-monsoon period (1st year)

5.3 Surface water level during pre-monsoon 2022

The team visited the check dam site on May 9, 2022, and the check dam was found empty. The water was found only in a few depressions at the lowest marking level of the staff gauge installed in the check dam, as shown in Figure 14. So, the dam was empty during the pre-monsoon 2022 visit, and the gauge reading was 433.0 m, which corresponds to the minimum water level/ground level in the dam.



Figure 14. Site photograph of water level gauge captured on May 9, 2022, during the pre-monsoon period (2nd year)

5.4 Surface water level during post-monsoon 2022

The team visited the check dam site on September 23, 2022, and the water level was found at the lowest marking level of the staff gauge installed in the check dam, as shown in Figure 15. The dam was empty during the post-monsoon 2022 visit, and the gauge reading was 433.0 m, which corresponds to the minimum water level/ground level in the dam.



Figure 15. Site photograph of water level gauge captured on September 23, 2022, during the post-monsoon period (2nd year)

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

Based 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 Figure 16. The same locations were used to collect surface and groundwater data both for pre and post-monsoon seasons. Out of 23 sampling sites visited around the NTPC plant site area, in-situ analysis of 13 samples was performed using a multi-parameter probe. Based on their relevant locations, 11 samples were selected to perform the detailed ex-situ analysis in the laboratory of IIT Roorkee during the pre and post-monsoon period.

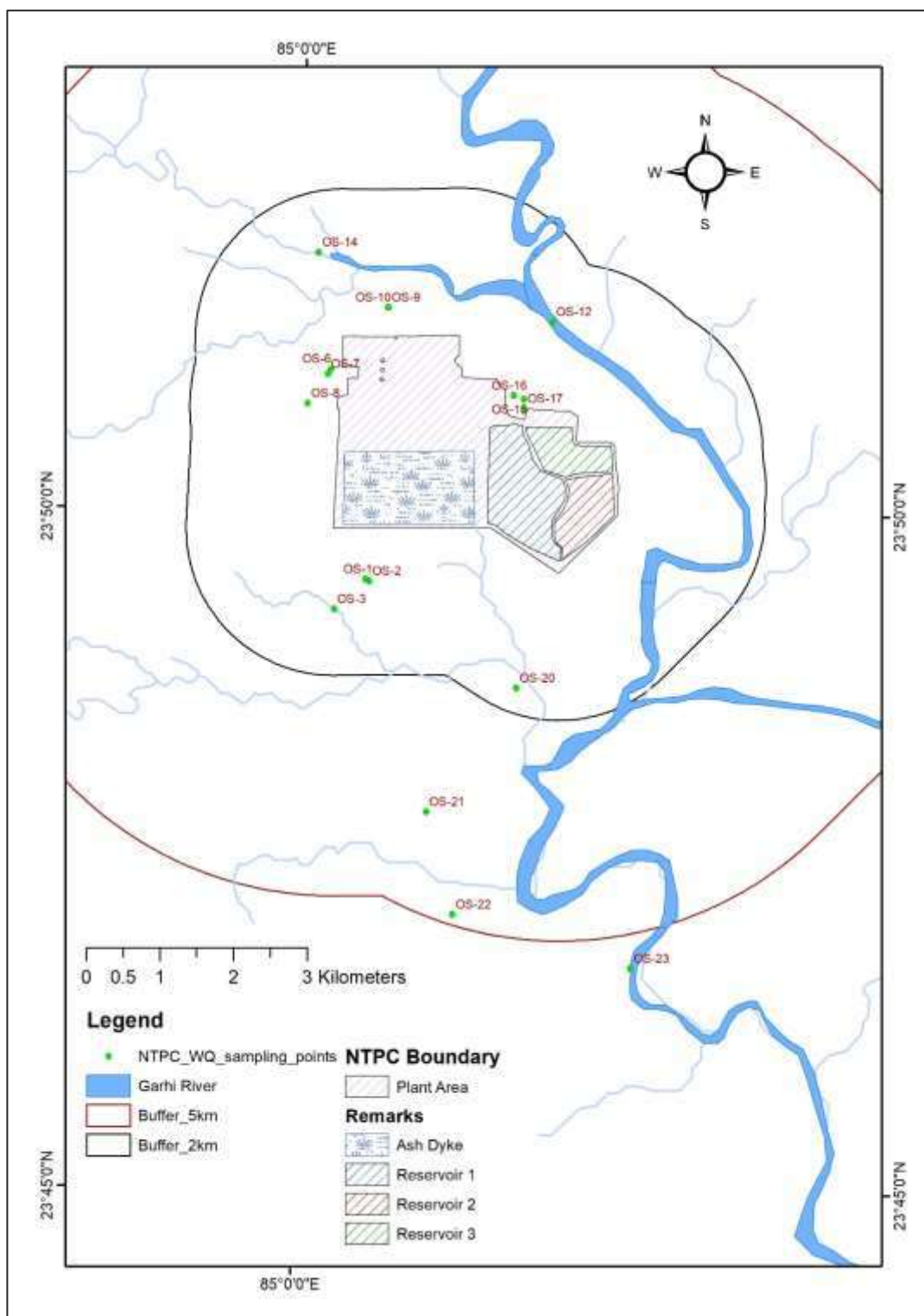



Figure 16. Map depicting locations of surface and groundwater sampling points.

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6.1 Pre-monsoon 2021 water quality results

Sampling locations for pre-monsoon groundwater quality analysis are listed in Table 7. 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 the In-situ analysis for the pre-monsoon period is listed in Table 8.

Table 7. Location of sampling sites for In-situ/Ex-situ during the pre-monsoon period

S. No.	Site code	Type of site/location	Latitude	Longitude	Type of Analysis
1	OS-1	Open Well/Raham	23°49'29.46"	85°0'31.86"	In-situ
2	OS-2	Hand pump/Raham	23°49'28.68"	85°0'33.66"	In-situ and Ex-situ
3	OS-3	Hot spring/Raham	23°49'16.14"	85°0'16.92"	In-situ and Ex-situ
4	OS-6	Open Well/Kamta	23°51'2.22"	85°0'13.98"	In-situ
5	OS-7	NTPC solar pump/Kamta	23°51'0.00"	85°0'12.48"	In-situ and Ex-situ
6	OS-8	Hand pump/Kamta	23°50'46.86"	85°0'2.88"	In-situ and Ex-situ
7	OS-9	Open Well/Garilaung	23°51'29.7"	85°0'40.98"	In-situ
8	OS-10	Tube Well/Garilaung	23°51'29.7"	85°0'40.98"	In-situ and Ex-situ
9	OS-12	Garhi River/Tandwa	23°51'24.28"	85° 2'0.10"	Ex-situ
10	OS-14	Garhi River/Kasaha DPS	23°51'53.64"	85° 0'7.17"	In-situ and Ex-situ
11	OS-15	Open Well/Tandwa	23°50'49.92"	85°1'46.74"	In-situ and Ex-situ
12	OS-16	Open Well/Tandwa	23°50'51.54"	85°1'41.82"	In-situ
13	OS-17	Open Well/Tandwa	23°50'45.78"	85°1'46.86"	In-situ
14	OS-20	Handpump/Asnatari	23°48'42.31"	85°1'44.71"	Ex-situ

(Note: observation points OS-4, OS-5, OS-11, OS-13, OS-18 and OS-19 were used only for ground water table monitoring)






Table 8. Mean values of pH, EC, TDS, DO, and temperature obtained in the water samples from In-situ analysis during the pre-monsoon period 2021.

Site code	Type of site	pH	EC(mS)	TDS(ppm)	DO(mg/l)	Saturation%	Temperature(°C)
OS-1	Open Well	6.98	0.78	—	5.11	—	23.9
OS-2	Hand pump	6.60	1.10	—	6.30	87.8	—
OS-3	Hot spring	6.74	0.83	—	5.85	103.5	40.9
OS-6	Open Well	7.26	1.20	623	—	—	—
OS-7	NTPC solar pump	7.23	0.70	340	—	—	29.1
OS-8	Hand pump	6.63	1.04	510	5.63	89.4	—
OS-9	Open Well	6.94	0.98	390	5.26	76.0	22.1
OS-10	Tube Well	6.40	0.58	290	6.78	90.8	25.8
OS-14	Garhi River	7.57	0.37	170	7.18	80.1	—
OS-15	Open Well	7.12	1.17	580	6.73	86.6	—
OS-16	Open Well	7.49	0.61	310	5.76	77.2	—
OS-17	Open Well	7.40	0.40	190	5.33	74.2	19
BIS	AL	6.5-8.5	-	500	-	-	-
Limits	PL	NR	-	2000	-	-	-

AL: acceptable limit; PL: permissible limit in the absence of alternate source; NR: no relaxation

Samples collected during pre-monsoon season for ex-situ analysis were examined using inductively coupled plasma mass spectrometry/Microwave plasma atomic emission spectroscopy (ICP-MS/MP-AES) and Ion Chromatography (IC) for finding the concentration of heavy metals and other elements in the water samples during the pre-and post-monsoon periods. All the samples were first acid digested, diluted to a suitable degree, filtered through a 0.45-micron filter, and then proceeded for ICP-MS/MP-AES analysis. The purpose of acid digestion is to destroy the matrix, which otherwise interferes during atomization. Also, digestion converts all forms of metal into a single oxidation state. Samples are analyzed using ICP-MS for Li, B, Na, Mg,



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Al, K, Ca, Cr, Cd, Mn, Fe, Co, Ni, Cu, Zn, As, Sr, Ag, Ba, Hg, Pb, Rh, and results after correction are listed in Table 9. Apart from the ICP-MS, samples were analyzed using ion chromatography (IC) for Cl, SO₄²⁻, F, and NO₃⁻ and results of pre and post-monsoon periods are listed in Table 10. The eluent used in the IC analysis for digestion purposes was 3.2 mM Na₂CO₃ mixed with 1mM NaHCO₃. All the water quality analysis results are compared with the Bureau of Indian Standards (BIS) code IS 10500:2012 to check the groundwater utility for drinking purposes.




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Table 9. Mean concentration of elements obtained in the water samples during the pre-monsoon period 2021 from ICP-MS analysis with BIS limits of IS 10500:2012

Parameter	Unit	Site Code									BIS Limits	
		OS-2	OS-3	OS-7	OS-8	OS-10	OS-12	OS-14	OS-16	OS-20	AL	PL
Lithium (Li)	ppm	0.027	0.352	0.253	0.034	0.129	0.036	0.049	0.040	0.410	NS	
Boron (B)	ppm	0.073	0.067	0.113	0.043	0.055	0.060	0.063	0.105	0.111	0.5	1
Aluminium (Al)	ppm	0.080	0.190	4.040	0.150	1.320	0.510	0.410	1.940	0.280	0.03	0.2
Chromium (Cr)	ppm	0.007	0.016	0.031	0.015	0.027	0.017	0.016	0.018	0.015	0.05	NR
Magnesium (Mn)	ppm	0.014	0.034	0.179	0.022	0.567	0.012	0.012	0.089	0.053	0.1	0.3
Iron (Fe)	ppm	0.081	0.259	3.123	0.202	0.768	0.742	0.700	1.108	0.198	0.3	NR
Cobalt (Co)	ppm	BDL	BDL	0.002	BDL	0.002	BDL	BDL	0.005	BDL	NS	
Nickel (Ni)	ppm	0.004	0.007	0.015	0.008	0.016	0.011	0.009	0.012	0.007	0.02	NR
Copper (Cu)	ppm	0.004	0.004	0.019	0.004	0.013	0.009	0.011	0.013	0.004	0.05	1.5
Zinc (Zn)	ppm	0.088	0.085	0.909	0.073	0.124	0.063	0.066	0.540	0.789	5	15
Arsenic (As)	ppm	0.001	BDL	0.003	BDL	0.001	0.013	0.037	0.003	BDL	0.01	0.05
Strontium (Sr)	ppm	0.267	0.485	1.951	0.254	0.250	0.074	0.074	6.559	0.985	NS	
Silver (Ag)	ppm	BDL	0.007	0.001	BDL	BDL	0.001	0.001	0.001	0.001	0.1	NR
Cadmium (Cd)	ppm	BDL	BDL	0.142	BDL	0.001	0.002	0.003	0.162	BDL	0.003	NR
Barium (Ba)	ppm	0.080	0.693	0.262	0.171	0.144	0.039	0.031	0.102	0.598	0.7	NR
Mercury (Hg)	ppm	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.001	NR
Lead (Pb)	ppm	0.002	0.006	0.072	0.005	0.018	0.015	0.011	0.023	0.006	0.01	NR
Rhodium (Rh)	ppm	1.55	1.60	1.63	1.59	1.65	3.21	2.97	1.65	1.53	NS	

BDL: Below detection limit; NS: Not specified; NR: No relaxation; AL: Acceptable limit; PL: Permissible limit




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Table 10. Mean concentration of elements (Chloride, Nitrate, Sulphate, and Fluoride) obtained in the water samples during the pre-monsoon period 2021 from IC analysis compared with BIS limits of IS 10500:2012

Parameter	Unit	Site Code									BIS Limits	
		OS-2	OS-3	OS-7	OS-8	OS-10	OS-12	OS-14	OS-16	OS-20	AL	PL
Sodium (Na)	ppm	57.6	42.82	32.25	46.66	33.01	19.49	19.11	68.85	56.48	NS	
Magnesium (Mg)	ppm	36.31	24.66	36.83	48.99	21.47	11.05	12.23	47.54	22.36	30	100
Potassium (K)	ppm	12.46	24.52	26.75	4.32	7.74	2.47	2.08	2.09	24.92	NS	
Calcium (Ca)	ppm	54.42	29.33	111.36	53.73	33.01	11.19	11.76	150.24	23.07	75	200
Chloride (Cl)	ppm	39.68	43.6	27.47	74.52	43.72	13.33	16.68	41.39	33.65	250	1000
Nitrate (NO ₃)	ppm	BDL	43.34	142.67	349.11	168.3	22.72	100.46	139.94	25.49	45	NR
Sulphate (SO ₄)	ppm	1006.66	265.1	439.01	527.13	198.57	121.92	96.34	107.57	243.56	NS	
Fluoride (F)	ppm	BDL	3.38	3.8	BDL	BDL	1.58	1.24	1.28	4.4	1	1.5

BDL: Below detection limit; NS: Not specified; NR: No relaxation; AL: Acceptable limit; PL: Permissible limit



6.2 Post-monsoon 2021 water quality results

Sampling locations for post-monsoon groundwater quality analysis are listed in Table 11. 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 the In-situ analysis for the post-monsoon period is listed in Table 12.

Table 11. Location of sampling sites for In-situ/Ex-situ analyses during the post-monsoon period

S. No.	Site code	Type of site/location	Latitude	Longitude	Type of Analysis
1	OS-1	Open Well/Raham	23°49'29.46"	85°0'31.86"	In-situ
2	OS-2	Hand pump/Raham	23°49'28.68"	85°0'33.66"	In-situ and Ex-situ
3	OS-3	Hot spring/Raham	23°49'16.14"	85°0'16.92"	In-situ and Ex-situ
4	OS-6	Open Well/Kamta	23°51'2.22"	85°0'13.98"	In-situ
5	OS-7	NTPC solar pump/Kamta	23°51'0.00"	85°0'12.48"	In-situ and Ex-situ
6	OS-8	Hand pump/Kamta	23°50'46.86"	85°0'2.88"	In-situ and Ex-situ
7	OS-9	Open Well/Garilaung	23°51'29.7"	85°0'40.98"	In-situ
8	OS-10	Tube Well/Garilaung	23°51'29.7"	85°0'40.98"	In-situ and Ex-situ
9	OS-12	Garhi River/Tandwa	23°51'24.28"	85° 2'0.10"	Ex-situ
10	OS-14	Garhi River/Kasaha DPS	23°51'53.64"	85° 0'7.17"	In-situ and Ex-situ
11	OS-15	Open Well/Tandwa	23°50'49.92"	85°1'46.74"	In-situ and Ex-situ
12	OS-16	Open Well/Tandwa	23°50'51.54"	85°1'41.82"	In-situ
13	OS-17	Open Well/Tandwa	23°50'45.78"	85°1'46.86"	In-situ
14	OS-20*	Handpump/Asnatari	23° 48' 45.72"	85°1' 33.53"	In-situ and Ex-situ
15	OS-21	Handpump	23°47'40.74"	85°1'15.74"	In-situ and Ex-situ
16	OS-22	Handpump	23°46'28.52"	85°1' 28.27"	In-situ and Ex-situ
17	OS-23	Garhi River	23°47'24.39"	85° 2' 35.59"	In-situ and Ex-situ


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Table 12. Mean values of pH, EC, TDS, DO, and temperature obtained in the water samples from In-situ analysis during the post-monsoon period 2021.


Site code	Type of site	pH	EC(mS)	TDS(ppm)	DO(mg/l)	Elevation	Temperature(°C)
OS-1	Open Well	6.94	0.72	350	6.2	453	23.9
OS-2	Hand pump	6.62	1.55	770	3.96	453	26.1
OS-3	Hot spring	6.32	0.74	370	3.72	440	42.5
OS-6	Open Well	7.11	1.18	580	6.63	473	23.6
OS-7	NTPC solar pump	7.04	0.65	320	7.13	474	24.2
OS-8	Hand pump	6.52	0.99	490	4.46	474	24.7
OS-9	Open Well	6.56	1.22	600	5.5	465	20.5
OS-10	Tube Well	5.99	0.57	280	6.1	465	20.3
OS-14	Garhi River	7.98	0.4	190	9.25	451	18.2
OS-15	Open Well	7.04	1.34	670	6.25	456	21.4
OS-16	Open Well	7.48	0.66	320	5.93	457	22.1
OS-17	Open Well	7.61	0.37	180	7.3	456	20.8
OS-20	Hand pump	6.46	0.61	300	4.38	-	26.1
OS-21	Hand pump	5.81	0.57	280	4.34	453	26.7
OS-22	Hand pump	6.52	0.78	390	5.01	449	25.9
OS-23	Garhi River	7.64	0.35	170	6.87	-	24.1
BIS Limits	AL	6.5-8.5	-	500	-	-	-
	PL	NR	-	2000	-	-	-

AL: acceptable limit; PL: permissible limit in the absence of alternate source; NR: no relaxation

*(Note: observation points OS-4 and OS-5 were used only for groundwater table monitoring; *The coordinates of OS-20, the hand pump site, have been changed due to disruption activities at the earlier site)*

Samples collected for ex-situ analysis were examined using inductively coupled plasma mass spectrometry/Microwave plasma atomic emission spectroscopy (ICP-MS/MP-AES) and Ion Chromatography (IC) for finding the concentration of heavy metals and other elements in the water samples during the pre-and post-monsoon periods. All the samples were first acid digested, diluted to a suitable degree, filtered through a 0.45-micron filter, and then proceeded for



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ICP-MS/MP-AES analysis. The purpose of acid digestion is to destroy the matrix, which otherwise interferes during atomization. Also, digestion converts all forms of metal into a single oxidation state. Samples are analyzed 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 listed in Table 13. Apart from the ICP-MS, samples were analyzed using ion chromatography (IC) for Cl, SO₄²⁻, F, NO₃⁻, and PO₄²⁻ and results of pre and post-monsoon periods are listed in Table 14. The eluent used in the IC analysis for digestion purposes was 3.2 mM Na₂CO₃ mixed with 1mM NaHCO₃. All the water quality analysis results are compared with the Bureau of Indian Standards (BIS) code IS 10500:2012 to check the groundwater utility for drinking purposes.



Table 13. Mean concentration of elements obtained in the water samples during the post-monsoon period 2021 from ICP-MS analysis with BIS limits of IS 10500:2012

Parameter	Unit	Site code											BIS Limits	
		OS-2	OS-3	OS-7	OS-8	OS-10	OS-14	OS-16	OS-20	OS-21	OS-22	OS-23	AL	PL
Lithium (Li)	ppm	0.020	0.291	0.302	0.032	0.132	0.062	0.052	0.392	0.250	0.092	0.016	NS	
Boron (B)	ppm	0.746	0.136	0.233	0.191	0.385	0.281	0.461	0.042	0.332	0.140	0.228	0.5	1
Aluminium (Al)	ppm	0.980	1.550	1.250	1.040	1.140	1.340	1.280	0.830	0.900	0.930	1.410	0.03	0.2
Chromium (Cr)	ppm	0.020	0.023	0.021	0.019	0.020	0.021	0.022	0.025	0.017	0.019	0.023	0.05	NR
Manganese (Mn)	ppm	0.032	0.031	0.055	0.029	0.105	0.023	0.021	0.017	0.052	0.034	0.023	0.1	0.3
Iron (Fe)	ppm	0.447	0.490	0.431	0.437	0.392	0.425	0.411	0.275	0.734	0.948	0.397	0.3	NR
Cobalt (Co)	ppm	0.002	0.003	0.001	0.001	0.002	0.002	0.003	0.001	0.002	0.002	0.000	NS	
Nickle (Ni)	ppm	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.004	0.02	NR
Coper (Cu)	ppm	0.002	0.001	0.002	0.001	BDL	0.002	0.001	0.001	0.001	BDL	BDL	0.05	1.5
Zinc (Zn)	ppm	3.147	2.298	3.078	4.911	2.780	3.770	2.928	2.361	2.779	2.622	3.466	5	15
Arsenic (As)	ppm	0.040	0.019	0.050	0.069	0.065	0.068	0.035	0.071	0.045	0.079	0.060	0.01	0.05
Strontium (Sr)	ppm	0.303	0.457	0.729	0.298	0.180	0.150	0.811	0.695	0.201	0.253	0.143	NS	
Silver (Ag)	ppm	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.1	NR
Cadmium (Cd)	ppm	0.005	0.006	0.007	0.009	0.009	0.008	0.010	0.009	0.012	0.012	0.012	0.003	NR
Barium (Ba)	ppm	0.070	0.200	0.070	0.072	0.059	0.048	0.058	0.052	0.055	0.148	0.055	0.7	NR
Mercury (Hg)	ppm	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.001	NR
Lead (Pb)	ppm	0.004	0.012	0.002	0.000	0.001	0.003	0.005	0.000	0.001	0.001	0.003	0.01	NR
Rhodium (Rh)	ppm	1.644	1.701	1.503	1.357	1.623	2.757	1.940	1.563	1.324	1.764	1.114	NS	

BDL: Below detection limit; NS: Not specified; NR: No relaxation; AL: Acceptable limit; PL: Permissible limit



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Table 14. Mean concentration of elements (Chloride, Nitrate, Sulphate, and Fluoride) obtained in the water samples during post-monsoon period 2021 from IC analysis compared with BIS limits of IS 10500:2012

Parameter	Unit	Site code											BIS Limits	
		OS-2	OS-3	OS-7	OS-8	OS-10	OS-14	OS-16	OS-20	OS-21	OS-22	OS-23	AL	PL
Sodium (Na)	ppm	159.16	101.18	78.08	98.99	71.42	66.58	105.03	60.9	61.28	60.89	62.55	NS	
Magnesium (Mg)	ppm	69.49	42.1	37.68	55.12	26.89	26.04	51.85	25.32	19.85	62.23	28.35	30	100
Potassium (K)	ppm	44.45	49.91	43.94	12.13	10.39	4.7	6.02	3.82	16.49	11.93	9.03	NS	
Calcium (Ca)	ppm	32.6	18.15	15.21	20.51	14.65	11.65	14.62	18.05	12.05	18.07	12.79	75	200
Chloride (Cl)	ppm	38.18	23.04	12.45	34.73	18.11	2.36	11.00	9.35	21.64	3.21	2.26	250	1000
Nitrate (NO ₃)	ppm	71.49	2.92	BDL	48.105	32.54	BDL	BDL	16.605	BDL	BDL	BDL	45	NR
Sulphate (SO ₄)	ppm	77.70	13.98	58.28	37.55	30.06	10.65	14.38	17.20	18.44	4.48	43.07	200	400
Fluoride (F)	ppm	BDL	1.5	1.46	BDL	BDL	0.415	0.49	BDL	0.47	BDL	BDL	1	1.5

BDL: Below detection limit; NS: Not specified; NR: No relaxation; AL: Acceptable limit; PL: Permissible limit



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6.3 Analysis of results of pre and post-monsoon 2021 water quality

The pH ranged from 6.40 to 7.57 in pre-monsoon, while in post-monsoon, it varied from 5.81 to 7.98. Only one sample, i.e., OS-10 (6.40), shows a slightly acidic nature of water in comparison to BIS (2012) limits. In the post-monsoon period, three samples are found to have little acidic pH range, i.e. OS-3 (6.32), OS-10 (5.99), and OS-21 (5.81). The TDS concentration in the pre-monsoon period ranged from 170 ppm to 623 ppm, whereas in the post-monsoon period, it varied from 170 ppm to 770 ppm. No significant variation in the TDS is found between pre and post-monsoon seasons. Also, the samples were found well within the permissible limit of BIS (2012) with respect to TDS concentration.

The concentration of heavy metals in the pre-monsoon period was analysed. It was observed that some trace metals particularly Al had slightly higher concentrations when compared to BIS (2012) limits for drinking water. In contrast, in the post-monsoon period, some water samples had slightly higher concentrations of Al, Fe, As, and Cd when compared to the BIS limit.

In the pre-monsoon period, aluminium concentration ranges from 0.08 ppm to 4.04 ppm, whereas in the post-monsoon period, it ranges from 0.83 ppm to 1.55 ppm, which indicates that most of the samples are above the permissible limit of BIS excluding three samples of pre-monsoon period (OS-2, OS-3, OS-8). The Fe concentration ranges from 0.081 ppm to 3.123 ppm in the pre-monsoon period, while in the post-monsoon period, it ranges from 0.275 ppm to 0.948 ppm during the post-monsoon period. This is to be noted that this time the Fe level has reduced significantly as compared to the pre-monsoon period. This could be due to the dilution impact and aggressive purging of the groundwater undertaken during the post-monsoon season. The arsenic concentration was found to be marginally high in some of the sampling locations during the post-monsoon period, which was within the acceptable limit during the pre-monsoon season. The Cd ranges from 0.005 to 0.012 ppm in the study area during the



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post-monsoon period. All the samples have little high Cd concentration as compared to the BIS limit.

In general, the high concentration of Mn and Fe in hand pump water samples indicates the poor quality and maintenance of hand pumps. Basically, the geological formations of the area and the presence of coal mines in the near vicinity of the study area could be the possible reason for the presence of some trace metals in water samples.

On the other hand, major cations and anions were also analysed in the pre and post-monsoon periods, and most of the ions were within the permissible limit of BIS (2012). However, sulfate and fluoride have shown marginally higher concentrations in a few of the samples of the pre-monsoon period, which seems to be getting diluted in the post-monsoon period. Fluoride-bearing minerals are the primary reason for fluoride contamination in groundwater. The nitrate concentration ranges from 22.72 ppm to 349.11 ppm in the pre-monsoon period, similarly in the post-monsoon period, it ranges from BDL-71.49 ppm; however, two samples (OS-2 and OS-8) have elevated concentration with respect to BIS in the post-monsoon season. This might be due to improper management of wells and excess use of nitrogenous-based fertilizers.

6.4 Pre-monsoon 2022 water quality results

Pre-monsoon water sampling was done during 8-10 May 2022. Sampling locations for pre-monsoon 2022 groundwater quality analysis are listed in Table 15. 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 sample collection points using the multimeter electrode. The result of the In-situ analysis for the post-monsoon period in 2022 is listed in [Table 16](#). Mean concentrations of heavy metal obtained in the water samples during the pre-monsoon period in 2022 are listed in [Table 17](#), and the concentration of major ions are listed in [Table 18](#).




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Table 15. Location of sampling sites for In-situ/Ex-situ analyses during the post-monsoon period

S. No.	Site code	Type of site/location	Latitude	Longitude	Type of Analysis
1	OS-1	Open Well/Raham	23°49'29.46"	85°0'31.86"	In-situ
2	OS-2	Hand pump/Raham	23°49'28.68"	85°0'33.66"	In-situ and Ex-situ
3	OS-3	Hot spring/Raham	23°49'16.14"	85°0'16.92"	In-situ and Ex-situ
4	OS-6	Open Well/Kamta	23°51'2.22"	85°0'13.98"	In-situ
5	OS-7	NTPC solar pump/Kamta	23°51'0.00"	85°0'12.48"	In-situ and Ex-situ
6	OS-8	Hand pump/Kamta	23°50'46.86"	85°0'2.88"	In-situ and Ex-situ
7	OS-9	Open Well/Garilaung	23°51'29.7"	85°0'40.98"	In-situ
8	OS-10	Tube Well/Garilaung	23°51'29.7"	85°0'40.98"	In-situ and Ex-situ
9	OS-12	Garhi River/Tandwa	23°51'24.28"	85° 2'0.10"	Ex-situ
10	OS-14	Garhi River/Kasaha DPS	23°51'53.64"	85° 0'7.17"	In-situ and Ex-situ
11	OS-15	Open Well/Tandwa	23°50'49.92"	85°1'46.74"	In-situ and Ex-situ
12	OS-16	Open Well/Tandwa	23°50'51.54"	85°1'41.82"	In-situ
13	OS-17	Open Well/Tandwa	23°50'45.78"	85°1'46.86"	In-situ
14	OS-20*	Handpump/Asnatari	23° 48' 45.72"	85°1' 33.53"	In-situ and Ex-situ
15	OS-21	Handpump	23°47'40.74"	85°1'15.744"	In-situ and Ex-situ
16	OS-22	Handpump	23°46'28.52"	85°1' 28.27"	In-situ and Ex-situ
17	OS-23	Garhi River	23°47'24.39"	85° 2' 35.59"	In-situ and Ex-situ
18	OS-24	Tubewell/plant	23°50'52.1"	85°01'31.4"	In-situ and Ex-situ
19	OS-25	Tubewell/plant	23°50'50.2"	85°01'00.4"	In-situ and Ex-situ

*(Note: observation points OS-4, OS-5 was used only for groundwater table monitoring; *The coordinates of OS-20 the hand pump site has been changed due to disruption activities at the earlier site)*



Table 16. Mean values of pH, EC, TDS, DO, and temperature obtained in the water samples from In-situ analysis during the pre-monsoon period in 2022.

Site code	Type of site	pH	EC(mS)	TDS(ppm)	DO(mg/l)	Elevation	Temperature(°C)
OS-1	Open Well	6.64	0.86	420	4.77	453	27.3
OS-2	Hand pump	6.41	0.54	270	5.04	453	27.9
OS-3	Hot spring	6.33	0.72	360	3.04	440	46
OS-6	Open Well	7.17	1.03	540	4.27	473	28.3
OS-7	NTPC solar pump	7.18	0.63	310	5.50	474	32.3
OS-8	Hand pump	6.54	1.03	510	3.50	474	26.2
OS-9	Open Well	7.03	1.05	520	5.27	465	28.2
OS-10	Tube Well	6.22	0.50	270	6.81	465	32.6
OS-12	Garhi River/Tandwa	7.65	0.48	240	7.74	440	30.5
OS-14	Garhi River/Kasaha DPS	7.79	0.36	180	6.33	451	31.5
OS-15	Open Well	7.28	1.36	670	7.65	456	28.7
OS-16	Open Well	7.63	0.69	340	6.78	457	26.9
OS-17	Open Well	7.96	0.36	170	3.77	456	26.9
OS-20	Hand pump	6.53	0.54	270	3.36		28.3
OS-21	Hand pump	6.14	0.61	300	3.59	453	28.8
OS-22	Hand pump	6.52	0.71	350	7.23	449	27.3
OS-23	Garhi River	8.31	0.13	60	2.80		36.8
OS-24	Tubewell/plant	7.94	0.51	250	2.8	454	37.3
OS-25	Tubewell/plant	6.83	0.65	320	4.94	459	34.7
BIS Limits	AL	6.5-8.5	-	500	-	-	-
	PL	NR	-	2000	-	-	-

AL: acceptable limit; PL: permissible limit in the absence of alternate source; NR: no relaxation



Table 17. Mean concentration of elements obtained in the water samples during the pre-monsoon period 2022 from ICP-MS analysis with BIS limits of IS 10500:2012

Parameter	Unit	Site Code												BIS Limits	
		OS-2	OS-3	OS-7	OS-8	OS-10	OS-12	OS-14	OS-16	OS-20	OS-21	OS-22	OS-23	AL	PL
Lithium (Li)	ppm	0.010	0.155	0.109	0.011	0.044	0.012	0.009	0.018	0.010	0.057	0.011	0.013	NS	
Boron (B)	ppm	0.860	0.884	0.946	0.901	0.736	0.065	0.065	0.105	0.111	0.451	0.256	0.326	0.5	1.0
Aluminium (Al)	ppm	0.900	0.312	4.060	0.923	1.425	0.523	0.261	1.864	0.812	1.452	1.240	0.321	0.03	0.2
Chromium (Cr)	ppm	0.045	0.018	0.033	0.024	0.032	0.021	0.012	0.023	0.016	0.017	0.020	0.035	0.05	NR
Manganese (Mn)	ppm	0.235	0.043	0.179	0.066	0.757	0.172	0.158	0.844	0.337	0.068	0.060	0.341	0.1	0.3
Iron (Fe)	ppm	0.842	0.665	3.684	0.590	0.728	0.833	0.712	1.273	0.196	0.737	0.988	0.889	0.3	NR
Cobalt (Co)	ppm	0.828	0.804	0.762	0.686	0.677	0.616	0.229	0.611	0.615	0.674	0.434	0.398	NS	
Nickle (Ni)	ppm	0.076	0.060	0.017	0.009	0.167	0.012	0.010	0.016	0.008	0.007	0.006	0.005	0.02	NR
Coper (Cu)	ppm	0.126	0.081	0.061	0.138	0.101	0.102	0.028	0.103	0.077	0.116	0.013	0.056	0.05	1.5
Zinc (Zn)	ppm	4.443	4.769	4.434	4.655	4.114	5.332	3.122	4.386	3.971	4.238	4.700	3.955	5	15
Arsenic (As)	ppm	0.001	BDL	0.004	BDL	0.002	0.018	0.004	0.003	BDL	0.046	0.007	0.006	0.01	0.05
Strontium (Sr)	ppm	0.327	0.762	1.921	0.416	0.395	0.331	0.188	0.562	0.199	0.308	1.319	0.218	NS	
Silver (Ag)	ppm	0.004	0.002	0.004	0.004	0.006	0.087	0.004	0.001	0.005	0.004	0.004	0.004	0.1	NR
Cadmium (Cd)	ppm	BDL	BDL	0.011	0.013	0.003	0.001	0.003	0.016	BDL	0.013	0.016	0.007	0.003	NR
Barium (Ba)	ppm	BDL	0.664	0.264	0.184	0.149	0.042	0.033	0.109	0.571	0.564	0.245	0.054	0.7	NR
Mercury (Hg)	ppm	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.001	NR
Lead (Pb)	ppm	0.003	0.007	0.004	0.006	0.019	0.014	0.001	0.024	0.006	0.001	0.001	0.003	0.01	NR
Rhodium (Rh)	ppm	1.410	1.642	1.536	1.642	1.745	3.321	3.463	1.741	1.563	1.452	1.792	1.126	NS	

BDL: Below detection limit; NS: Not specified; NR: No relaxation; AL: Acceptable limit; PL: Permissible limit





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Table 18. Mean concentration of elements (Chloride, Nitrate, Sulphate, and Fluoride) obtained in the water samples during pre-monsoon period 2022 from IC analysis compared with BIS limits of IS 10500:2012

Parameter	Unit	Site code											BIS Limits	
		OS-2	OS-3	OS-7	OS-8	OS-10	OS-14	OS-16	OS-20	OS-21	OS-22	OS-23	AL	PL
Sodium (Na)	ppm	162.51	98.23	81.54	76.23	64.53	70.85	107.36	66.54	60.25	61.53	70.01	NS	
Magnesium (Mg)	ppm	70.5	44.25	41.35	54.36	27.84	29.43	55.23	24.65	20.05	63.78	30.31	30	100
Potassium (K)	ppm	46.56	51.5	44.85	11.56	12.56	6.3	7.26	4.56	17.65	12.75	1045	NS	
Calcium (Ca)	ppm	33.78	19.84	16.45	21.61	15.7	12.3	13.62	19.56	13.21	19.42	12.82	75	200
Chloride (Cl)	ppm	40.22	24.4	13.41	36.75	19.15	2.56	12.31	10.25	22.43	4.26	2.41	250	1000
Nitrate (NO ₃)	ppm	72.56	3.52	1.12	49.56	33.56	0.12	BDL	17.54	BDL	BDL	BDL	45	NR
Sulphate (SO ₄)	ppm	80.52	14.56	55.62	38.26	32.15	9.56	15.42	16.53	17.44	5.85	10.07	200	400
Fluoride (F)	ppm	BDL	1.6	0.78	BDL	0.15	0.23	0.56	BDL	0.75	1.23	0.41	1	1.5

BDL: Below detection limit; NS: Not specified; NR: No relaxation; AL: Acceptable limit; PL: Permissible limit



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The pH ranged from 6.22 to 7.96 in the pre-monsoon period of 2022. Only one sample, i.e., OS-10 (6.22) shows a slightly acidic nature of water in comparison to BIS (2012) limits. The OS-10 sampling tube well showed a similar trend in the year 2021. The TDS concentration ranges from 60 ppm to 670 ppm. All the samples were found well within the permissible limit of BIS (2012) with respect to TDS concentration.

The concentration of heavy metals in a few samples of the pre-monsoon period (2022) indicates little high concentration of trace elements, particularly Al and Fe, when compared to BIS (2012) limits for drinking water. The aluminium concentration ranges from 0.321 ppm to 4.06 ppm in the samples. The Fe concentration ranges from 0.196 ppm to 3.684 ppm. The Cd ranges from 0.001 to 0.016 ppm. Some samples have slightly higher Cd concentrations compared to the BIS limit. The Mn, Ni, and Pb concentrations have also been high in a few of the samples in the study area. In general, the high concentration of Mn and Fe in hand pump water samples indicates the poor quality and maintenance of hand pumps. Basically, the geological formations of the area and the presence of coal mines in the near vicinity of the study area could be the possible reason for the presence of some trace metals in water samples. The concentration of major ions indicates that most of the samples are within the permissible limit of BIS (2012). However, nitrate and fluoride have shown marginally higher concentrations in a few of the samples of the pre-monsoon period (2022). Two samples (OS-2 and OS-8) have an excess concentration of nitrate, i.e. 72.56 ppm and 49.56 ppm, respectively with respect to BIS. Only one sample, OS-3, showed a 1.6 ppm concentration of fluoride in the pre-monsoon period of 2022.

6.5 ***Post-monsoon 2022 water quality results***

Post-monsoon water sampling was done during 22-24 September 2022. Locations of water samples collected from various points during the post-



monsoon season of the year 2022 are listed in Table 19. 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 sample collection points using the multimeter electrode. The result of the In-situ analysis for the post-monsoon period in 2022 is listed in Table 20. The mean concentration of heavy metal obtained in the water samples during the post-monsoon period in 2022 is listed in Table 21, and the concentration of major ions is listed in Table 22.

The pH ranged from 6.11 to 7.96 in the post-monsoon period of 2022. Five samples, i.e. OS-10 (6.11), OS-3 (6.27), OS-8 (6.45), OS-21 (6.27), and OS-22 (6.44), show a slightly acidic nature of water in comparison to BIS (2012) limits. The OS-10 sampling tube well showed a similar trend in 2021 and pre-monsoon 2022. The TDS concentration ranges from 130 ppm to 710 ppm. All the samples were found well within the permissible limit of BIS (2012) with respect to TDS concentration. The concentration of EC ranges between 0.26-1.42 mS with an average value of 0.67 mS. The concentration of DO range from 1.7 mg/L to 6.86 mg/L, with a mean value of 4.41. The temperature during the sampling was also measured of samples which ranges between 27.2-44.2°C with a mean value of 30.51°C. As observed in earlier seasons, the maximum temperature was observed at hot spring sampling site (Raham).

The concentration of heavy metals in a few samples of the post-monsoon period of 2022 indicates a little high for some elements, particularly Al and Fe, compared to BIS (2012) limits for drinking water. The aluminium concentration ranges from 0.189 ppm to 0.892 ppm in the samples. The Fe concentration ranges from 0.143 ppm to 1.201 ppm. The Cd ranges from BDL to 0.018 ppm. Some samples have slightly higher Cd concentrations compared to the BIS limit. The Pb concentration is reported in one of the samples in the study area during the post-monsoon period of 2022. In general, a high concentration of Fe in hand pump water samples indicates the poor quality and maintenance of hand pumps. Basically, the geological formations of the area and the presence of coal mines in the near vicinity of the study area could be the possible reason

for the presence of some trace metals in water samples. The concentration of major ions indicates that most of the samples are within the permissible limit of BIS (2012). Only one sample OS-2 (49.63 ppm) has a slightly high concentration of nitrate in comparison to the BIS (2012) limit.

Table 19. Location of sampling sites for In-situ/Ex-situ analyses during the post-monsoon period (September 2022)

S.no	Code	Type of site	Latitude	Longitude	Type of Analysis
1	OS-1	Open Well/Raham	23°49'29.46"	85°0'31.86"	In-situ/Water Level
2	OS-2	Hand pump/Raham	23°49'28.68"	85°0'33.66"	In-situ and Ex-situ
3	OS-3	Hot spring/Raham	23°49'16.14"	85°0'16.92"	In-situ and Ex-situ
4	OS-6	Open Well/Kamta	23°51'2.22"	85°0'13.98"	In-situ/Water Level
5	OS-7	NTPC solar pump/Kamta	23°51'0.00"	85°0'12.48"	In-situ and Ex-situ
6	OS-8	Hand pump/Kamta	23°50'46.86"	85°0'2.88"	In-situ and Ex-situ
7	OS-9	Open Well/Garilaung	23°51'29.7"	85°0'40.98"	In-situ/Water Level
8	OS-10	Tube Well/Garilaung	23°51'29.7"	85°0'40.98"	In-situ and Ex-situ
9	OS-12	Garhi River/Tandwa	23°51'24.28"	85° 2'0.10"	Ex-situ
10	OS-14	Garhi River/Kasaha DPS	23°51'53.64"	85° 0'7.17"	In-situ and Ex-situ
11	OS-15	Open Well/Tandwa	23°50'49.92"	85°1'46.74"	In-situ and Ex-situ
12	OS-16	Open Well/Tandwa	23°50'51.54"	85°1'41.82"	In-situ
13	OS-17	Open Well/Tandwa	23°50'45.78"	85°1'46.86"	In-situ
14	OS-20	Handpump/Asnatari	23°48' 45.72"	85°1'33.53"	In-situ and Ex-situ
15	OS-21	Handpump	23°47'40.74"	85°1'15.74"	In-situ and Ex-situ
16	OS-22	Handpump	23°46'28.52"	85°1'28.27"	In-situ and Ex-situ
17	OS-23	Garhi River	23°47'24.39"	85°2'35.59"	In-situ and Ex-situ
18	OS- 24	Tubewell/ Inside township	23°50'52.1"	85°01'31.4"	In-situ and Ex-situ
19	OS-25	Tubewell/ Inside plant	23°50'50.2"	85°01'00.4"	In-situ and Ex-situ

Table 20. Mean values of pH, EC, TDS, DO, and temperature obtained in the water samples from In-situ analysis during the post-monsoon period (September 2022).

Site code	Type of site/location	pH	EC(mS)	TDS(ppm)	DO(mg/l)	E(m)	T (°C)
OS-1	Open Well/Raham	6.89	0.99	490	4.13	453	28.2
OS-2	Hand pump/Raham	6.53	1.42	710	2.79	453	27.8
OS-3	Hot spring/Raham	6.27	0.72	350	1.7	440	44.2
OS-6	Open Well/Kamta	6.92	0.9	450	4.09	473	28.2
OS-7	NTPC solar pump/Kamta	7.01	0.61	300	5.41	474	30.9
OS-8	Hand pump/Kamta	6.45	0.94	460	2.22	474	27.2
OS-9	Open Well/Garilaung	6.67	1.29	640	4.53	465	29.4
OS-10	Tube Well/Garilaung	6.11	0.52	250	4.75	465	31.7
OS-12	Garhi River/Tandwa	7.31	0.27	130	5.34	440	31.5
OS-14	Garhi River/Kasaha DPS	7.79	0.27	130	6.86	451	28.9
OS-15	Open Well/Tandwa	7.55	0.51	250	6.75	456	30.6
OS-16	Open Well/Tandwa	7.39	0.46	230	5.68	457	30.3
OS-17	Open Well/Tandwa	7.54	0.31	150	6.86	456	30.6
OS-20	Handpump/Asnatari	6.76	0.55	270	2.79	432	27.3
OS-21	Handpump	6.27	0.84	420	3.07	453	28.1
OS-22	Handpump	6.44	0.74	370	1.97	449	28
OS-23	Garhi River	7.51	0.26	130	6.15	412	31.8
OS-24	Tubewell/ Inside township	7.96	0.52	260	4.26	454	32.8
OS-25	Tubewell/ Inside plant	6.92	0.69	340	4.42	459	32.1
BIS	AL	6.5-	-	500	-	-	-
Limits		8.5					
	PL	NR	-	2000	-	-	-

AL: acceptable limit; PL: permissible limit in the absence of alternate source; NR: no relaxation; E: Elevation in meters; T: Temperature in degree Celsius



Table 21. Mean concentration of elements obtained in the water samples during the post-monsoon period 2022 from ICP-MS analysis with BIS limits of IS 10500:2012

Parameter	Unit	Site Code												BIS Limits	
		OS-2	OS-3	OS-7	OS-8	OS-10	OS-12	OS-14	OS-16	OS-20	OS-21	OS-22	OS-23	AL	PL
Lithium (Li)	ppm	0.006	0.129	0.064	0.008	0.026	0.013	0.008	0.007	0.015	0.026	0.010	0.002	NS	
Boron (B)	ppm	0.027	0.052	0.038	0.022	0.037	0.042	0.018	0.053	0.029	0.072	0.039	0.027	0.5	1
Aluminium (Al)	ppm	0.080	0.197	0.189	0.192	0.237	0.737	0.713	0.316	0.321	0.429	0.357	0.892	0.03	0.2
Chromium (Cr)	ppm	0.005	0.014	0.021	0.013	0.030	0.023	0.025	0.023	0.022	0.027	0.030	0.023	0.05	NR
Manganese (Mn)	ppm	0.017	0.096	0.302	0.047	0.332	0.054	0.041	0.117	0.158	0.337	0.154	0.046	0.1	0.3
Iron (Fe)	ppm	0.054	0.288	0.205	0.345	0.192	0.557	0.562	0.143	0.283	0.500	1.201	0.623	0.3	NR
Cobalt (Co)	ppm	BDL	BDL	BDL	BDL	BDL	0.001	BDL	BDL	BDL	0.003	0.001	0.001	NS	
Nickle (Ni)	ppm	0.003	0.005	0.006	0.008	0.010	0.011	0.008	0.008	0.009	0.016	0.012	0.008	0.02	NR
Coper (Cu)	ppm	0.009	0.010	0.006	0.009	0.013	0.011	0.009	0.009	0.031	0.020	0.019	0.011	0.05	1.5
Zinc (Zn)	ppm	0.113	0.184	0.150	0.498	0.171	0.162	0.146	0.136	0.393	0.822	0.245	0.108	5	15
Arsenic (As)	ppm	BDL	0.001	0.002	0.001	BDL	0.002	0.001	0.001	0.001	0.001	0.004	0.001	0.01	0.05
Strontium (Sr)	ppm	0.157	0.712	1.457	0.222	0.202	0.188	0.101	0.366	0.796	0.262	1.111	0.151	NS	
Silver (Ag)	ppm	0.003	0.086	0.002	0.018	0.005	0.017	0.006	0.004	0.106	0.291	0.005	0.021	0.1	NR
Cadmium (Cd)	ppm	0.001	BDL	0.002	0.007	0.002	0.003	0.001	0.006	0.001	0.018	0.007	0.002	0.003	NR
Barium (Ba)	ppm	0.060	1.146	0.152	0.193	0.099	0.092	0.049	0.122	0.239	0.148	0.648	0.071	0.7	NR
Mercury (Hg)	ppm	BDL	BDL	BDL	BDL	BDL	0.001	0.001	0.001	BDL	BDL	0.001	BDL	0.001	NR
Lead (Pb)	ppm	0.009	0.005	0.002	0.002	0.018	0.004	0.003	0.017	0.001	BDL	0.058	0.001	0.01	NR
Rhodium (Rh)	ppm	0.121	0.014	0.064	0.087	1.112	1.212	0.023	0.045	1.041	0.325	0.562	1.002	NS	

BDL: Below detection limit; NS: Not specified; NR: No relaxation; AL: Acceptable limit; PL: Permissible limit





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Table 22. Mean concentration of elements (Chloride, Nitrate, Sulphate, and Fluoride) obtained in the water samples during post-monsoon period 2022 from IC analysis compared with BIS limits of IS 10500:2012

Parameter	Unit	Site Code											BIS Limits	
		OS-2	OS-3	OS-7	OS-8	OS-10	OS-14	OS-16	OS-20	OS-21	OS-22	OS-23	AL	PL
Sodium (Na)	ppm	74.37	46.78	33.00	53.45	23.38	18.45	49.24	22.69	67.75	31.00	18.65	NS	
Magnesium (Mg)	ppm	39.62	26.95	25.31	36.62	14.39	12.20	27.37	16.17	20.51	38.41	12.06	30	100
Potassium (K)	ppm	55.45	34.98	33.73	6.79	5.65	2.14	2.96	3.80	26.65	6.36	2.99	NS	
Calcium (Ca)	ppm	40.23	83.65	73.57	112.59	59.32	33.67	58.78	91.21	100.63	97.46	34.88	75	200
Chloride (Cl)	ppm	29.53	21.35	15.56	30.57	16.36	3.84	16.37	12.84	30.59	20.64	10.86	250	1000
Nitrate (NO ₃)	ppm	49.63	1.06	BDL	28.78	19.45	BDL	BDL	5.82	BDL	BDL	BDL	45	NR
Sulphate (SO ₄)	ppm	60.52	11.32	45.25	30.84	25.45	10.52	14.63	15.68	11.71	4.88	8.36	200	400
Fluoride (F)	ppm	BDL	0.89	0.61	BDL	BDL	0.19	0.45	BDL	0.52	0.96	0.26	1	1.5

BDL: Below detection limit; NS: Not specified; NR: No relaxation; AL: Acceptable limit; PL: Permissible limit




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6.6 Overall analysis of results of pre and post monsoon 2021 & 2022 water quality

The pH ranged from 6.40 to 7.57 in pre-monsoon, while in post-monsoon, it varied from 5.81 to 7.98 in the year 2021. However, in the year 2022, pH concentration ranged from 6.22 to 7.96 in pre-monsoon, while in the post-monsoon period ranged from 6.11 to 7.96. In the post-monsoon period of the year 2022, five samples, i.e., OS-10 (6.11), OS-3 (6.27), OS-8 (6.45), OS-21 (6.27), and OS-22 (6.44) shows a slightly acidic nature of water in comparison to BIS (2012) limits. The OS-10 sampling tube well showed a similar trend in 2021 and pre-monsoon 2022. Moreover, in the post-monsoon period of the year 2021, the pH concentration in sample OS-3 (6.32), OS-10 (5.99), and OS-21 (5.81) shows acidic nature of water similar to the post-monsoon period sampling of the Year of 2022. The TDS concentration in the pre-monsoon period ranged from 170 ppm to 623 ppm, whereas it varied from 170 ppm to 770 ppm in the post-monsoon period. Moreover, in the year 2022, the TDS concentration ranged from 60 ppm to 670 ppm in the pre-monsoon period, while in post-monsoon, it ranged from 130 ppm to 710 ppm. Thus, no significant variation in the TDS is seen between the pre- and post-monsoon seasons of years 2021 and 2022. Also, the samples were found well within the permissible limit of BIS (2012) with respect to TDS concentration.

The concentration of heavy metals in the pre- and post-monsoon periods in the years 2021 and 2022 were analysed. Aluminium (Al) and Iron (Fe) had slightly higher concentrations in both the years (2021 and 2022) when compared to BIS (2012) limits for drinking water. This is to be noted that this time the Fe level has reduced significantly as compared to the pre-monsoon period. This could be due to the dilution impact and aggressive purging of the groundwater undertaken during the post-monsoon season. Some of the trace metals show variations while comparing the yearly and seasonal data, such as arsenic (As) and Manganese (Mn).




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In comparison to the BIS (2012) limit, some traces of Arsenic (As) were reported in the post-monsoon period of 2021; however, in the other periods (pre-monsoon 2021, pre- and post-monsoon 2022), Arsenic was not observed or found within the prescribed BIS (2012) limits for drinking water. Mn, Cd, and Pb concentrations reduced significantly in post-monsoon period sampling during both years, showing the dilution impact. Major cations and anions, on the other hand, were studied before and after the monsoon season, and it was noticed that the majority of the ions were within the BIS permissible limit (2012). Although sulfate, fluoride, and nitrate concentrations were marginally higher in a few samples of the pre-monsoon period of 2021, they appear to be diluted in the post-monsoon period of 2021. A similar pattern was also observed for the year 2022. Overall, the geological formations of the area and the presence of coal mines in the near vicinity of the study area could be the possible reason for the presence of some trace metals in water samples.

7 Specific remedial measures based upon the monitoring report of water samples for any deterioration observed during the sampling period

No significant change in the water quality parameters is observed in the study area during the pre- and post-monsoon seasons of the last two years (i.e. 2021 and 2022). The presence of trace metals like Al and Fe is found in some water samples. The Fe was found mainly in the old hand pumps, which seems to be due to rusting of the well casing. The aggressive purging process reduced the Fe level in these sampling points. Aluminium seems to be high due to the geogenic formation of the area and shall be treated for potable water supply. No deterioration trend is observed from Pre-monsoon 2021 to pre-monsoon 2022 in the area.



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8 Identification and delineation of Aquifer geometry, Geological Setup 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 kilometres of geographical area with 29.61% forest area and owns about 40% of the total mineral resources of India (Figure 17). 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, Soapstone, Fire Clay, Coal Bed Methane, Uranium, Phosphorite, Apatite, Quartz, Feldspar, Gold and Pyroxenite are other important minerals available in huge quantities in the state.

As per the EIA report prepared by Vogue Construction & Company Pvt. Ltd., New Delhi, the texture of the soil is generally clay, and sandy clay loam, sandy loam in the North Karanpura district. The clay contains in the soil of the study area varies from 7.2 to 51.2 per cent. The bulk density of soil in the region is found to be 1.24-1.40 g/cm³ 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. The pH of the soil is generally slightly acidic and neutral in a reaction as their pH is in the range of 6.3-7.8, and the electrical conductivity of the soil is 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. The total viable microbial population per gram of soil varied from $37 - 82 \times 10^6$ CFU. Different microflora observed per gram of soil was fungi ($1 - 6 \times 10^4$ CFU), actinomycetes ($1 - 4 \times 10^4$ CFU), rhizobium ($2 - 17 \times 10^4$ CFU) and azotobacter ($2 - 9 \times 10^4$ CFU). The geological map of the North Karanpura coalfield is shown in Figure 18.

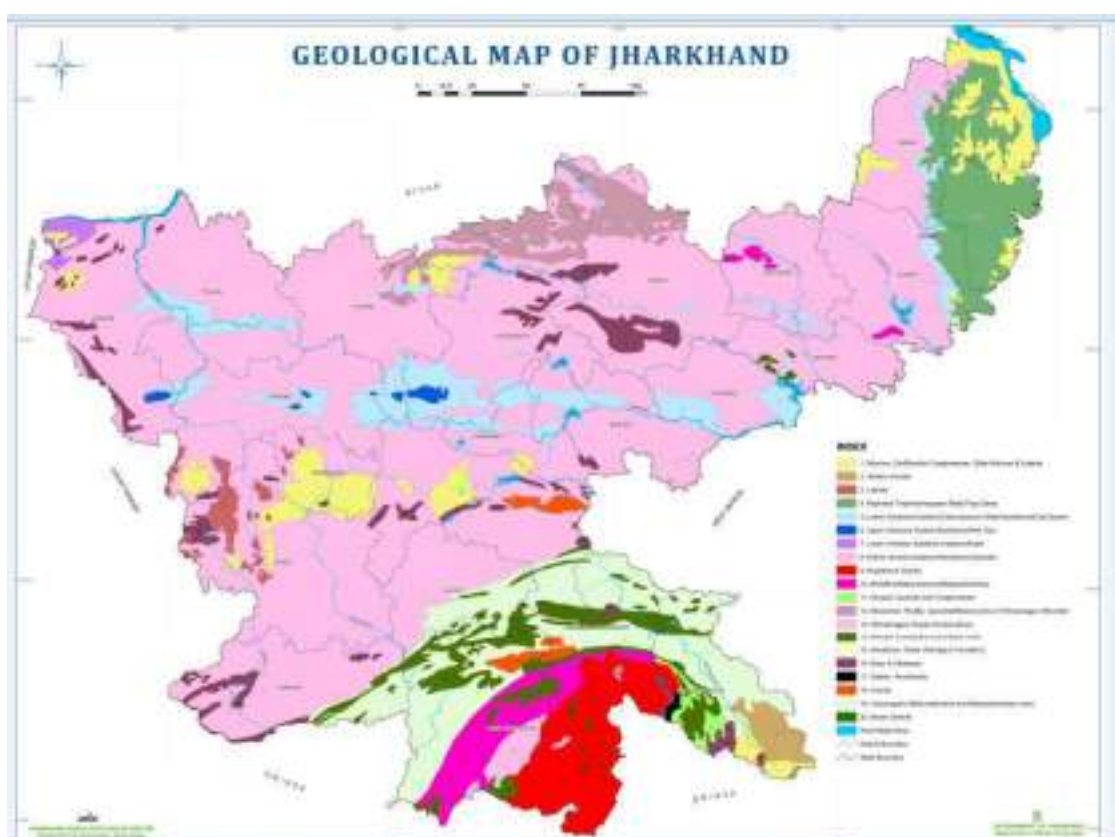


Figure 17. Geological map of Jharkhand (adopted from ismenvis.nic.in)

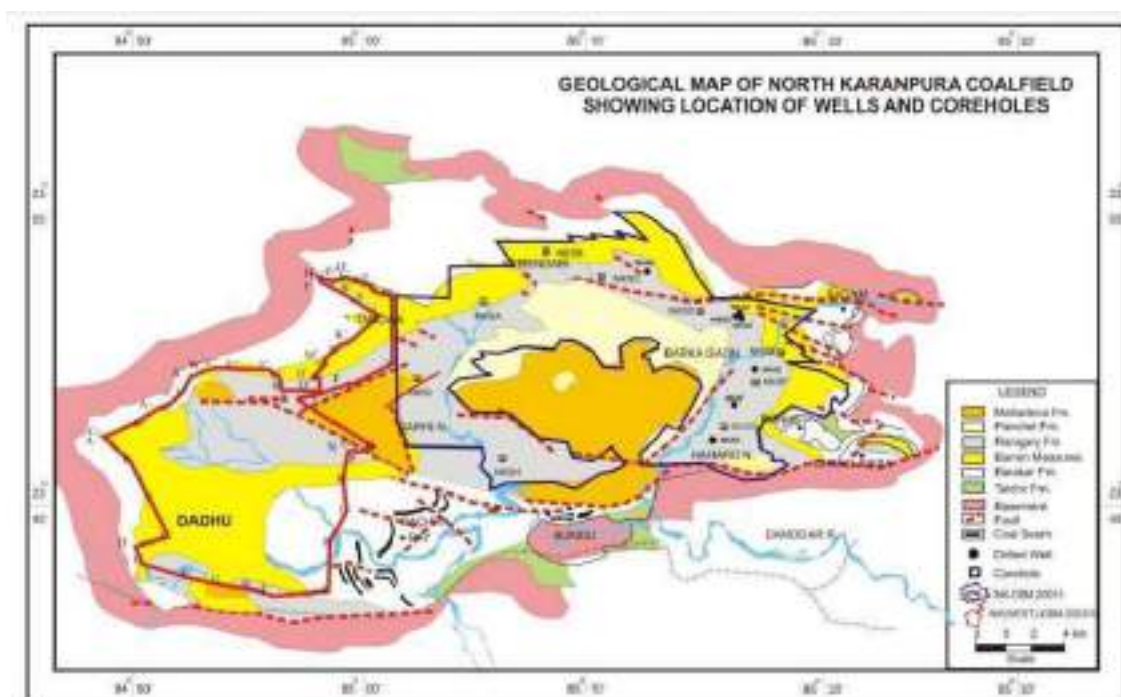


Figure 18. Geological map of North Karanpura coalfield

8.1 Geophysical investigation of the study area

The interpretation of all VES's performed at different sites of NTPC Tandwa during the second field trip has been analyzed using a manual curve matching technique and Zond 1D software. The locations of all VES, along with the nomenclature used in this study area, are listed in Table 23 and shown on the map in Figure 19.

Table 23. VES locations, along with their respective coordinates

Nomenclature	Latitude	Longitude
VES SJ1	23°51' 52" N	84°59' 58" E
VES SJ2	23°50' 24" N	84°59' 45" E
VES SJ3	23°49' 36" N	85°8' E
VES SJ4	23°50' 46" N	85°2' 19" E

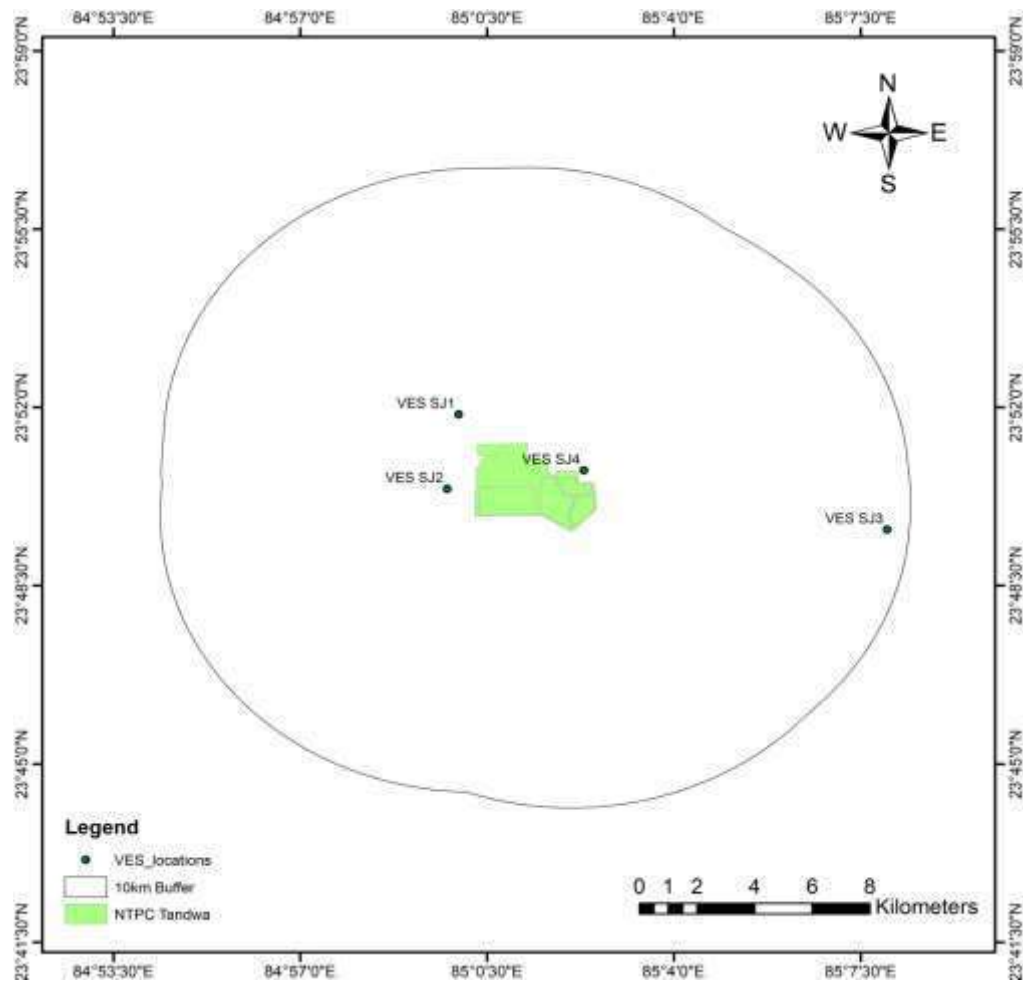


Figure 19. Point location of VES site around plant site

Apparent resistivity vs $AB/2$ plots are obtained from the field and are first plotted on the log paper and matched with a family of master curves and auxiliary curves to obtain the true layer thicknesses and resistivity values. The curves are plotted on a logarithmic scale (Figure 20) and are normalized by plotting the ratio of the apparent resistivity to the resistivity of the first layer (ρ_a / ρ_1) versus the ratio of the electrode spacing to the thickness of the first layer (a / z). Each curve of the family represents a value of the parameter k , which is defined by: $k = (\rho_2 - \rho_1) / (\rho_2 + \rho_1)$. The apparent resistivity for the small spacing is between the electrodes approaches ρ_1 and for the large spacing's

approaches ρ_2 ; these curves start at $\rho_a / \rho_1 = 1$ and asymptotically approach $\rho_a / \rho_1 = \rho_2 / \rho_1$.

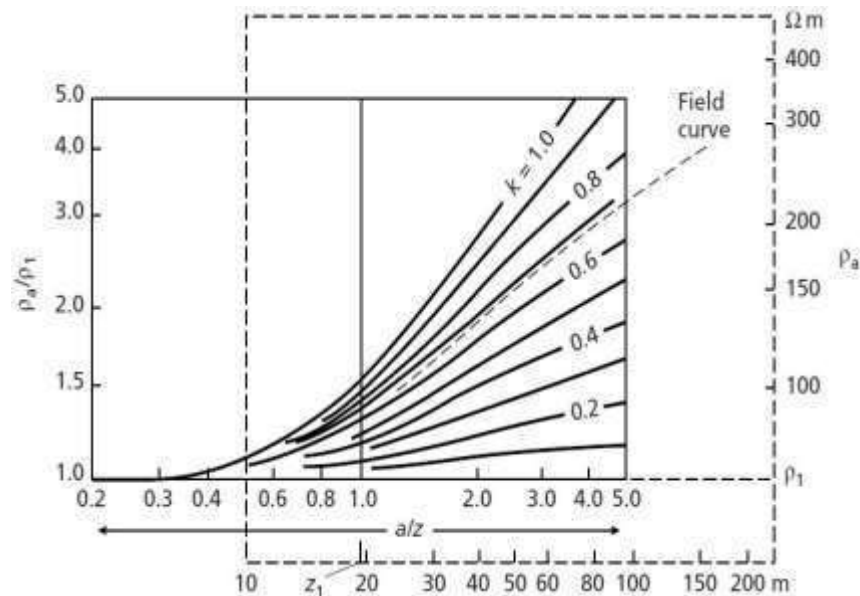


Figure 20. The resistivity of the first layer (ρ_a / ρ_1) versus the ratio of the electrode spacing to the thickness of the first layer (a / z).

Probable layer resistivity and thickness derived both from manual interpretation in log sheets using master curves and from the software were correlated. In manual interpretation, the observed resistivity of a layer and its thickness are considered to be the actual values. The layer thicknesses and resistivity of the other layers are calculated as $\rho_2 = k_1 \rho_{1r}$, $\rho_3 = k_2 \rho_{2r}$, $\rho_4 = k_3 \rho_{3r}$ and so on. For True thickness: h_2/h_{1r} , h_3/h_2 , depth ratios are matched with the depth factors for obtaining the true thickness. Results of all VES along with raw field data collected during field visit is shown below. The p-h-z in the interpreted tables refer to resistivity, layer thickness, and cumulative depth from ground level, respectively. The interpreted results in form of a p-h-z table, data curves (black), type curves (red), and simulated 1D models (red blocks) for each VES are mentioned under the concerned VES site heading. The possible average error in these interpretations is $\pm 3.5\%$ and the average error in measurement of coordinates is $\pm 3\text{m}$. The stratigraphic unit for each sounding data was developed in Rock ware 3d software.

VES SJ1

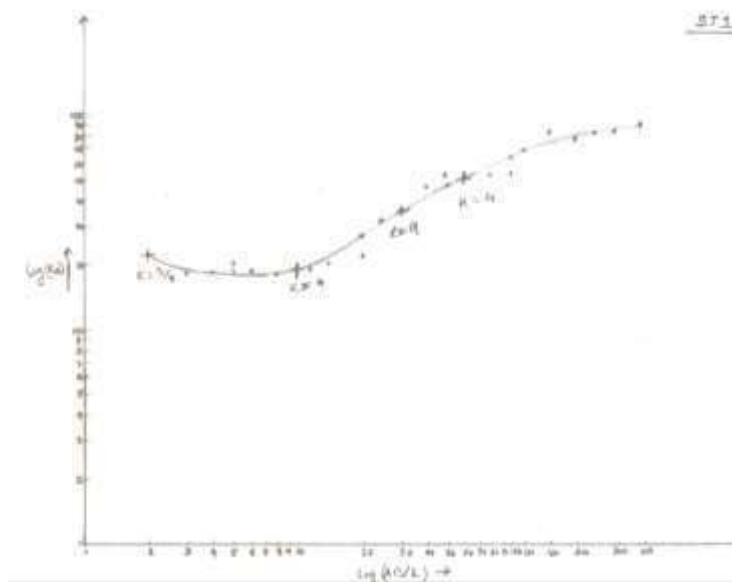
The VES was performed on 27/11/2021 near DPS School Sharadhu. The site is in the NW direction of the plant and observed data are listed in Table 24. During the field investigation, it is revealed that the groundwater table is at 40 ft but bores in the area are about 160-180 ft. The area contains primarily quaternary alluvium sandstones and granite gneiss. Potential water-bearing strata are indicated at a depth of 14.62 m. From both the manual and software-based analysis, the resistivities of the subsurface areas were observed to vary between 15-200 ohmmeters. A typical HA type curve (Figure 21 & Figure 22) is observed from the sounding data collected in the field. The last layer is considered to be of infinite thickness in the case of manual interpretation. The data obtained from both analyses correlate well and is within the comparable limit. A depth of about 150 m was analyzed from this sounding. From the resistivity values, the probable stratigraphic succession has been constructed as shown in Figure 23 and probable lithology based on resistivity and layer thickness at site SJ1 as listed in Table 25.

Table 24. Field survey data collection from location SJ1

Date	11/27/2021	Station No.	SJ1	Sounding No.	SJ1
Latitude	23°51' 52" N	Longitude	84°59' 58" E		
Locality	Near DPS School (Sharadhu)				
S. No.	AB/2	MN/2	Resistance (Ω)	Kq	App. Res. (Ω m)
1.	2	0.5	1.95	11.78	22.97
2.	3	0.5	0.69	27.49	18.83
3.	4	0.5	0.38	49.48	18.95
4.	5	0.5	0.25	77.75	19.28
5.	5	1	0.55	37.70	20.85
6.	6	1	0.35	54.98	19.13
7.	8	1	0.19	98.96	18.60
8.	10	1	0.12	155.51	18.66
9.	10	2	0.25	75.40	18.93
10.	12	2	0.18	109.90	19.30

11.	15	2	0.12	173.57	20.27
12.	20	2	0.07	311.02	22.61
13.	20	4	0.18	150.80	27.58
14.	25	4	0.13	239.15	31.97
15.	30	4	0.10	347.15	36.28
16.	40	4	0.07	622.04	46.34
17.	50	4	0.06	975.46	53.65
18.	50	10	0.12	376.99	45.35
19.	60	10	0.09	549.78	50.25
20.	80	10	0.05	989.60	53.64
21.	100	10	0.03	1555.09	53.81
22.	100	20	0.08	753.98	63.33
23.	120	20	0.06	1099.56	68.94
24.	160	20	0.04	1979.20	81.15
25.	200	20	0.02	3110.18	76.82
26.	200	40	0.05	1507.96	77.66
27.	250	40	0.03	2391.54	81.31
28.	300	40	0.02	3471.46	82.97
29.	350	40	0.02	4747.73	83.32
30.	400	40	0.01	6220.35	90.20

a) Manual Interpretation



Resistivity (Ωm)

ρ_1	23
ρ_2	9.85
ρ_3	76
ρ_4	116
ρ_5	200

Layer Thickness (m)

h_1	2
h_2	12
h_3	30
h_4	45

Figure 21. Log sheet plot of apparent resistivity versus current electrode spacing for site SJ1

b) Software Interpretation

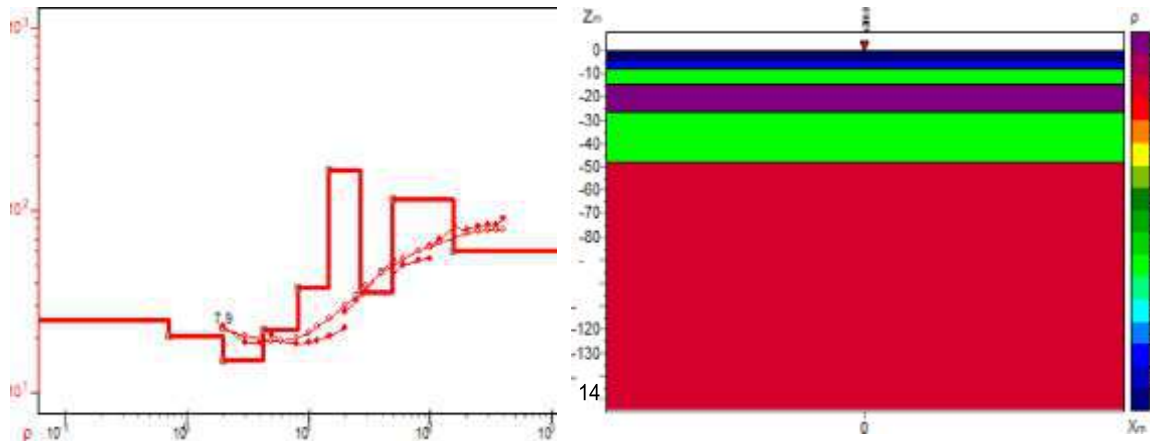


Figure 22. Model derived interpolated layer thickness and resistivity for site SJ1

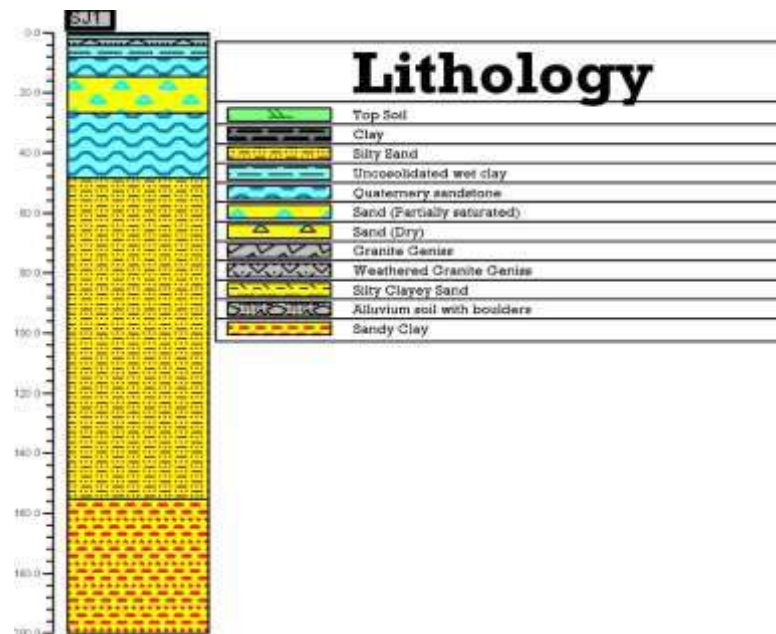


Figure 23. Stratigraphic representation of site SJ1


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Table 25. Probable lithology based on resistivity and layer thickness at site SJ1

p	h	z	Probable Lithology
24.97	0.71	0/0	Top Soil, Clay with boulders
20.48	1.26	0.71	Unconsolidated wet clay
15.15	2.26	1.97	Alluvium soil with boulders
21.93	3.92	4.22	Unconsolidated wet clay
37.80	6.48	8.14	Quaternary and Miocene sandstone (potential water bearing strata)
167.0 1	12.02	14.62	Sand (Partially Saturated)
35.73	21.70	26.64	Quaternary and Miocene sandstone, silty sand
115.6 1	106.9 5	48.34	Silty Sand
60.30		155.2 9	Sandy Clay (Potential Aquifer)

VESJ2

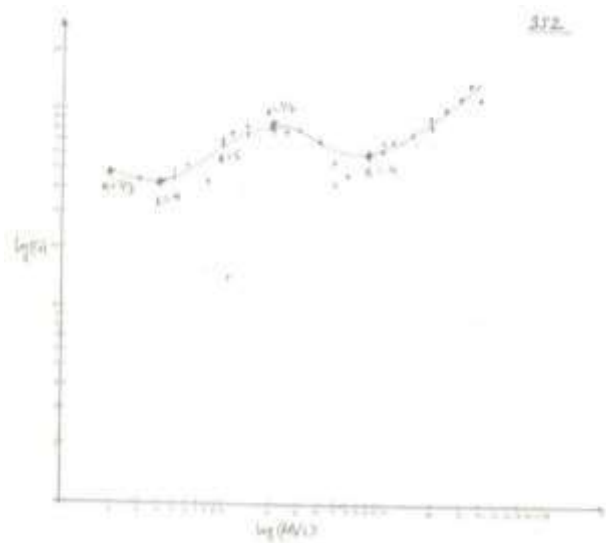
The VES was performed on 27/11/2021 near Kamta Village. The site is on the Westside of the plant and observed data are listed in Table 26. Typical HA, KQ, and HA type curves (Figure 24 & Figure 25) are obtained from the sounding performed in this area. The presence of HA-type curves is common in water-bearing formations, while the KQ combination is representative of impermeable and compacted strata (granite gneiss). The observations have been represented in the form of stratigraphic succession in Figure 26. The probable water-bearing quaternary sandstone unit lies within 15-30 m depth. Probable lithology based on resistivity and layer thickness at site SJ2 is listed in Table 27.



Table 26. Field survey data collection from location SJ2

Date	11/27/2021	Station No.	SJ2	Sounding No.	SJ2
Latitude	23°50' 24" N	Longitude	84°59' 45" E		
Locality	Kamta Village				
S. No.	AB/2	MN/2	Resistance (Ω)	Kq	App. Res. (Ωm)
1.	2	0.5	4.21	11.78	49.59
2.	3	0.5	1.64	27.49	45.06
3.	4	0.5	0.88	49.48	43.44
4.	5	0.5	0.60	77.75	46.42
5.	5	1	1.29	37.70	48.56
6.	6	1	0.96	54.98	52.78
7.	8	1	0.44	98.96	43.74
8.	10	1	0.43	155.51	67.18
9.	10	2	0.93	75.40	70.27
10.	12	2	0.70	109.90	77.26
11.	15	2	0.48	173.57	83.14
12.	20	2	0.26	311.02	81.49
13.	20	4	0.57	150.80	86.26
14.	25	4	0.33	239.15	79.40
15.	30	4	0.20	347.15	70.12
16.	40	4	0.10	622.04	60.65
17.	50	4	0.05	975.46	52.77
18.	50	10	0.11	376.99	42.45
19.	60	10	0.09	549.78	47.34
20.	80	10	0.06	989.60	60.86
21.	100	10	0.04	1555.09	62.98
22.	100	20	0.91	753.98	688.38
23.	120	20	0.07	1099.56	71.69
24.	160	20	0.04	1979.20	77.58
25.	200	20	0.03	3110.18	83.35
26.	200	40	0.06	1507.96	93.80
27.	250	40	0.04	2391.54	105.23
28.	300	40	0.04	3471.46	122.54
29.	350	40	0.03	4747.73	147.18
30.	400	40	0.02	6220.35	120.67

a) Manual Interpretation



Resistivity (Ωm)

ρ_1 48

ρ_2 32

ρ_3 168

ρ_4 320

ρ_5 44

ρ_6 248

Layer Thickness (m)

h_1 1.9

h_2 3.04

h_3 8.8

h_4 15

h_5 80

Figure 24. Log sheet plot of apparent resistivity versus current electrode spacing for site SJ2

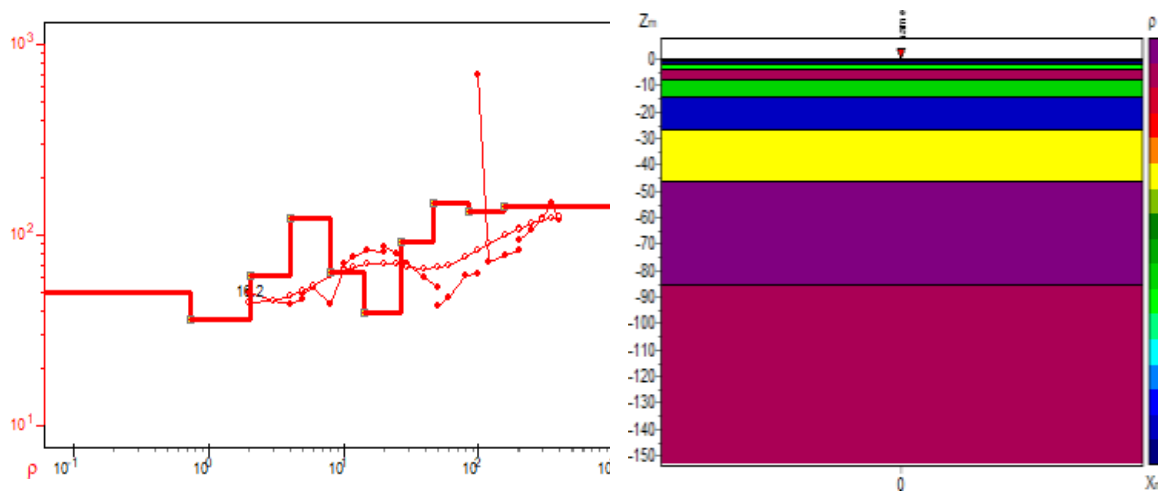


Figure 25. Model derived interpolated layer thickness and resistivity for site SJ2

Table 27. Probable lithology based on resistivity and layer thickness at site SJ2

p	h	z	Probable Lithology
50.03	0.73	0/0	Alluvial sand, any coal ore
36.21	1.33	0.73	Quaternary Sandstone
60.90	2	2.06	Silty Sand, coal presence
122.06	4.04	4.06	Sand (Dry)
64.28	6.26	8.10	Alluvial soil with boulders, coal ore presence
39.06	12.50	14.36	Quaternary Sandstone
91.73	19.67	26.86	Silty sand
146.67	38.65	46.53	Sand (Dry)
132.23	68.71	85.18	Weathered granite gneiss
141.43		153.89	Granite gneiss

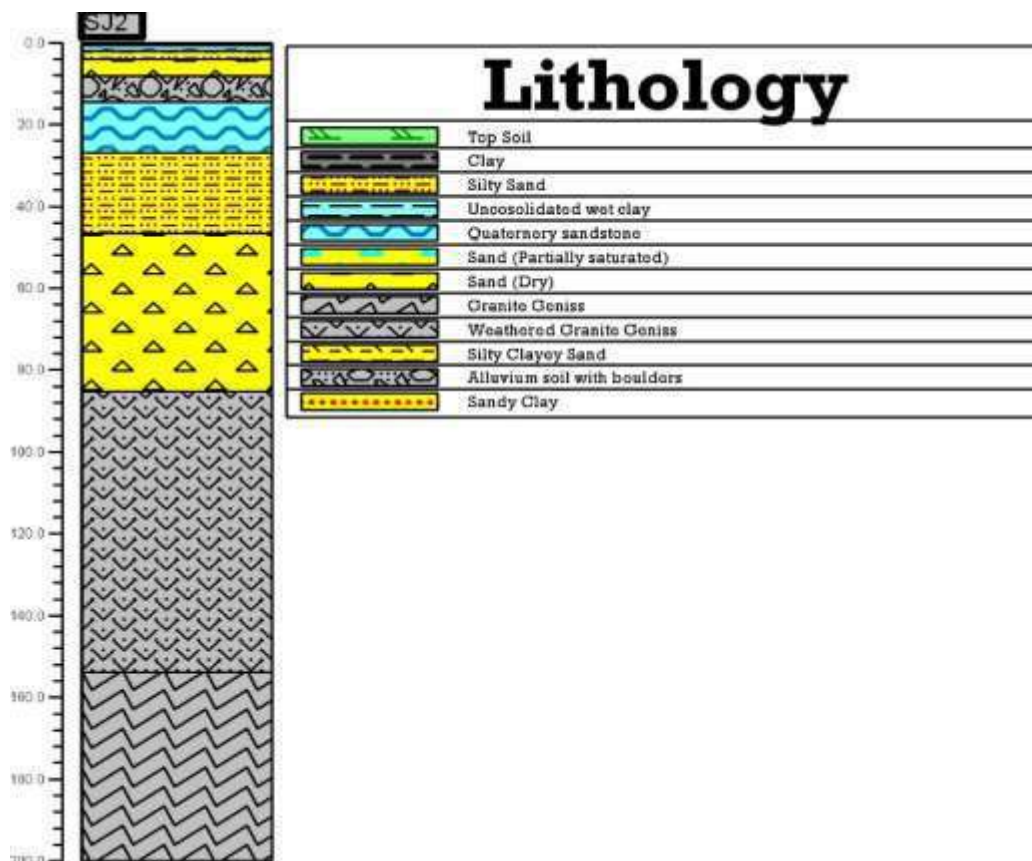


Figure 26. Stratigraphic representation of site SJ2

VES SJ3:

The VES was performed on 27/11/2021 in Raham Tarwaria peper. The site is in the south of the plant location observed data are listed in Table 28. Typical QH, HA type curves (Figure 27 & Figure 28) were obtained from the sounding performed in this area. Probable litho units up to a depth of about 160 m were delineated based on the interpreted resistivity data. The presence of intercalated sand and clay units was observed based on the computation results. The water-bearing quaternary sandstone formation lies within a depth of about 4.12 m bgl (Figure 29). Probable lithology based on resistivity and layer thickness at site SJ3 listed in

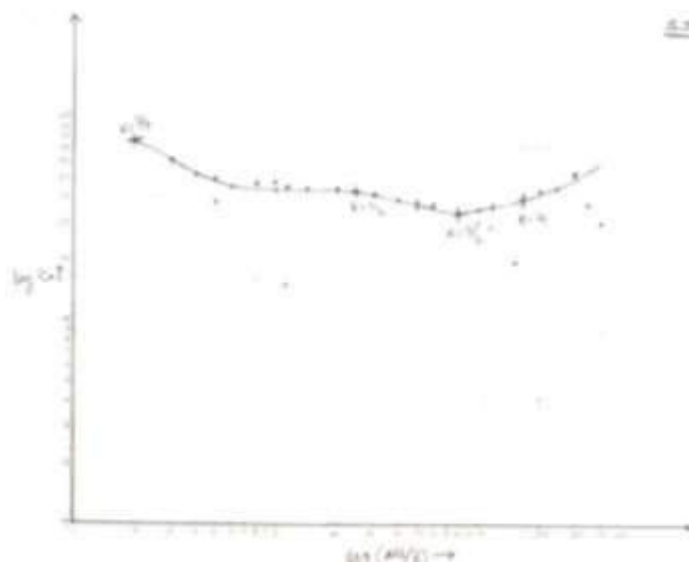
Table 29.

Table 28. Field survey data collection from location SJ3

Date	11/27/2021	Station No.	SJ3	Sounding No.	SJ3
Latitude	23°49' 36" N	Longitude	85°8' E		
Locality					
S. No.	AB/2	MN/2	Resistance (Ω)	Kq	App. Res. (Ωm)
1.	2	0.5	6.57	11.78	77.39
2.	3	0.5	2.27	27.49	62.40
3.	4	0.5	1.07	49.48	53.14
4.	5	0.5	0.64	77.75	49.92
5.	5	1	1.03	37.70	38.85
6.	6	1	0.85	54.98	46.68
7.	8	1	0.48	98.96	47.40
8.	10	1	0.31	155.51	47.90
9.	10	2	0.61	75.40	45.99
10.	12	2	0.42	109.90	46.27
11.	15	2	0.26	173.57	45.48
12.	20	2	0.14	311.02	45.00
13.	20	4	0.30	150.80	44.49
14.	25	4	0.18	239.15	43.43
15.	30	4	0.12	347.15	41.76
16.	40	4	0.06	622.04	39.69
17.	50	4	0.04	975.46	36.48

18.	50	10	0.10	376.99	38.00
19.	60	10	0.07	549.78	37.17
20.	80	10	0.03	989.60	34.24
21.	100	10	0.02	1555.09	30.12
22.	100	20	0.05	753.98	35.96
23.	120	20	0.03	1099.56	29.14
24.	160	20	0.01	1979.20	19.53
25.	200	20	0.00	3110.18	4.20
26.	200	40	0.03	1507.96	44.79
27.	250	40	0.02	2391.54	45.08
28.	300	40	0.01	3471.46	32.11
29.	350	40	0.01	4747.73	37.84

a) Manual Interpretation



Resistivity (Ωm)

ρ_1 76

ρ_2 32.57

ρ_3 22

ρ_4 51

ρ_5 152

Layer Thickness (m)

h_1 2

h_2 30

h_3 76

h_4 66

Figure 27. Log sheet plot of apparent resistivity versus current electrode spacing for site SJ3

b) Software Interpretation

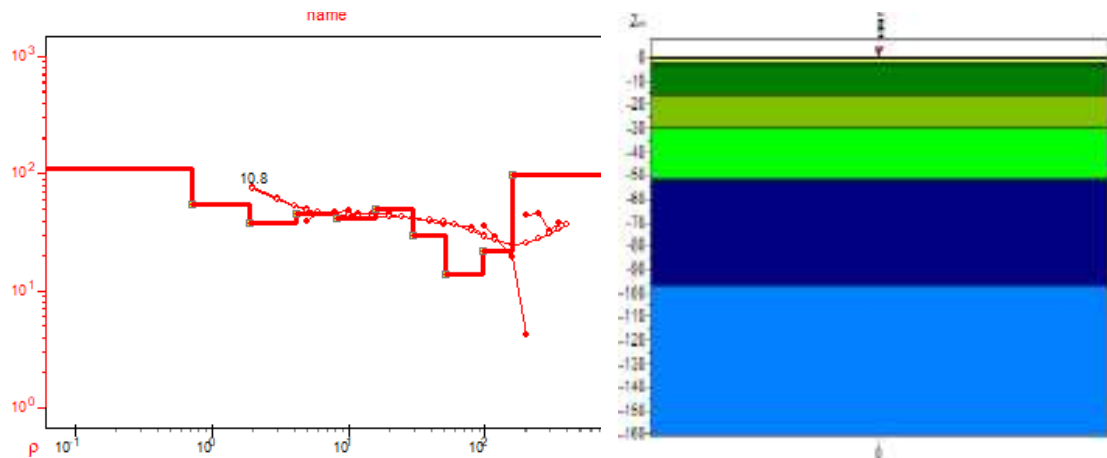


Figure 28. Model derived interpolated layer thickness and resistivity for site SJ3

Table 29. Probable lithology based on resistivity and layer thickness at site SJ3

p	h	z	Probable Lithology
109.3 9	0.72	0/0	Sand (Dry)
55.64	1.15	0.72	Alluvium Sand with boulders
38.57	2.24	1.88	Quaternary Sandstone
45.51	4.08	4.12	Silty Sand
41.01	7.49	8.19	Silty Sand
49.52	14.07	15.68	Silty Clayey Sand
29.57	22.16	29.75	Clay
13.89	44.80	51.91	Unidentified (Clay mixed with some conductive ore)
21.85	64.33	96.71	Unconsolidated wet clay
97.90		161.0 4	Sandstone, Sand (Dry)

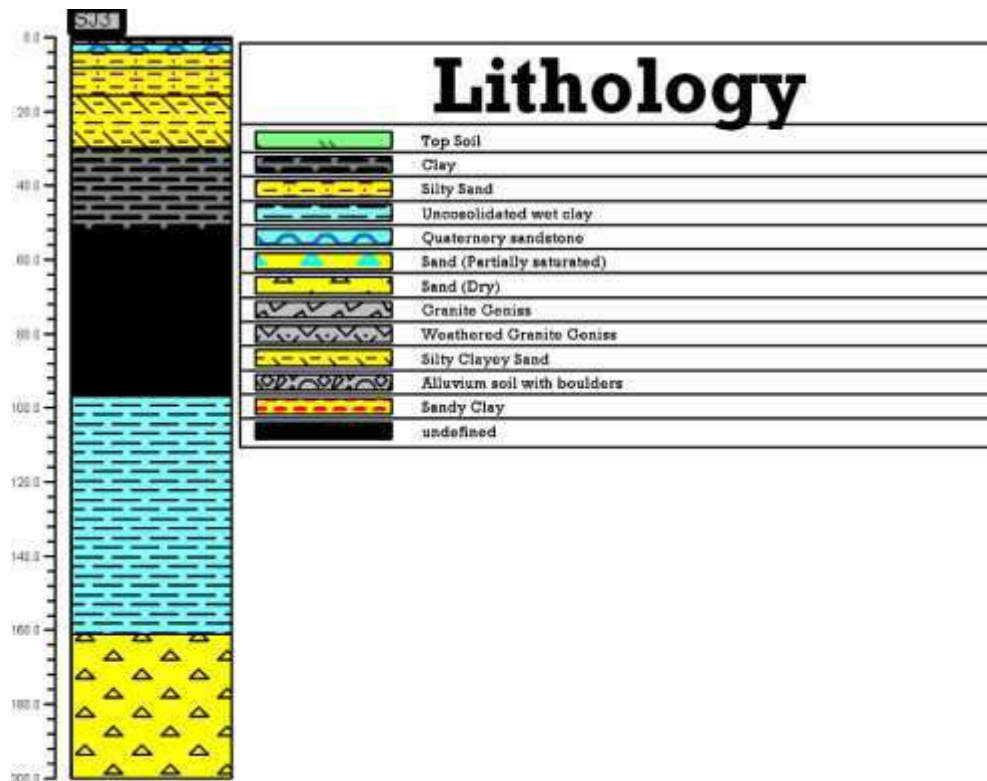


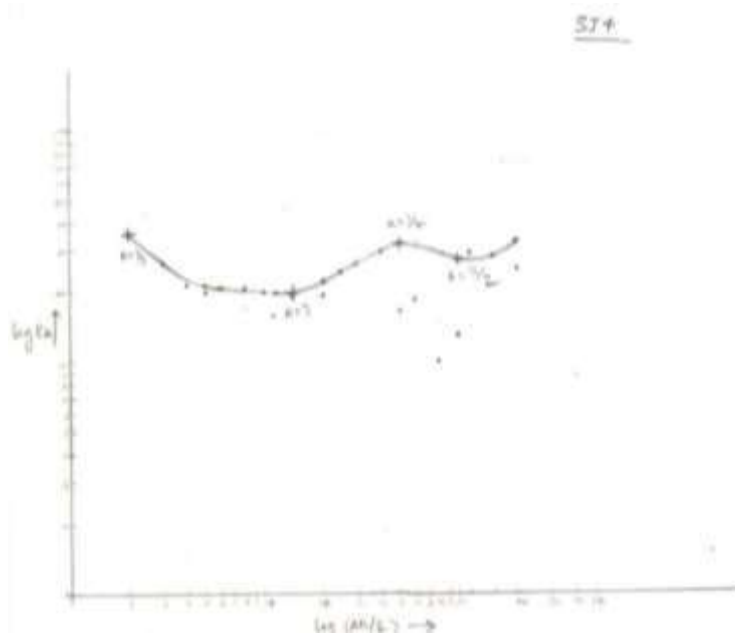
Figure 29. Stratigraphic representation of site SJ3

VES SJ4: The VES was performed near Nayi Param Village. The site is in the east direction of the plant near the reservoir and observed data are listed in Table 30. Sounding curves show the presence of two water-bearing zones (H-A-H Combination Figure 30 & Figure 31). On comparing the same with the surrounding lithology data, the probable litho units were correlated with the findings from this survey. There is the presence of silty sand and unconsolidated wet clay at depths of 5-20m and 50-80m respectively. But possible water-bearing horizon can be within the silty sand layers, because the clayey horizon is of very low permeability. Beyond current electrode spacing of 200m negative values were encountered which could be possibly due to the presence of underground metallic units, contact resistance offered by the electrodes or wet sand. Probable lithology based on resistivity and layer thickness at site SJ4 is listed in Table 31 and the Stratigraphic representation of site SJ4 is shown in Figure 32.

Table 30. Field survey data collection from location SJ4

Date	11/27/2021	Station No.	SJ4	Sounding No.	SJ4
Latitude	23°50' 46" N	Longitude	85°2' 19" E		
Locality	Nayi Param (East of the plant)				
S. No.	AB/2	MN/2	Resistance (Ω)	Kq	App. Res. (Ωm)
1.	2	0.5	3.06	11.78	36.05
2.	3	0.5	0.99	27.49	27.33
3.	4	0.5	0.46	49.48	22.51
4.	5	0.5	0.27	77.75	20.84
5.	5	1	0.58	37.70	21.90
6.	6	1	0.39	54.98	21.22
7.	8	1	0.22	98.96	21.38
8.	10	1	0.13	155.51	20.95
9.	10	2	0.27	75.40	20.51
10.	12	2	0.18	109.90	20.01
11.	15	2	0.11	173.57	19.53
12.	20	2	0.06	311.02	19.87
13.	20	4	0.15	150.80	23.18
14.	25	4	0.10	239.15	24.90
15.	30	4	0.08	347.15	27.08
16.	40	4	0.05	622.04	30.29
17.	50	4	0.03	975.46	32.97
18.	50	10	0.05	376.99	17.53
19.	60	10	0.03	549.78	19.08
20.	80	10	0.01	989.60	10.14
21.	100	10	0.01	1555.09	14.00
22.	100	20	0.04	753.98	28.43
23.	120	20	0.03	1099.56	29.69
24.	160	20	0.01	1979.20	28.94
25.	200	20	0.01	3110.18	24.10
26.	200	40	0.01	1507.96	15.89
27.	250	40	0.00825 (-ve)	2391.54	-
28.	300	40	0.012 (-ve)	3471.46	-

a) Manual Interpretation



Resistivity (Ωm)

ρ_1 36

ρ_2 12

ρ_3 60

ρ_4 16.5

ρ_5 42

Layer Thickness (m)

h_1 2

h_2 24

h_3 52

h_4 52.5

Figure 30. Log sheet plot of apparent resistivity versus current electrode spacing for site SJ4

b) Software Interpretation

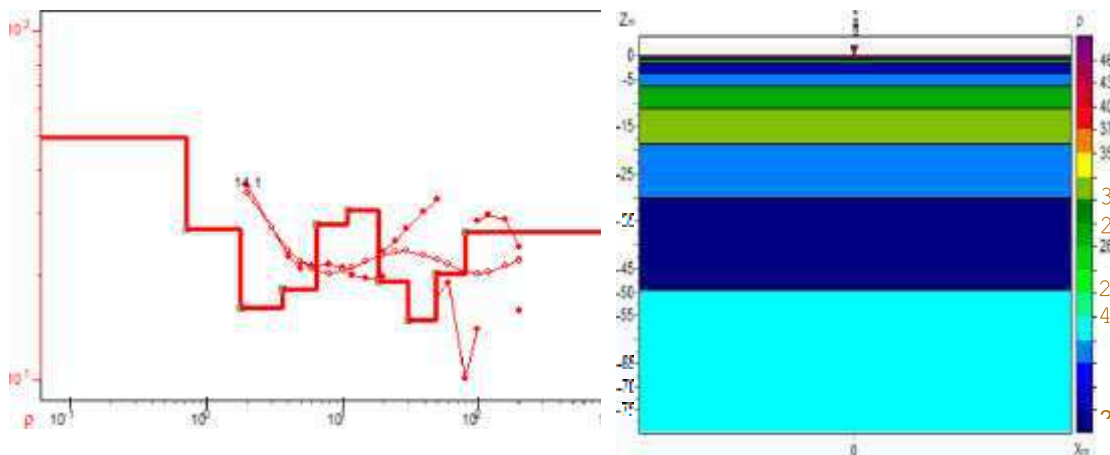


Figure 31. Model derived interpolated layer thickness and resistivity for site SJ4

Table 31. Probable lithology based on resistivity and layer thickness at site SJ4

p	h	z	Probable Lithology
49.28	0.72	0/0	Silty Clayey Sand
27.07	1.06	0.72	Unconsolidated wet clay
16.22	1.81	1.78	Clay
18.19	2.88	3.60	Clay
28	4.59	6.48	Silty sandy clay
30.78	7.48	11.07	Silty sand
19.10	11.63	18.55	Unconsolidated wet clay
14.81	19.33	30.18	Alluvium sand
20.11	30.45	49.50	Unconsolidated wet clay
26.71		79.95	Quaternary Sandstone

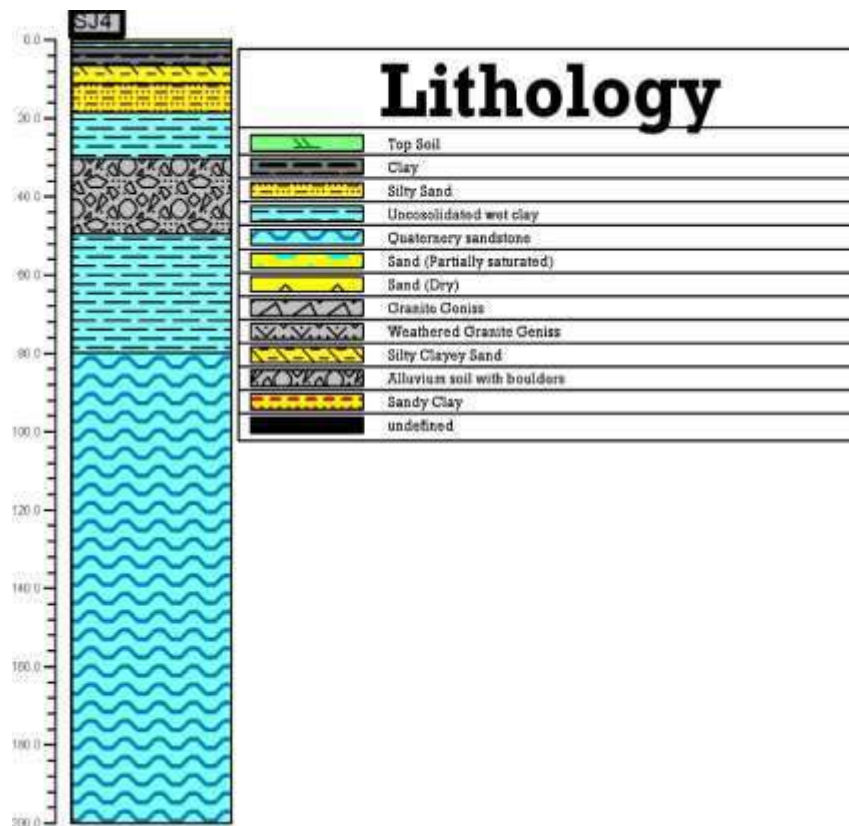



Figure 32. Stratigraphic representation of site SJ4

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8.2 Pump and recovery test analysis

The pumping test is a method to determine the characteristic of the water-bearing formation. The commonly used pumping test is the constant-rate pumping in which the control well is pumped at a constant rate, and pumping water-level response (drawdown) is measured in one or more surrounding observation wells. The data obtained from the pumping test are used to estimate the hydraulic properties of the aquifer. The pumping test was conducted, followed by the recovery test in the study area. The recovery test is used as an independent check for transmissivity obtained during the pumping test, as shown in Figure 33 and Figure 34. The straight-line plot of drawdown (s) versus time (t) is plotted on the semi-logarithmic paper for the observed data, showing transmissivity (T) of the formation as 70.76 m²/day and **storativity as 8.84 x 10⁻⁵**. The recovery test of the data shows a comparable T value. It is to be noted that the hydrogeological parameters obtained in these tests are related to the aquifer media. The properties of the vadose zone and other confining layers of the subsurface control the movement of surface water to the underlying groundwater resources and its subsequent movement predominantly in the down gradient side. Additional infiltration tests are proposed here to investigate the properties of the unsaturated zone.



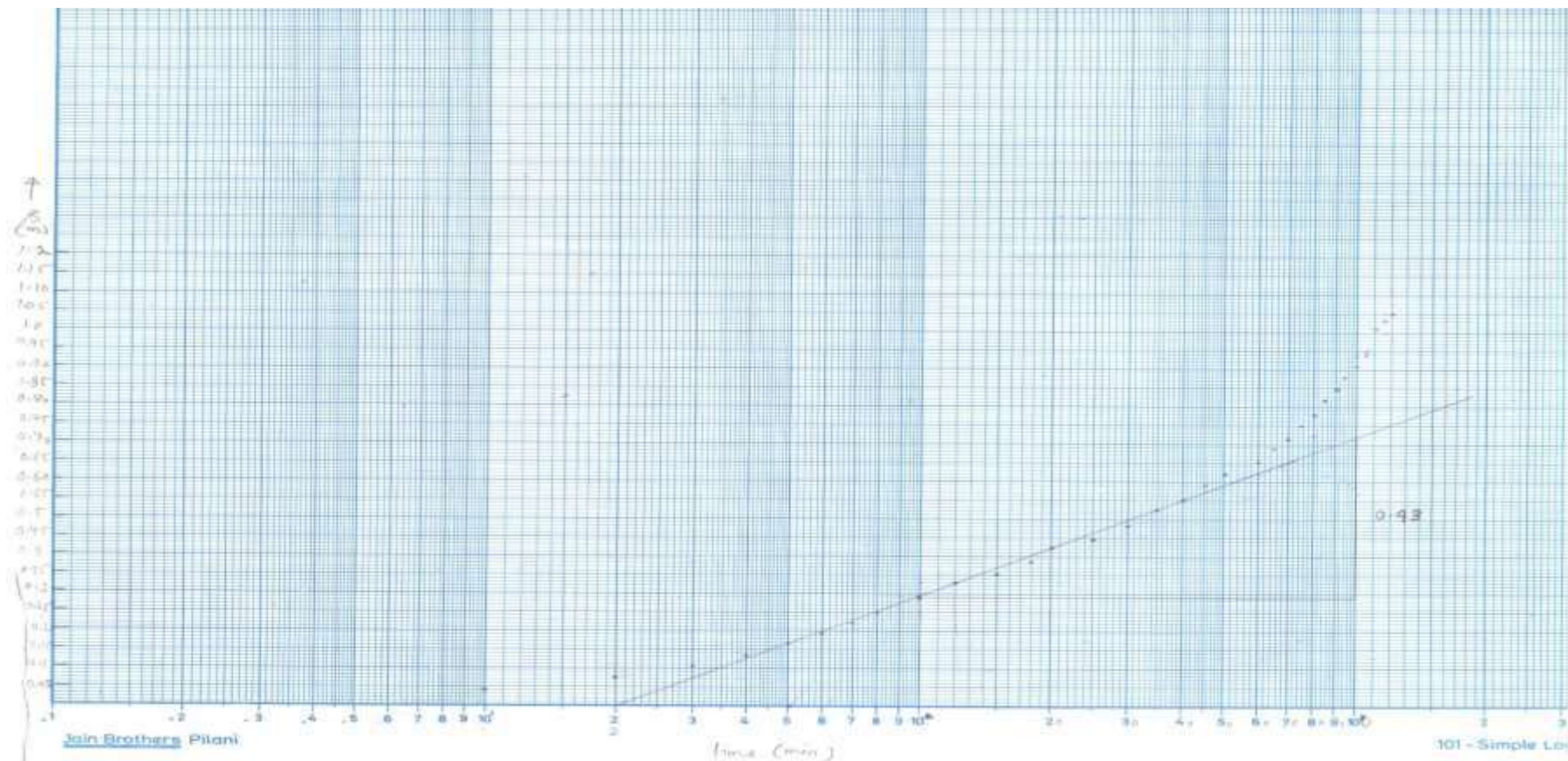


Figure 33. Pumping test data for determination of aquifer parameters

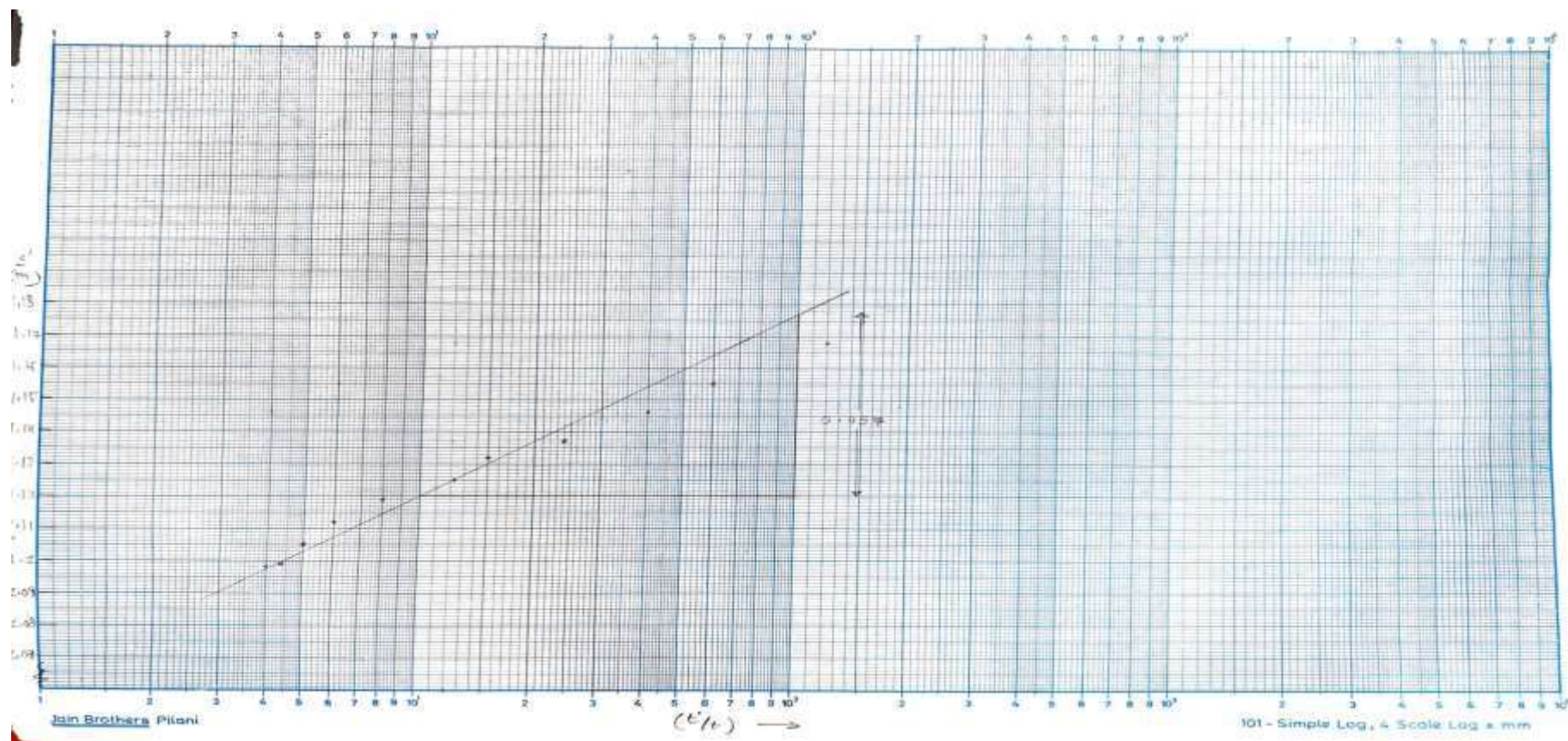


Figure 34. Recovery test data plot.



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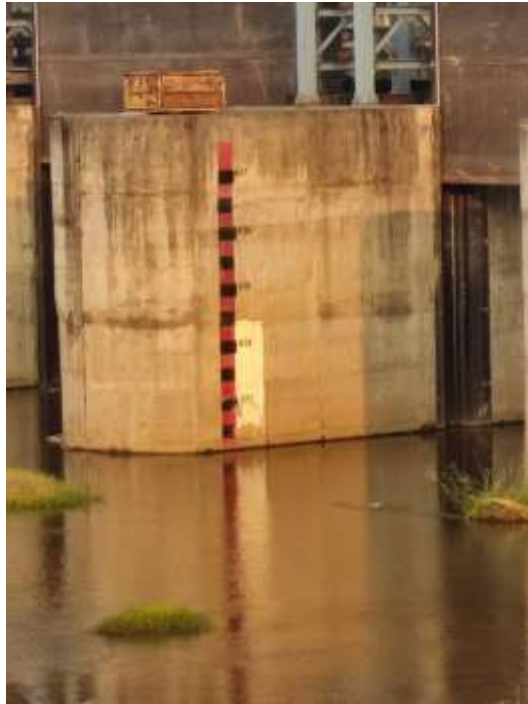
Appendix-A: Photographs of sampling sites around NTPC North Karanpura (Tandwa), along with geographic coordinates





Water Sampling Sites (Ground and Surface water)					
S.no	Site name	Coordinates		Location Photograph	Remarks
		Latitude	Longitude		
1	OS-1	23°49'29.46"	85°0'31.86"		Open well Raham Village
2	OS-2	23°49'28.68"	85°0'33.66"		Bittu Pandey Handpump (Indiamarka) Raham Village
3	OS-3	23°49'16.14"	85°0'16.92"		Hot Water Spring, Raham Village







4	OS-4	23°49'30"	85°0'12.96"		Sammuddin Ansari well, Raham Village
5	OS-5	23°49'30.9"	85°0'14.52"		Server Ansari Well, Well Test done here, Raham Village
6	OS-6	23°51'2.22"	85°0'13.98"		Zahur Mia' s Well (Kamta Village)




7	OS-7	23°51' 0.00"	85°0'12.48"		NTPC solar pump, Kamta Village
8	OS-8	23°50'46.86"	85°0'2.88"		Abdul Rehman Handpump (IM), Kamta village (West)
9	OS-9	23°51'29.7"	85°0'40.98"		Upender Yadav Well, Garhilog village

10	OS-10	23°51'29.7"	85°0'40.98"		Tubewell, Near to OS-9, Garhlong village, south-west to the NTPC plant
11	OS-11	23° 51' 18.34"	85° 2' 6.13"		Barrage





12	OS-12	23°51'24.28"	85° 2'0.10"		Near barrage, Tandwa market
13	OS-13	23°51'10.08"	85°1'56.52"		Binod Malakar well, Tandwa village, neem chowk
14	OS-14	23°51'53.64"	85°0'7.17"		Garhi river Upstream (near DPS School, Kasaha)
15	OS-15	23°50'49.92"	85°1'46.74"		Rajendra Rana Well, Tandwa

16	OS-16	23°50'51.54"	85°1'41.82"		Chamar Paswan well, Tandwa
17	OS-17	23°50'45.78"	85°1'46.86"		Near Joda Lake, Tandwa
18	OS-18	23°50'54.42"	85°1'33.3"		Well discarded, Parking area created (Near Falgu Quarter, inside township)

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19	OS-19	23°50'54.42"	85°1'33.3"		Inside plant borewell Near OS-18
20	OS-20	23°48'45.72"	85°1'33.528"		Indiamarka Handpump (Adjacent to the main road), Asnatari
21	OS-21	23°47'40.74"	85°1'15.744"		Indiamarka Handpump (Akash Surao), Samidhi village



22	OS-22	23°46'28.524"	85°1'28.272"		Rajkiya Madhya Vidyalaya, Mander (inside school)
23	OS-23	23°47'24.396"	85°2'35.59"		Garhi river downstream (Chora village)
24	OS-24	23°50'52.1"	85°01'31.4"		Near Annapurna mess, inside township
25	OS-25	23°50'50.2"	85°01'00.4"		Inside Plant Tubewell, Near Visvesvaraya bhawan (NTPC office)



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Social Impact Assessment Study

NTPC North Karanpura

January 2022



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List of Abbreviations

CSR	Corporate Social Responsibility
R&R	Resettlement and Rehabilitation
CD	Community Development
FGD	Focus Group Discussion
NAS	Need Assessment Survey
PHC	Primary Health Care
SIE	Socio-Impact Evaluation
IDI	In-Depth Interview
INR	Indian National Rupee
OECD DAC	Organization for Economic Co-operation and Development (OECD) Development Assistance Committee
SDGs	Sustainable Development Goals
SDI	Sustainable Development Indicator
WHO	World Health Organization
PAP	Project Affected Population

Executive Summary

Executive Summary

Since the application of mandatory CSR provision in 2014, CSR spending by Corporate India has increased significantly. Along with increasing their CSR spending, the companies are also taking up innovative projects and demonstrating novel ways of addressing social issues. These projects are then replicated or scaled up through investment from the Government. NTPC, being a responsible corporate has taken this opportunity to integrate CSR into its strategy. CSR forms an integral part of NTPC's culture. Social welfare is largely directed towards the communities residing in the vicinity of its plants. NTPC adopted a holistic approach and focused on overall development of the community by looking at each of the major development sectors including education, health, water, skill development and overall community infrastructure. Along similar lines, NTPC Karanpura has been conducting R&R-CD activities for people residing near the power station. Major activities include provision of infrastructural support (construction of school buildings, classrooms, toilet blocks, boundary walls, etc.), provision of books and school bags to students, installation of RO water plants in villages for improved access to safe drinking water, organizing health camps, mobile health care units, support to PHCs to improve access to affordable health facilities, conducting trainings for the youth to improve their employability, among several others.

For the purpose of this study, KPMG adopted a 'mixed method' approach (qualitative and quantitative). Review of documents and data provided by the program team was undertaken to understand the objective and coverage of the program. Subsequently, field visits were carried out in the 6 project villages in Chatra district for data collection from the beneficiaries and other relevant stakeholders. A statistical approach was adopted to decide on the sample size. In total, 394 beneficiaries were surveyed as part of this project. This sample had a proportionate representation of beneficiaries from all age groups and across genders and caste (Scheduled caste, scheduled tribe, and other backward class). KPMG used the OECD DAC framework for developing the research tools (questionnaires for quantitative and qualitative surveys) and evaluating the impact created.

Key Impact

Based on analysis of primary data collected from beneficiaries and stakeholders, it was found that the R&R-CD activities carried out by NTPC have created positive impact on focus area. The R&R-CD interventions have created a positive impact on several indicators across sectors including attendance, regularity, and enrolment levels of the children, access to affordable health care services and reduced incidence of diseases, access to safe and reliable water, improved skills and confidence level through skill development trainings, improved connectivity to rural infrastructure, improved sense of safety after dark, etc. Around 32% beneficiaries surveyed shared that enrolment of girls have increased post the intervention. During stakeholder interactions, the attendance rate for children in treatment villages was reported to be approximately 78%, whereas attendance rate for control group stands at 75%. This impact has been created through provision of various amenities to students in school like desk and benches, books, school shoes and socks, to the children, sanitary napkins to school-going girls and other infrastructural support. Amongst the beneficiaries surveyed, 37% shared that there has been a reduction in overall dropout rate in schools as well as decrease in dropout rate of girls in particular.

Basis interactions with key stakeholder, it was noted that the dropout rate in treatment villages stands at 8% whereas control group villages had a dropout rate of 26%.

Around 97% of the beneficiaries shared that NTPC organizes free health camps for the community. Around 72% of the beneficiaries were satisfied with the service provided in the MMU. Furthermore, provision of free medical services has contributed to decrease in health expenditures with around 68% of the beneficiaries surveyed reporting reduction in medical expenditures. 75% beneficiaries reported that the overhead tank installed by NTPC is the primary source of drinking water for the community. Among the beneficiaries surveyed, 47% reported reduction in the onset of water borne diseases. According to 53% of the beneficiaries surveyed, installation of water supply related infrastructure such as water tankers and pipelines has helped them save time. Around 75% had reported lack of access to clean water for drinking and domestic purposes before intervention. Around 63% of the beneficiaries surveyed reported having access to safe drinking water due to NTPC's interventions which resolved their concerns around water to a large extent. Approximately 69% of the women beneficiaries surveyed reported improved water supply system in villages post intervention.

As part of R&R-CD activities, NTPC has installed streetlights, constructed internal roads, boundary walls in the villages. About 64% of the beneficiaries reported that they have experienced a sense of safety while commuting after these roads were constructed by NTPC. Around 86% of the beneficiaries surveyed reported that NTPC has developed the market area in Tandwa. NTPC's sports interventions had a significant impact on the health of the beneficiaries. About 51% of the surveyed beneficiaries mentioned that the sports initiatives by NTPC helped them in developing their sports habits and enhance their interest in them. 92% of the surveyed beneficiaries reported that they have experienced improved physical fitness after getting involved in sports activities and initiatives conducted by NTPC. Overall NTPC Karanpura has contributed towards community development through implementation of its R&R-CD initiatives in the targeted villages. Table 1¹ below mentions selected impact and the percentage of beneficiaries reporting the corresponding impact.

Table 1: Impact Created by R&R-CD projects of NTPC

Sector	Impact	Percentage of beneficiaries reporting the impact
Education	Improved regularity and attendance of children in school	32
	Increase in enrolment of children in school	30
	Improved learning outcome of children in school	37
	Reduction in education related expenditure	37
	Reduction in dropout rate of children	37

¹ Source: KPMG Primary Data Analysis

Health	Improved access to health infrastructure	41
	Reduction in incidence of disease	24
	Reduced expenditure on health	68
Water	Improved access to safe drinking water	63
	Decrease in water-borne diseases	47
	Reduced expenditure on water borne diseases	16
	Improved water supply system in village	64
	Reduced time spent for procuring water due to installation of water supply related infrastructure	53
Skill Development	Enhanced employability	37
	Improved confidence level	52
Community Infrastructure	Improved access to community infrastructure	38
	Reliable outdoor lighting	30
	Reduced incidence of crime	38
	Reduced accident rate	38
	Enhanced sense of security due to reduced chances of accident	64
	Increased social activity and interaction	36
Sports and Culture	Improved health due to physical activity	92
	Enhanced interest in sports	51
	Reduced expenditure in organizing events	39

Areas of Improvement

In order to be able to demonstrate impact, different activities need to come together to create that impact. Holistic support needs to be provided to the beneficiaries including support in infrastructure, deployment of staffs with the ability to deliver quality services, maintenance of infrastructure provided as part of the different activities, designing of systems and processes in a way such that the beneficiaries are able to fully access the benefits and defining the exit strategy so that the beneficiaries continue to access the benefits even after NTPC exits. During the field visit, the beneficiaries surveyed shared that NTPC presently is covering certain aspects, which

could be further strengthened. Needs and expectations of the beneficiaries (as shared by the beneficiaries during the survey) surveyed is presented in the table below²:

Table 2: Needs of beneficiaries surveyed

Sector	Needs	Percentage of beneficiaries reporting challenges in the respective areas
Education	Support in infrastructure- <i>Beneficiaries surveyed expressed the need for construction of more classrooms, library, and dining room along with the maintenance of the existing ones, new doors for classrooms, chairs, benches, and desks along with a teacher's table and computer systems for their computer and physics lab</i>	67
	Quality of education- <i>Beneficiaries surveyed shared the need for organizing teachers training at the local level to improve quality of education</i>	71
	Ability to meet education related expenditure- <i>Beneficiaries surveyed shared the need for provision of scholarship support to school-going children</i>	93
Health and Sanitation	Support in infrastructure- <i>Beneficiaries surveyed shared the need for ambulances and mobile health care units, facilities for undertaking X-ray and blood testing and regular supply of medicine</i>	97
	Quality of service - <i>Beneficiaries surveyed shared the need for deploying experienced staff for providing health care services and arranging for female doctors/ health workers with whom the women beneficiaries can have a one-one discussion on their health issues</i>	96
Water	Community Water Pumps situated at far distances- <i>Beneficiaries surveyed shared that there is a need to travel distances and stand in long ques to fetch water from the common source</i>	47
	Maintenance of the water infrastructure- <i>including leakages in water pipelines, RO, etc.</i>	78

² Source: KPMG Primary Data Analysis

Skill Development	Support in employment- <i>Beneficiaries surveyed shared that they need continued and holistic support including understanding the job requirements of beneficiaries in the communities, organizing relevant trainings around the same and providing support in job placements.</i>	96
Community Infrastructure	Quantity of assets provided- <i>Beneficiaries surveyed shared that more community halls, solar streetlights, etc. need to be constructed</i>	80
	Maintenance of the infrastructure – <i>including repair of community toilets, solar streetlights, community halls, roads, and drains</i>	78
Sports & Culture	Improving sports infrastructure through constructing playground in schools, sports field, provision of training kit and equipment.	85
	Increasing frequency of sports events to promote sports especially amongst school children.	95


Overall, based on the observations and interactions with the beneficiaries and stakeholders across villages, it was observed that NTPC Karanpura initiatives have been able to create positive impact through their R&R-CD interventions. However, these could be further strengthened through provision of continued and holistic support, which is crucial to create a sustainable impact on the beneficiaries.

Recommendations

Our recommendation primarily revolves around providing holistic and end to end support to the beneficiaries.

In the education space, support should be provided for capacity building of teachers, provision of basic supplies to children on a continuous basis, infrastructure construction, regular maintenance of the infrastructure provided, constructing playgrounds for the children, etc., all of which together will contribute towards building an enabling environment for the children in schools. This can be done through onboarding individuals from the development sphere along with collaborating with NGO partners who are specialized in the education sector and with their expertise can play crucial role in implementing NTPC's program in a holistic manner.

Similarly, in the health sector, support should comprise both preventive and curative health care. It should include activities - conducting diagnostics for detecting diseases, supply of medicines, continuous monitoring on whether the beneficiaries are receiving follow up treatment, training the village youths and pharmacies on conducting basic testing and common medicines. All these will lead to an improved sustainability quotient of their models. In water-related interventions, NTPC should enable end to end support, starting from installation of infrastructure to regular maintenance of the same with the required support from village heads and the agencies installing



these infrastructures. Village heads should ensure that everyone in the community is able to access community assets installed/ constructed by NTPC.

In the skill development sector, beneficiaries should be provided with a judicious mix of business/ entrepreneurship trainings, on-site technical assistance and counselling, provision of income generating assets for enterprise development, and linkage with government schemes. In activities pertaining to provision of community infrastructure, support should include the following- proper assessment of beneficiaries, provision of the assets in adequate numbers, and ensuring the quality of infrastructure (streetlights) / physical assets provided. Furthermore, the programs should ensure the presence of a proper beneficiary selection process, with specific criteria for selection of beneficiaries defined, such that chances of excluding any target beneficiary is reduced.

Introduction

Chapter 1: Introduction

1.1 About NTPC

NTPC, India's largest energy conglomerate was established in 1975, not only to accelerate the power sector in the country, but also to contribute to the larger development of the nation through generation of electricity and allied activities. NTPC is positioned to enable India's drive toward ambitious national renewable energy targets and is leading the global energy transition as well. The company has large portfolio of energy sources for generating electricity starting from fossil fuels, hydro, nuclear and renewable energy. The company has also ventured into sectors of power trading, coal mining, rural electrification, ash utilisation and training power professionals to strengthen its core business of producing electricity. NTPC has been awarded the Maharatna Company title in May 2010, one of the only four companies to be awarded this status and is also ranked as No. 2 Independent Power Producer (IPP) by Platts Top 250 Global Energy Company rankings.³

NTPC is committed to inclusive growth and sustainable development with special focus on the community in neighbourhood areas of its operation. NTPC firmly believes that *"communities located in the vicinity of our projects as well as those displaced by them are important partners/stakeholders in India's growth story. As good neighbours, we have built strong partnerships with them through a slew of well-conceived community development intervention programs"*.⁴

Commitment for CSR and Sustainability⁵

"NTPC commits itself to contribute to the society, discharging its corporate social responsibilities through initiatives that have positive impact on society at large, especially the community in the neighborhood of its operation by improving the quality of life of the people, promoting inclusive growth and sustainability"



Figure 1 Focus areas

³ <https://www.ntpc.co.in/en/about-us/ntpc-overview>

⁴ Available from: <https://www.ntpc.co.in/en/corporate-citizenship/corporate-social-responsibility>

⁵ Available from: <https://www.ntpc.co.in/download/ntpc-policy-csr-sustainability>

NTPC works towards improving the quality of life in neighbourhood community through various R&R-CD initiatives under its Initial Community Development (ICD) policy, Rehabilitation & Resettlement (R&R) policy and Policy for Corporate Social Responsibility (CSR) & Sustainability. The R&R-CD initiatives of NTPC are focused on enhancing quality of life of the community in the vicinity of business locations by way of improving community healthcare and education and developing critical small civic infrastructures besides generating sustainable livelihood options, promoting sports, art, and culture. These projects have been designed based on local specific requirement, need assessment surveys (NAS) and consultation with various stakeholders.

The R&R-CD projects of NTPC cover a diverse range of issues including education, community health and sanitation, water, infrastructure development, gender empowerment and capacity building. These projects have been designed based on local specific requirement, need assessment surveys (NAS) and consultation with various stakeholders.

The R&R-CD initiatives of NTPC have been taken up on PAN India basis around NTPC operations primarily in 20 states mentioned below: Andhra Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand, West Bengal.

The scope of this study covers the R&R-CD programs at NTPC Limited, Karanpura.

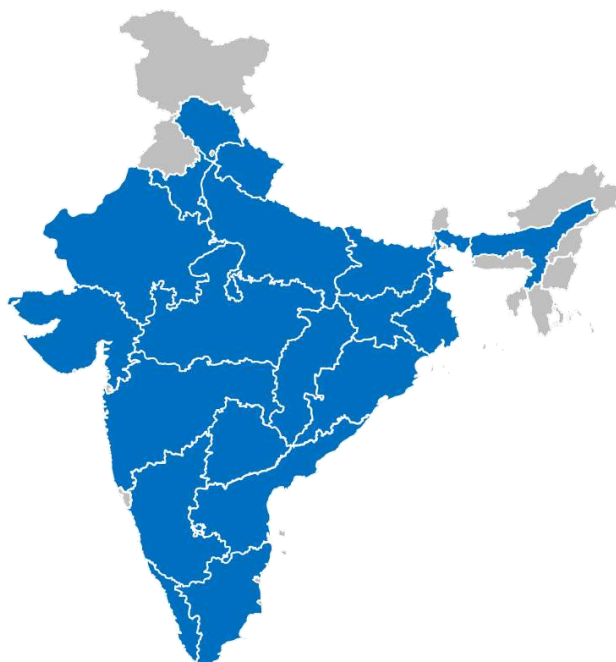


Figure 2 Geographical reach of NTPC initiatives

1.2 About NTPC Karanpura

North Karanpura Super Thermal Power Plant is a coal-fired power plant located in the Chatra district of Jharkhand. The initiative was taken by NTPC as early as in 1989 for setting up 2000 MW Thermal Power Project and CEA accorded Techno Economic Clearance in May'1990 with a linked coal source from Magadh Coal Block of CCL. The R&R Plan for North Karanpura Super Thermal Power Project (3x660MW) was formulated in consultation with project affected families (PAFs) and VDAC (Village Development Advisory Committee) as per the R&R Policy of Government of Jharkhand & NTPC. R&R Plan was approved by Govt. of Jharkhand through District Administration & also by the NTPC Board of Directors but due to dispute with CCL project was put on hold till it received CCL clearance in 2013. The compensation for land and assets has been paid to the eligible persons by State Government.

Rehabilitation & Resettlement – Community Development (CD) activities has been conducted for improving the Quality of Life (QoL) of Project Affected families / Project Affected Villages (PAVs). The project authorities for community development activities allocate additional funds for the purpose of upliftment of QoL in the Project Affected Villages (PAVs) from where land has been acquired or PAFs are residing. In line with the traditions of the other NTPC plants, NTPC Karanpura has undertaken various R&R-CD activities in 6 villages surrounding its area of operation. Details of project activities conducted in PAVs is presented theme-wise under Chapter 4: Community Development Work: Need, Status, and Activities.

Socio-economic Profile

Chapter: 2: Socio economic Profile

This chapter provides a socio-economic understanding of the project-affected villages. The total population of the project affected village is 20929⁶ with a sex ratio of almost 1:1⁷.

Table 3 Village-wise Population of PAV villages

Village	Population	Female	Male
Dundua	747	373	374
Garilong	4323	2045	2278
Kamta	2455	1194	1261
Naiparam	1833	979	854
Raham	5046	2472	2574
Tandwa	6475	3037	3438
Total	20929	10100	10779
Percentage		48%	52%

The following section provides a village-wise understanding of the infrastructural facilities and social development indicators⁸. In order to effectively monitor the progress and impact of R&R-CD interventions, NTPC had selected the following thirteen key social development indicators (SDI) based on the sustainable development goals: (i) percentage of population below poverty line, (ii) per capita income, (iii) literacy rate, (iv) percentage of children (6-14) attending school, (v) percentage of children dropping out after grade 5, (vi) percentage of population having higher education (graduation, post-graduation, technical education), (vii) infant mortality rate per thousand, (viii) maternal mortality rate per lakh, (ix) proportion of population having house/ shelter, (x) proportion of household having pucca house, (xi) proportion of house having access to drinking water (within premises & near to premises), (xii) proportion of household having toilet facilities and (xiii) proportion of household having electricity. Data on the other key indicators have been collected and presented in Annexure 1, 2, 3 and 4. Village-wise key SDIs are presented below for the six PAVs along with national, state and district level data for a comparative view. The information on infrastructural profile for villages was provided by the key stakeholders that were covered in the study through in-depth interviews. The indicators capture an overview of availability and need of key facilities such as roads, community buildings, health and WASH facilities. It also provides information on the socio-cultural improvements such as increase in participation levels of children in sports and cultural activities along with an overall community awareness of key health and social issues.

⁶ Source: Data shared by NTPC Karanpura, Census 2011

⁷ Source: KPMG Primary Data analysis

⁸ Source: Census India, 2011; World Bank Group, May 2016. Jharkhand: Poverty, Growth & Inequality; Ministry of Human Resource Development, 2014. Statistics of School Education; Jharkhand Education Project Council, Educational Indicators; Ministry of Home Affairs, 2012-13, Annual Health Survey Fact Sheet; Statista Research Department, May 31, 2021. Per capita income in Jharkhand India FY 2012-2019; Ministry of Health and Family Welfare, 2021, Maternal Mortality Rate (MMR)

Village: Dundua

Dundua village has the lowest population amongst the project affected villages with 747 people. Around 100% of respondents noted that construction and maintenance of roads and community halls were needed in the village. Dundua performed better than the district level on percentage of population below poverty line, literacy rate, and access to amenities such as water, electricity and toilet facilities.

Infrastructural profile of Dundua:

Indicators		Dundua
Availability & condition of:		
Infrastructure	Roads	23% beneficiaries surveyed reported improved access to basic rural infrastructure post development of roads. 100% of respondents noted that construction of new roads is needed.
	Community Buildings	100% of respondents noted that construction of new community halls is needed. 100% of respondents noted that better maintenance of existing community halls is required.
Health and Sanitation	Safe Drinking Water Facilities	75% of the beneficiaries surveyed reported improved access to clean water. 75% of the respondents shared that more numbers of tankers, pipelines and better maintenance of existing RO / solar plants /pipes is required.
	Sanitation Facilities	Basis stakeholder interaction, it was noted that 20% of the people have toilet facility. Need to construct toilets at both household and community levels.
	Health Facility	Number of beds per 1000 population is 0 (approximately). Average distance to nearest PHC/hospital- 3km. NTPC vans visit once every week. Health center is available which has been useful. 33% beneficiaries reported improved access to affordable health care.
Socio- cultural Improvement	Level of participation of people including children	
	-in sports	92% of the beneficiaries reported experiencing improved physical fitness after getting involved in sports activities
	-in cultural activities	Cultural activities related to local festivals and beliefs are conducted by the general public with support provided by NTPC.
	• The changes in socio- cultural pattern of communities taken place due to project interventions in different fields	Around 90% of the beneficiaries reported that there has been a decrease in the crime rate in the post-intervention period as compared to the pre-intervention period.
Awareness	Level of Awareness generated towards	
	• Hygiene & Sanitation	Beneficiaries highlighted the need to eradicate open defecation through conducting awareness campaigns amongst the community members
	• Social issues etc.	50% of the respondents shared that superstition is the most common social issue that they are faced with in their regular life.

Veterinary Facility	Health status	No Information provided
Agricultural Pattern	Mention the changes (if any) in agricultural pattern during the last three years.	Percentage of agricultural laborers is 3%

Social development indicator profile of Dundua:

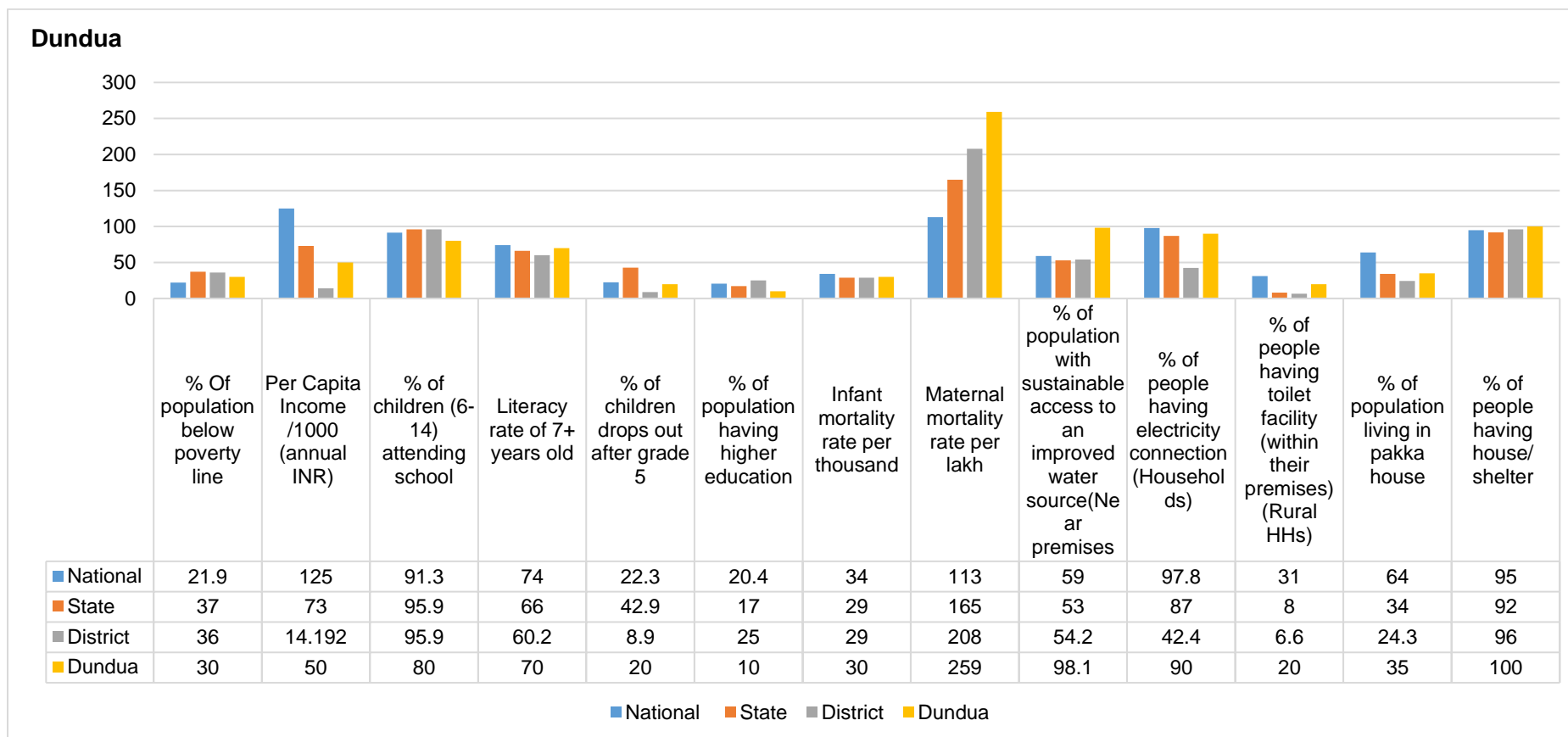


Figure 3 Dundua SDI profile



Village: Garilong

Garilong village has a population of 4323 with 2045 females. Around 71% of respondents noted that construction and maintenance of roads were needed in the village. About 100% of the respondents reported experiencing improved physical fitness after getting involved in sports activities. Garilong performed better than the district level on literacy rate, infant mortality rate and access to amenities such as electricity, toilet facilities and shelter.

Infrastructural profile of Garilong:

Indicators		Garilong
Availability & condition of:		
Infrastructure	Roads	71% beneficiaries surveyed reported improved access to basic rural infrastructure post development of roads. 71% of respondents noted that construction of new roads is needed.
	Community Buildings	50% of respondents noted that construction of new community halls is needed. 50% of respondents noted that better maintenance of existing community halls is required.
Health and Sanitation	Safe Drinking Water Facilities	93% of the beneficiaries surveyed reported improved access to clean water. 50% of the respondents shared that more numbers of tankers, pipelines and better maintenance of existing RO / solar plants /pipes is required.
	Sanitation Facilities	7% of the beneficiaries shared that NTPC constructed toilets in their house. Basis stakeholder interaction, it was noted that 55% of the people have toilet facility. Need to construct toilets at both household and community levels.
	Health Facility	Number of beds per 1000 population is 0 (approximately). Average distance to nearest PHC/hospital- 4km NTPC vans visit once every week. Health center is available and has been useful to the community. 36% beneficiaries reported improved access to affordable health care.
Socio- cultural Improvement	Level of participation of people including children	
	-in sports	100% of the beneficiaries reported experiencing improved physical fitness after getting involved in sports activities
	-in cultural activities	Cultural activities related to local festivals and beliefs are conducted by the general public with support provided by NTPC.
	• The changes in socio- cultural pattern of communities taken place due to project interventions in different fields	Around 90% of the beneficiaries reported that there has been a decrease in the crime rate in the post-intervention period as compared to the pre-intervention period.
Awareness	Level of Awareness generated towards	
	• Hygiene & Sanitation	Beneficiaries highlighted the need to eradicate open defecation through conducting awareness campaigns amongst the community members

	• Social issues etc.	50% of the respondents shared that superstition is the most common social issue that they are faced with in their regular life.
Veterinary Facility	Health status	No Information provided
Agricultural Pattern	Mention the changes (if any) in agricultural pattern during the last three years.	Percentage of agricultural laborers is 7%

Social development indicator profile of Garilong:

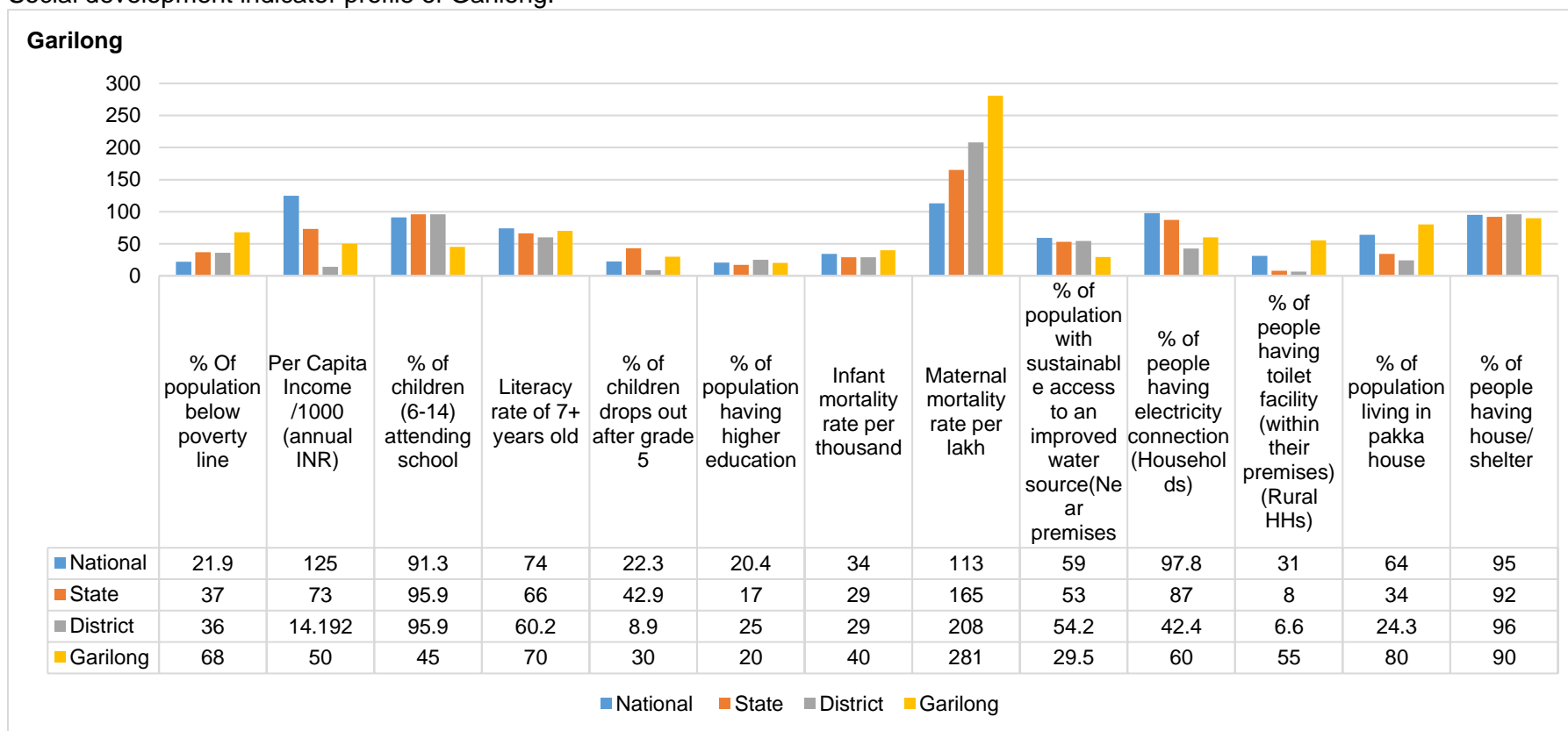


Figure 4 Garilong SDI profile

Village: Kamta

Kamta village has a population of 2455 with 48.6% female population. Around 83% of respondents noted that construction and maintenance of roads and community halls were needed in the village. About 92% of the beneficiaries surveyed reported improved access to clean water. Kamta performed better than the district level on per capita income, infant mortality rate and access to amenities such as water, electricity, toilet facilities and shelter.

Infrastructural profile of Kamta:

Indicators		Kamta
Availability & condition of:		
Infrastructure	Roads	42% beneficiaries surveyed reported improved access to basic rural infrastructure post development of roads. 83% of respondents noted that Construction of new roads is needed.
	Community Buildings	92% of respondents noted that construction of new community halls is needed. 83% of respondents noted that better maintenance of existing community halls is required.
Health and Sanitation	Safe Drinking Water Facilities	92% of the beneficiaries surveyed reported improved access to clean water. 92% of the respondents shared that more numbers of tankers, pipelines and better maintenance of existing RO / solar plants /pipes is required.
	Sanitation Facilities	8 % of the beneficiaries shared that NTPC constructed toilets in your house. Basis stakeholder interaction, it was noted that 80% of the people have toilet facility. Need to construct toilets at both household and community levels.
	Health Facility	Number of beds per 1000 population is 0 (approx..). Average distance to nearest PHC/hospital- 6km NTPC vans visit once every week. Health center available. This has been useful. 58% beneficiaries reported improved access to affordable health care.
Socio- cultural Improvement	Level of participation of people including children	
	-in sports	83% of the beneficiaries reported experiencing improved physical fitness after getting involved in sports activities
	-in cultural activities	Cultural activities related to local festivals and beliefs are conducted by the general public with support provided by NTPC.
	• The changes in socio- cultural pattern of communities taken place due to project interventions in different fields	Around 90% of the beneficiaries reported that there has been a decrease in the crime rate in the post-intervention period as compared to the pre-intervention period.
Awareness	Level of Awareness generated towards	
	• Hygiene & Sanitation	Beneficiaries highlighted the need to eradicate open defecation through conducting awareness campaigns amongst the community members

	• Social issues etc.	50% of the respondents shared that superstition is the most common social issue that they are faced with in their regular life.
Veterinary Facility	Health status	No Information provided
Agricultural Pattern	Mention the changes (if any) in agricultural pattern during the last three years.	Percentage of agricultural laborers is 13%

Social development indicator profile of Kamta:

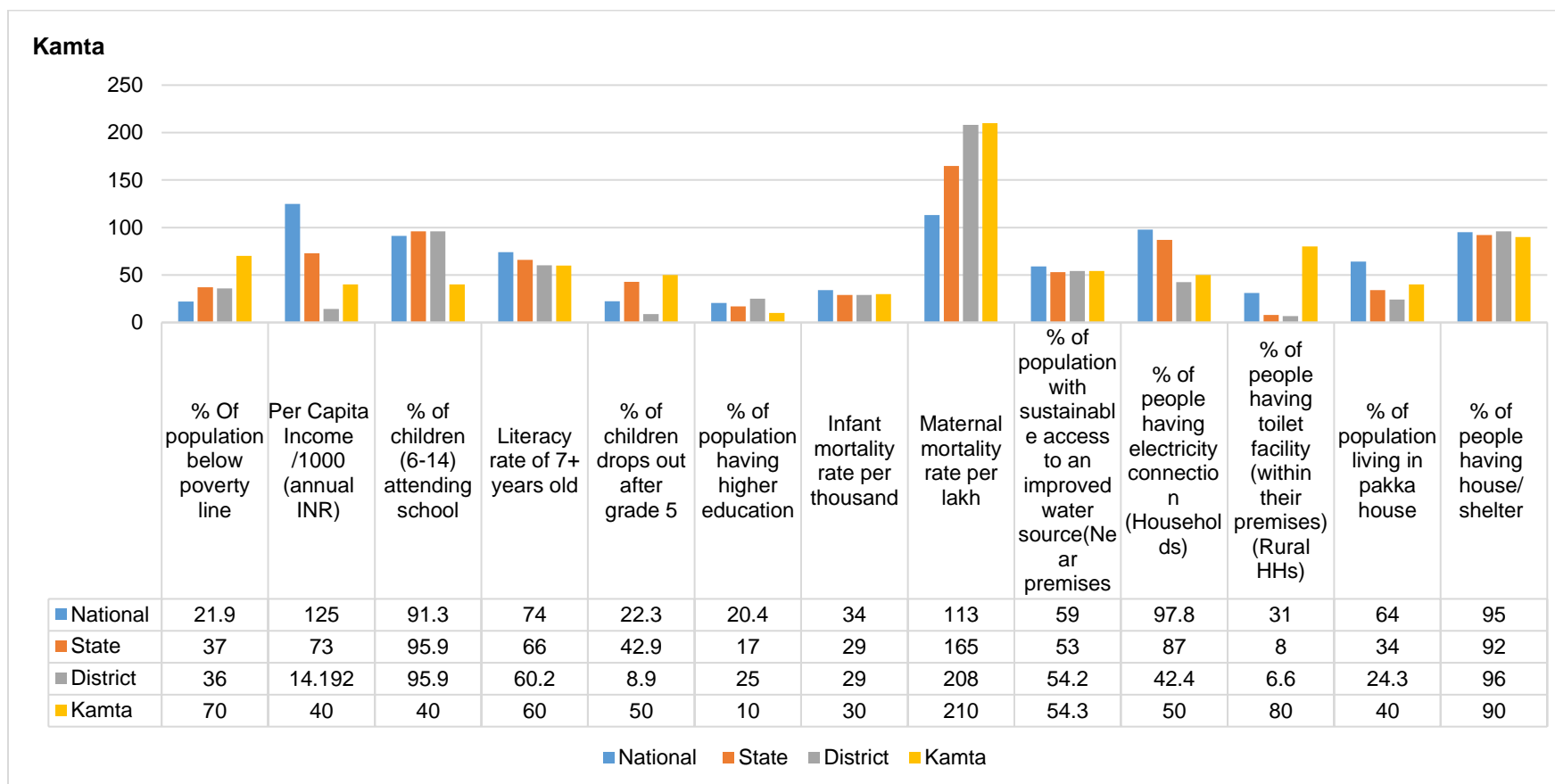


Figure 5 Kamta SDI profile

Village: Naiparam

Naiparam village has a population of 1833 with 53.4% female population. About 67% of the beneficiaries shared that NTPC constructed toilets in their house. Around 92% of respondents noted that construction and maintenance of roads and community halls were needed in the village. Naiparam performed better than the district level on per capita income, literacy rate, drop-out rate, infant mortality rate and access to amenities such as electricity, toilet facilities and shelter.

Infrastructural profile of Naiparam:

Indicators		Naiparam
Availability & condition of:		
Infrastructure	Roads	33% beneficiaries surveyed reported improved access to basic rural infrastructure post development of roads. 92% of respondents noted that Construction of new roads is needed.
	Community Buildings	92% of respondents noted that construction of new community halls is needed. 92% of respondents noted that better maintenance of existing community halls is required.
Health and Sanitation	Safe Drinking Water Facilities	92% of the beneficiaries surveyed reported improved access to clean water. 92% of the respondents shared that more numbers of tankers, pipelines and better maintenance of existing RO / solar plants /pipes is required.
	Sanitation Facilities	67% of the beneficiaries shared that NTPC constructed toilets in their house. Basis stakeholder interaction, it was noted that 95% of the people have toilet facility. Need to construct toilets at both household and community levels.
	Health Facility	Number of beds per 1000 population is 0 (approx.). Average distance to nearest PHC/hospital- 4km NTPC vans visit once every week. Health center available. This has been useful. 50% beneficiaries reported improved access to affordable health care.
Socio- cultural Improvement	Level of participation of people including children	
	-in sports	100% of the beneficiaries reported experiencing improved physical fitness after getting involved in sports activities
	-in cultural activities	Cultural activities related to local festivals and beliefs are conducted by the general public with support provided by NTPC.
	• The changes in socio- cultural pattern of communities taken place due to project interventions in different fields	Around 90% of the beneficiaries reported that there has been a decrease in the crime rate in the post-intervention period as compared to the pre-intervention period.
Awareness	Level of Awareness generated towards	
	• Hygiene & Sanitation	Beneficiaries highlighted the need to eradicate open defecation through conducting awareness campaigns amongst the community members

	• Social issues etc.	50% of the respondents shared that superstition is the most common social issue that they are faced with in their regular life.
Veterinary Facility	Health status	No Information provided
Agricultural Pattern	Mention the changes (if any) in agricultural pattern during the last three years.	Percentage of agricultural laborers is 2%

Social development indicator profile of Naiparam:

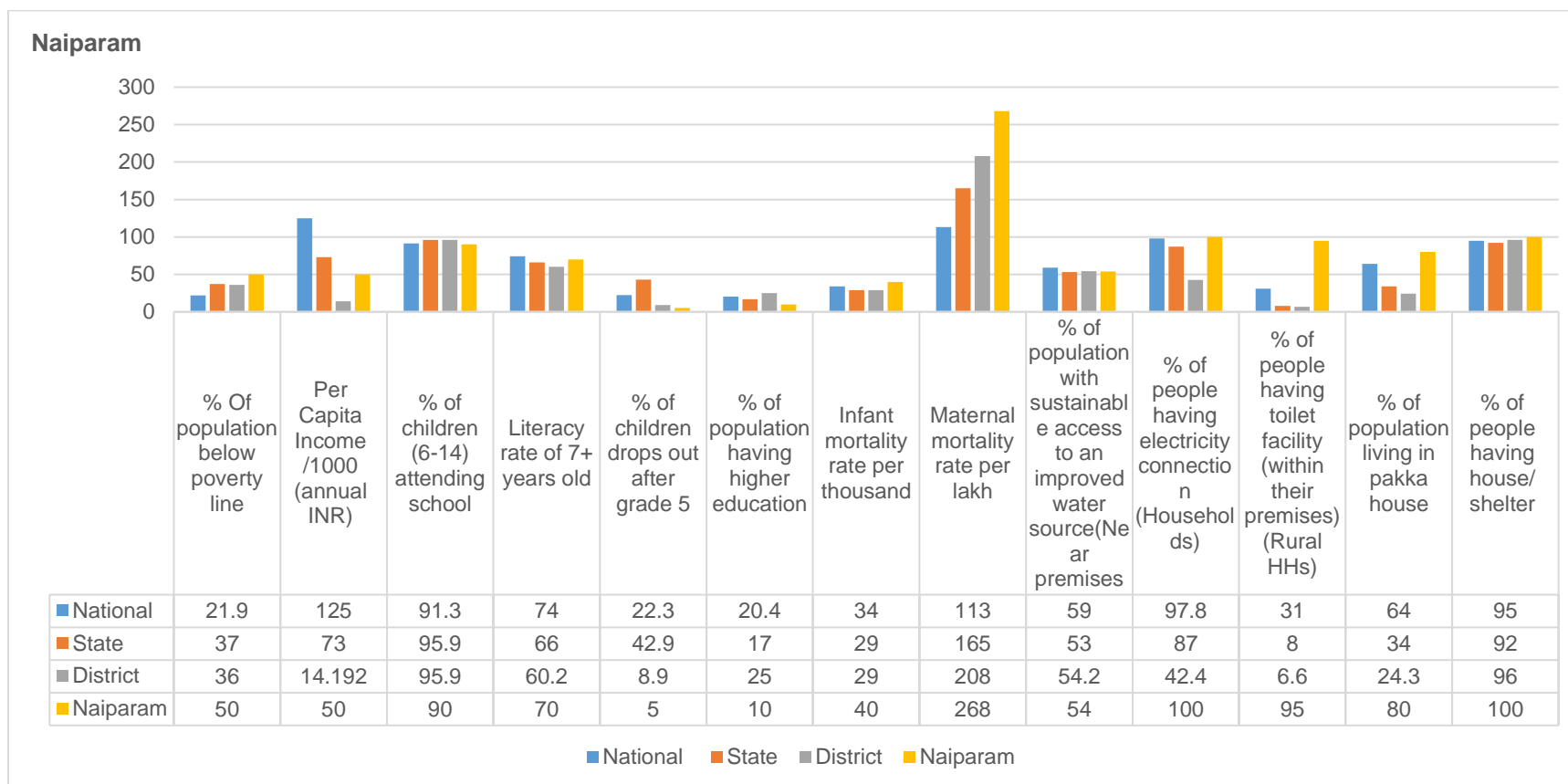


Figure 6 Naiparam SDI profile

Village: Raham

Raham village has a population of 5046 with 50% female population. About 75% of the beneficiaries surveyed reported improved access to clean water due to project interventions. Around 100% of respondents noted that construction and maintenance of roads and community halls were needed in the village. Raham performed better than the district level on per capita income, literacy rate, drop-out rate, infant mortality rate and access to amenities such as water, electricity, toilet facilities and shelter.

Infrastructural profile of Raham:

Indicators		Raham
Availability & condition of:		
Infrastructure	Roads	42% beneficiaries surveyed reported improved access to basic rural infrastructure post development of roads. 100% of respondents noted that Construction of new roads is needed.
	Community Buildings	100% of respondents noted that construction of new community halls is needed. 100% of respondents noted that better maintenance of existing community halls is required.
Health and Sanitation	Safe Drinking Water Facilities	75% of the beneficiaries surveyed reported improved access to clean water. 75% of the respondents shared that more numbers of tankers, pipelines and better maintenance of existing RO / solar plants /pipes is required.
	Sanitation Facilities	Basis stakeholder interaction, it was noted that 60% of the people have toilet facility. Need to construct toilets at both household and community levels.
	Health Facility	Number of beds per 1000 population is 0 (approx.). Average distance to nearest PHC/hospital- 6km NTPC vans visit once every week. Health center available. This has been useful. 50% beneficiaries reported improved access to affordable health care.
Socio- cultural Improvement	Level of participation of people including children	
	-in sports	89% of the beneficiaries reported experiencing improved physical fitness after getting involved in sports activities
	-in cultural activities	Cultural activities related to local festivals and beliefs are conducted by the general public with support provided by NTPC.
Awareness	• The changes in socio- cultural pattern of communities taken place due to project interventions in different fields	Around 90% of the beneficiaries reported that there has been a decrease in the crime rate in the post-intervention period as compared to the pre-intervention period.
	Level of Awareness generated towards	
	• Hygiene & Sanitation	Beneficiaries highlighted the need to eradicate open defecation through conducting awareness campaigns amongst the community members

	• Social issues etc.	50% of the respondents shared that superstition is the most common social issue that they are faced with in their regular life.
Veterinary Facility	Health status	No Information provided
Agricultural Pattern	Mention the changes (if any) in agricultural pattern during the last three years.	Percentage of agricultural laborers is 12%

Social development indicator profile of Raham:

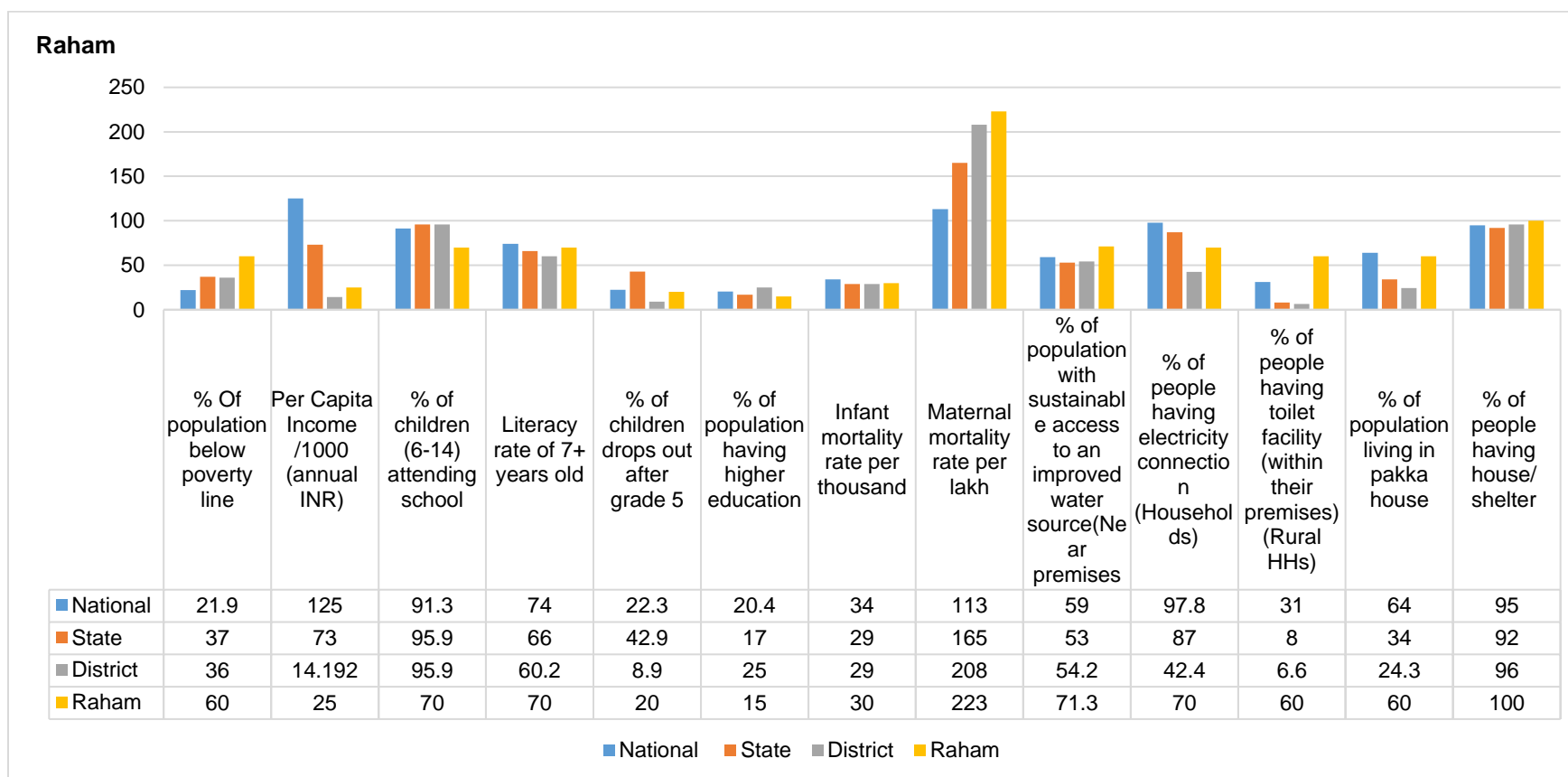


Figure 7 Raham SDI profile

Village: Tandwa

Tandwa village has a population of 3037 with 47% female population. Around 100% of respondents noted that construction and maintenance of roads and community halls were needed in the village. About 92% of the beneficiaries reported experiencing improved physical fitness after getting involved in sports activities. Tandwa performed better than the district level on per capita income, literacy rate, infant mortality rate, maternal mortality rate, and access to amenities such as water, electricity, toilet facilities and shelter.

Infrastructural profile of Tandwa:

Indicators		Tandwa
Availability & condition of:		
Infrastructure	Roads	9% beneficiaries surveyed reported improved access to basic rural infrastructure post development of roads. 100% of respondents noted that Construction of new roads is needed.
	Community Buildings	100% of respondents noted that construction of new community halls is needed. 100% of respondents noted that better maintenance of existing community halls is required.
Health and Sanitation	Safe Drinking Water Facilities	9% of the beneficiaries surveyed reported improved access to clean water. 91% of the respondents shared that more numbers of tankers, pipelines and better maintenance of existing RO / solar plants /pipes is required.
	Sanitation Facilities	Basis stakeholder interaction, it was noted that 70% of the people have toilet facility. Need to construct toilets at both household and community levels.
	Health Facility	Number of beds per 1000 population is 1 (approx.). Tandwa has a primary health center. NTPC vans visit once every week. Health center available. This has been useful. 42% beneficiaries reported improved access to affordable health care.
Socio- cultural Improvement	Level of participation of people including children	
	-in sports	92% of the beneficiaries reported experiencing improved physical fitness after getting involved in sports activities
	-in cultural activities	Cultural activities related to local festivals and beliefs are conducted by the general public with support provided by NTPC.
	• The changes in socio- cultural pattern of communities taken place due to project interventions in different fields	Around 90% of the beneficiaries reported that there has been a decrease in the crime rate in the post-intervention period as compared to the pre-intervention period.
Awareness	Level of Awareness generated towards	
	• Hygiene & Sanitation	Beneficiaries highlighted the need to eradicate open defecation through conducting awareness campaigns amongst the community members

	• Social issues etc.	50% of the respondents shared that superstition is the most common social issue that they are faced with in their regular life.
Veterinary Facility	Health status	No Information provided
Agricultural Pattern	Mention the changes (if any) in agricultural pattern during the last three years.	Percentage of agricultural laborers is 3%

Social development indicator profile of Tandwa:

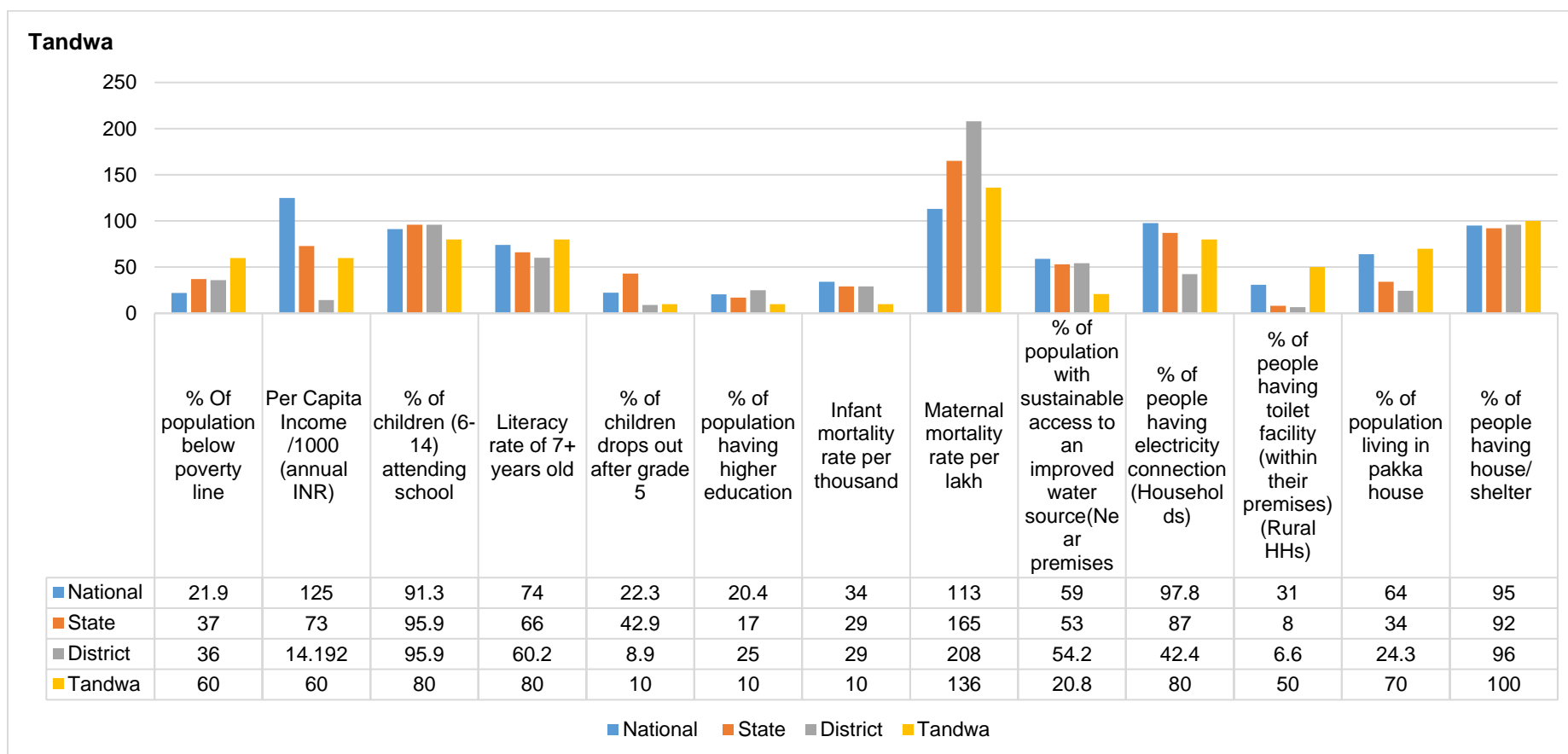


Figure 8 Tandwa SDI profile

Overall Project:

The overall performance of the treatment villages across the selected thirteen key social development indicators vis-à-vis the national, state, district, as well as the control group is presented in the chart below. Treatment villages performed better than the control villages on children attending school, population having higher education, infant mortality rate, maternal mortality rate, and access to amenities such as electricity and shelter.

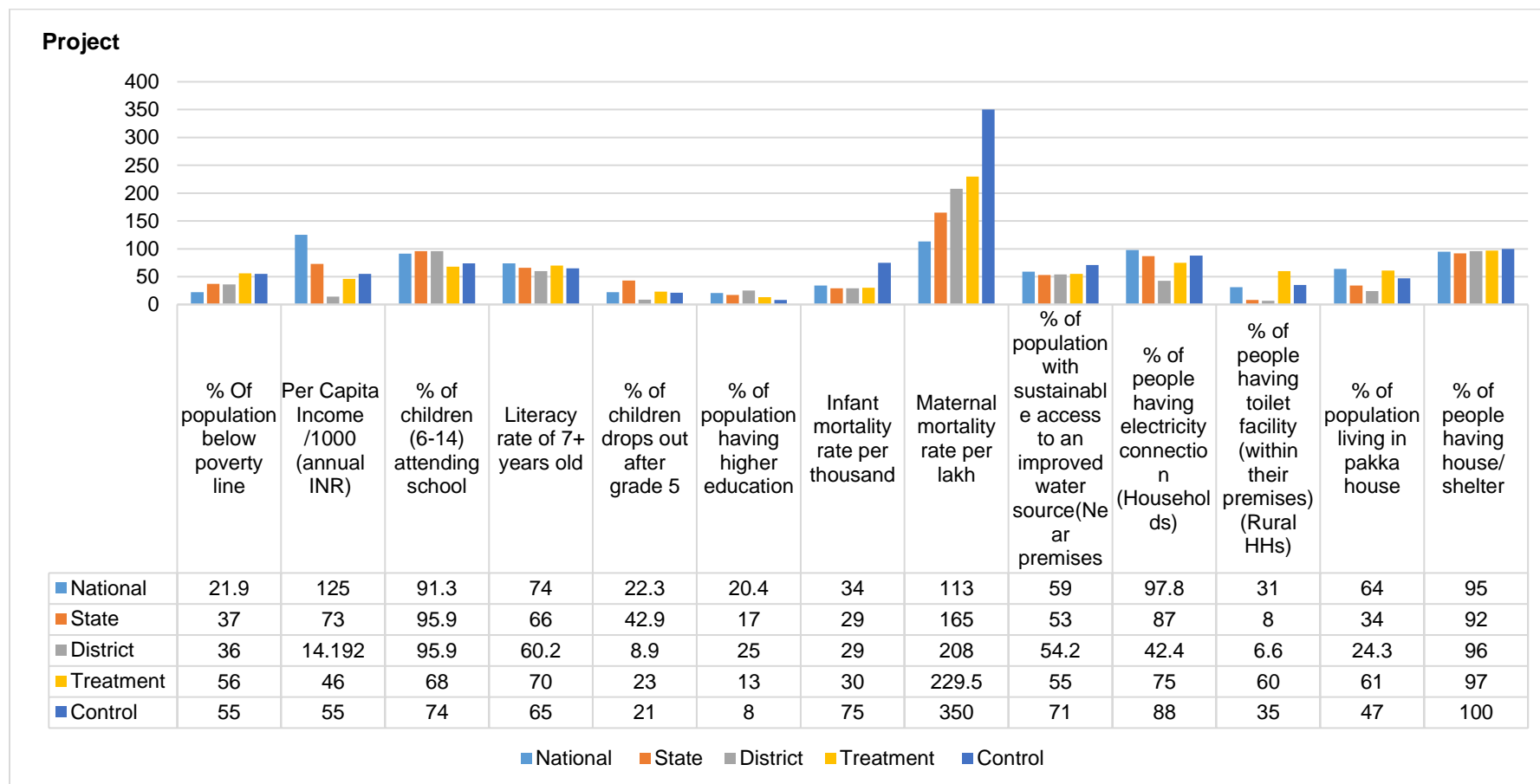
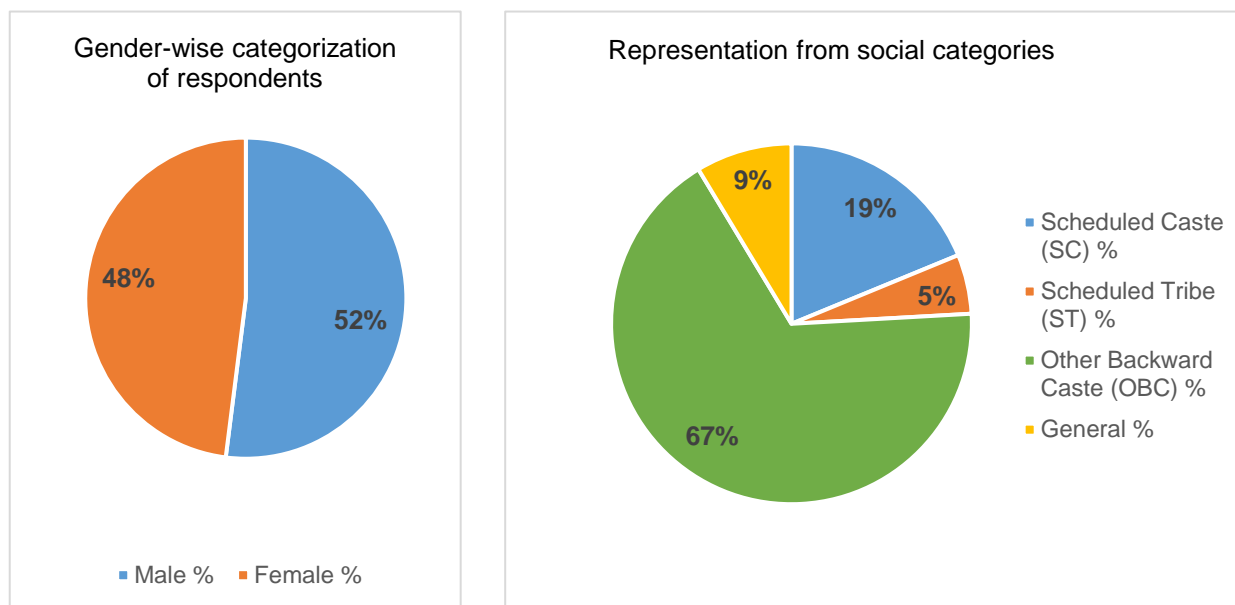
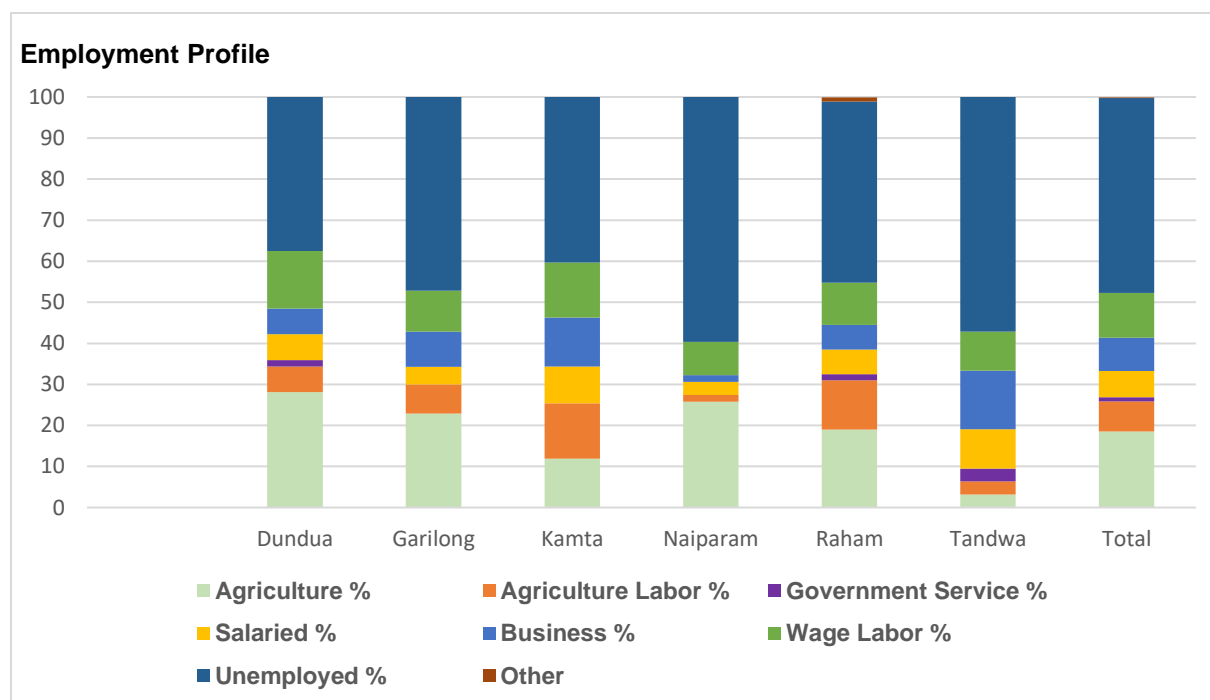


Figure 9 Project SDI profile

The study covered approximately 2% (394 beneficiaries) of the total population of the project affected villages (20929). The following graphs provide a gender-wise break up as well as distribution of respondents across various social categories:



The findings of our study indicate that agriculture is the primary occupation in almost all the villages, followed by wage labor. On an average, the percentages of beneficiaries reporting their respective occupation, have been presented in the table below.



Employment sector	Dundua	Garilong	Kamta	Naiparam	Raham	Tandwa	Total
Agriculture %	28	23	12	26	19	3	19
Agriculture Labor %	6	7	13	2	12	3	7
Government Service %	2	0	0	0	1	3	1
Salaried %	6	4	9	3	6	10	6
Business %	6	9	12	2	6	14	8
Wage Labor %	14	10	13	8	10	10	11
Unemployed %	38	47	40	60	44	57	47
Other %	0	0	0	0	1	0	0

The survey noted that around 68% of the beneficiaries had access to formal education with over 40% of the respondents having completed their education till class 10th. Village wise education levels of the beneficiaries is given in the table below:

Name of Village	No School %	Up to 5th grade %	6th - 10th grade %	10th - 12th grade %	Graduate %	Post-graduate %
Dundua	25	5	17	34	17	2
Garilong	40	3	27	19	9	3
Kamta	39	9	21	21	9	1
Naiparam	34	6	11	42	3	3
Raham	25	9	28	28	4	6
Tandwa	30	8	14	19	17	11
Total	32	7	20	27	10	4

According to this survey, the average monthly income and expenditure of beneficiaries across villages are INR 14,737 and 12,576 respectively. On an average, the monthly expenditure is INR 2,161 less than the monthly income. Village wise average income and expenditure is given in the table below:

Name of Village	Average monthly income of household	Average monthly expenditure of household
Dundua	14406	12609
Garilong	13079	9857
Kamta	17627	13224
Naiparam	13282	15097
Raham	13853	11779
Tandwa	16175	12889
Total	14737	12576

Interactions with the beneficiaries suggested that Hindi and khortha the most commonly spoken language in the villages. Some of the beneficiaries surveyed also indicated that they can speak oraon, Urdu, nagpuri, Bhojpuri as well. Furthermore, amongst the beneficiaries surveyed, 56% shared that they were part of either a social, religious, or political organization, which contributes to their sense of empowerment. 96% of the beneficiaries liked spending time with friends and family and around 30% of the respondents noted that they enjoy art and music in their free time.

Based on this survey results, superstition has emerged as one of the predominant social problems faced by the beneficiaries surveyed, followed closely by alcoholism. 50% of the respondents shared that superstition is the most common social issue that they are faced with in their regular life, followed by alcoholism (44%), crime (22%) and gender-based discrimination (9%). Around 90% of the beneficiaries reported that there has been a decrease in the crime rate in the post-intervention period as compared to the pre-intervention period.

Around 86% of the respondents were land oustees, with Tandwa and Naiparam having about 95% of land oustee respondents. On an average, 78% respondents across villages reported having received land grant of INR 15 lacs per acre, with around 90% of Tandwa beneficiaries reporting they have received the land grant, Village-wise percentage coverage of respondents who were land oustees and %age respondents who had received land grant is shown in the table below:

Name of Village	%age of respondents who were land oustees	% age of respondents reported receiving land grant received (INR 15 Lacs per acre)
Dundua	83	77
Garilong	83	71
Kamta	87	72
Naiparam	95	89
Raham	76	72
Tandwa	95	90
Total	86	78

About the Study

Chapter 3: About the study

In 2020, NTPC has empaneled KPMG to conduct need assessment survey and socio-impact evaluation in connection with their R&R-CD projects.

3.1 Objectives of the evaluation

In order to strategize and plan its R&R-CD activities, NTPC Karanpura has planned to carry out an impact assessment of the projects. The objective of the study was to assess the impact created on the stakeholders covered under the program.

The expected benefits from the study are as follows:

- Captures the perceptions of benefits of beneficiaries, stakeholders, and their behavioral change
- Suggests improvements in management and monitoring systems
- Applicable across diverse interventions and recognizes the diverse range of development and humanitarian activities
- Guides more effective investment
- Recommends improvements in program delivery
- Enhances understanding of the status of upkeep of the assets created out of the R&R-CD activities

3.2 Scope of the evaluation

The scope of the evaluation covers six project affected villages- *Tandwa, Garilong, Kamta, Raham, Naiparam, and Dundua*- in Chatra district in Jharkhand. The project interventions cover six thematic areas- education, health & sanitation, water, skill development, community infrastructure, and sports & culture.

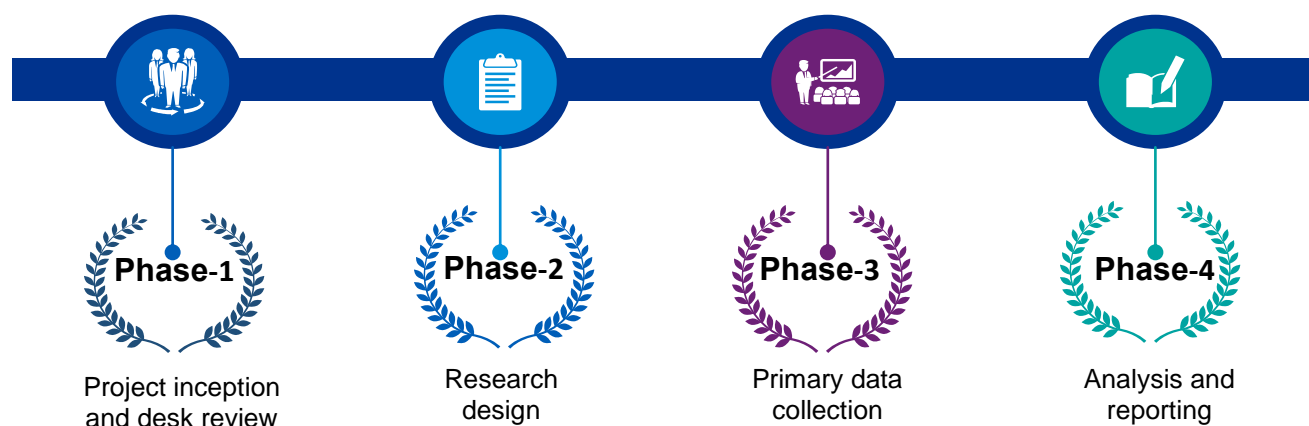
The evaluation also includes a control group study in two villages near the treatment area- Badagaon and Mandar. The findings will be used as a road map for existing and planning new interventions.



Figure 10 Geographical scope of evaluation

3.3 Methodology used for the evaluation

This study adopted a four-phase structured methodology for evaluation as illustrated below. The adopted methodology ensured that OECD DAC evaluation criteria were followed throughout to effectively capture the impact of the program.



1. Project inception and desk review

During the inception phase, team conducted desk review of documents and reports related to the program. Evaluation team also held discussions with NTPC Karanpura in order to understand the project timelines and beneficiaries.

3. Primary data collection

Primary data collection was done through both face-to-face interviews and focus group discussions to cover wider diversity of respondents. The team conducted surveys with beneficiaries and interactions with relevant stakeholders including control group. The evaluation team were on the field from 13 July 2021 till 28 July 2021.

2. Research design

During this phase evaluation team developed an impact map for each project. Primary data collection tools were also developed and finalized in consultation with NTPC Karanpura.

4. Analysis and reporting

Data captured during the primary data collection phase has been analyzed for report writing. Qualitative responses to the questionnaires, conducted with beneficiaries and stakeholders in the respective areas, have also been analyzed.

3.4 OECD DAC Framework⁹

The Organization for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) first laid out the evaluation criteria (relevance, effectiveness, efficiency, impact, and sustainability) in the 1991. These five criteria serve as the core reference for evaluating international development and humanitarian projects, programs, and policies. These evaluation criteria have been defined below:

- **Relevance:** The extent to which the intervention objectives and design respond to beneficiaries' needs, policies, and priorities, and continue to do so if circumstances change.
- **Effectiveness:** The extent to which the intervention achieved, or is expected to achieve, its objectives, and its results, including any differential results across groups.
- **Efficiency:** The extent to which the intervention delivers, or is likely to deliver, results in an economic and timely way.
- **Impact:** The extent to which the intervention has generated or is expected to generate significant positive or negative, intended, or unintended, higher-level effects.
- **Sustainability:** The extent to which the net benefits of the intervention continue or are likely to continue.

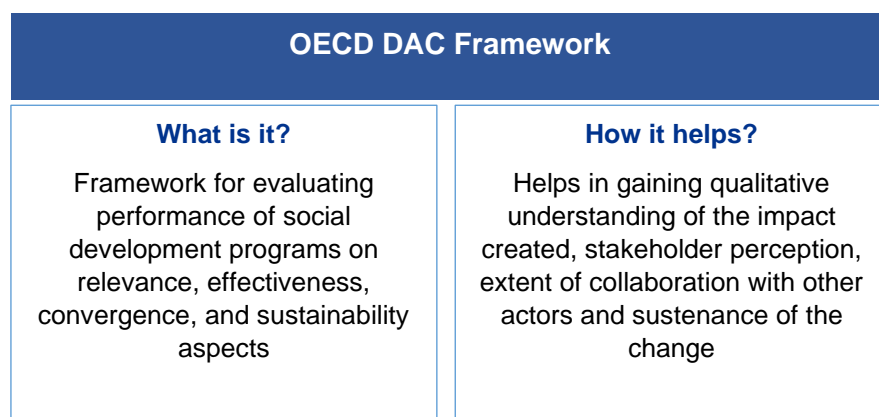


Figure 11 OECD DAC framework

⁹ <http://www.oecd.org/dac/evaluation/revised-evaluation-criteria-dec-2019.pdf>

Evaluation Criteria	Indicative questions	Key Performance Indicator
Relevance	<i>To what extent does the program have the capacity to meet the needs and expectations of society? To what extent does the program have the potential to facilitate participation from the community?</i>	<i>Program aligned to the needs and expectations of society and involved engagement / participation from the community, linkage with SDGs, etc</i>
Effectiveness	<i>To what extent did the program activity attain its objectives? What were the major factors influencing the achievement or non-achievement of the objectives?</i>	<i>Program achieved cross-cutting objectives during project implementation</i>
Efficiency	<i>To what extent has the program been able to use the least costly resources possible to achieve the results?</i>	<i>Resources are provided and efficiently used for participation of all stakeholders</i>
Impact	<i>To what extent has the program been able to create an impact on HDI profile of beneficiaries?</i>	<i>Achieved real and long- lasting positive changes in the lives of intended beneficiaries</i>
Sustainability	<i>To what extent does the program have the potential to create a sustainable impact post withdrawal of NTPC's support?</i>	<i>Enhancement of local community/ institution skills to govern and manage programs, linkages with government/ other funding, etc.</i>

3.5 Social Return on Investment

Social Return on Investment (SROI) is a systematic method that endeavors to measure and incorporate value created because of investment – namely social, environmental, and economic value which is not fully reflected in conventional cost-benefit analyses. This method is used to monetize the social and environmental impact of the program and measure how much value has been created for each rupee invested/ spent on the program. The evaluative aspect of an SROI quantifies the value of the social impact of programs, and policies, and measures change in ways that are relevant to the people or organizations that experience or contribute to it. Through an SROI, organizations can evidence the social value their programs are achieving, gain deeper insight into what impact they are having for their stakeholders and can thus use this as an input for their company strategy. SROI is about value, rather than money. It can encompass the social value generated by an entire organization or focus on just one specific aspect of the organization's work.

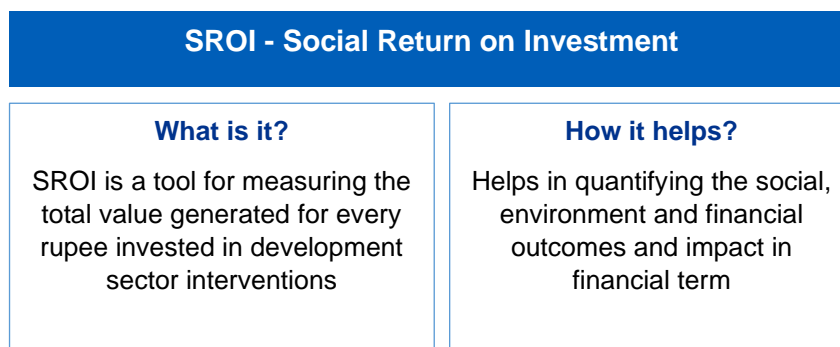


Figure 12 About SROI

SROI utilizes the concept of “theory of change/ impact map” to describe the change creation by measuring social, environmental, and economic outcomes. It uses monetary values to represent the outcomes thus enabling calculation of ratio of benefits to costs to be calculated. SROI analysis includes case studies and qualitative, quantitative, and financial information thus helping organizations/ people to base their future decisions. The striking advantage of SROI study is that other impact assessment methodologies stop at identifying outcomes while SROI methodology goes beyond to value them and calculate the social value of impact. Steps of a SROI study are listed below –

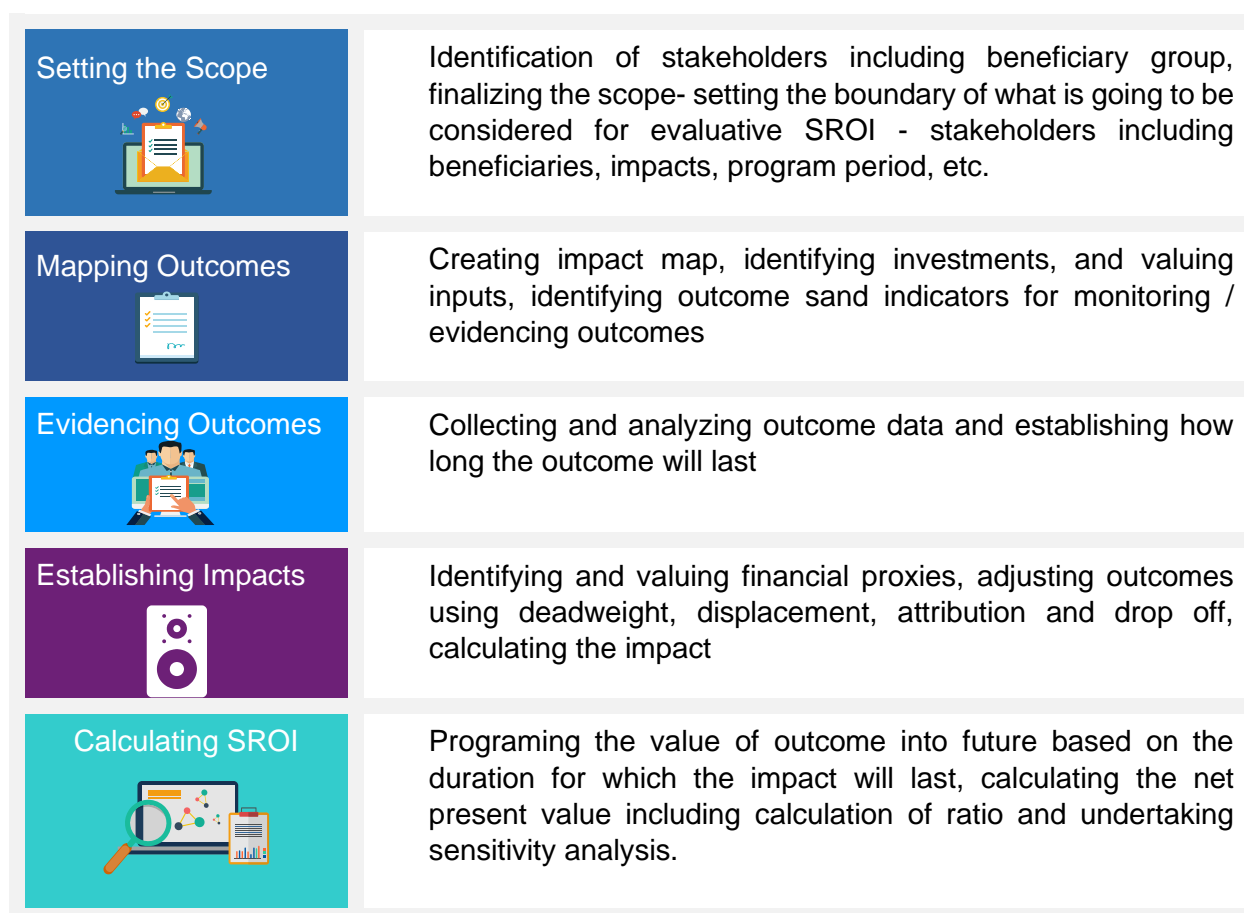


Figure 13 SROI framework

3.6 Overall sampling

Based on the review of the documents and the available information on beneficiaries and stakeholders obtained from NTPC, a combination of simple random sampling (SRS) and purposive sampling method has been selected. The SRS sampling method is a type of probability sampling method under which each unit of the population has an equal probability of being selected as a sample. In other words, a simple random sample of size 'n' consists of 'n' individuals from the population such that every unit of 'n' has an equal chance to be the sample selected. This method is used to avoid bias in sample selection. (Source: Moore, David S., George P. McCabe, and Bruce A. Craig. *Introduction to the Practice of Statistics*. New York: WH Freeman, 2009) It is suitable in the current context as the available information about the beneficiaries is limited.

3.6.1 Sampling strategy

The sample size for this study has been calculated using Cochran's sample size formula. This formula allows one to calculate the sample size with desired level of:

- Precision
- Confidence level
- Estimated proportion of attribute present in the population

Cochran's formula is particularly appropriate in situations with large population. Cochran's Sample Size formula is given by:

Equation 1: Cochran Sampling Formula

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where,

- Z^2 – Z value corresponding to confidence level i.e., obtained from Z table (statistical table),
- p - proportion of population which has the attribute in question,
- q - 1-p (estimation of variance)
- e - margin of error, which indicates by how many percentages the result will differ from the real population value

For the purpose of this study,

- Total population: 21000¹⁰
- Z: 1.96 (z value for 95% Confidence level)
- p: 0.5 (assumption is that 50% of the population says yes and 50% of the population says no to the question)
- q: 0.5 (1-p) – estimate of variance
- e: 5% (standard assumption)

¹⁰ Source: Data provided by NTPC Karanpura

Putting all the values in the Cochran's formula, we get: $((1.96)^2(0.5)(0.5)) / (0.05)^2 = 384.16$ i.e., equivalent to 384

This indicates that a random **sample of 384 households will give us the confidence level that we need.**¹¹

3.6.2 Sample size

For the purpose of this study, we have surveyed 394 beneficiaries, conducted 6 FGDs and interacted with 24 stakeholders. A sample of 360 beneficiaries was drawn for 6 villages ensuring equal coverage of five thematic areas- Education, Health & Sanitation, Water, Community Infrastructure and Sports & Culture. A sample of 24 trainees was taken for targeting Skill Development across all villages and the study covered 24 candidates. FGDs were conducted in the following villages: *Tandwa, Garilong, Kamta, Raham, Naiparam, and Dundua*. In addition, surveys were conducted with non-beneficiaries (control group) including local government officials to bring about a holistic understanding of the project and its current outreach. Data for control group was collected through 6 stakeholder interactions conducted with key community members across the two control group villages- Badagaon and Mander. One stakeholder each for education, health and gram pradhan were covered for both the control group villages.

Table 4: Total population and sample size excluding skill development candidates (24)

S. No.	Village	Population	Sample	Achieved
1	Dundua	747	60	65
2	Garilong	4323	60	60
3	Kamta	2455	60	60
4	Naiparam	1833	60	60
5	Raham	5046	60	66
6	Tandwa	6475	60	59
Total		20929	360	370

3.7 Stakeholder Map

Stakeholder mapping refers to the technique used for identifying and engaging with the stakeholders. The major stakeholders, with whom we had interacted during the study is presented in the figure below. The methods used for engaging with the stakeholders were survey interviews, in-depth interview and FGDs.

Survey Interview

Survey is a list of questions aimed at extracting specific data from a particular group of people. It is often used to assess thoughts, opinions, and feelings. In survey interviews, questionnaires are completed by the interviewer based on answers of respondents. In the study, the survey interview

¹¹ Available from: <https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/find-sample-size/>

was conducted to gather primary data from sampled beneficiaries on the impact of the program on their lives using a structured questionnaire.

Key Informant Interview

Key informant interviews are qualitative in-depth interviews with people who have firsthand knowledge about the program interventions and the activities undertaken for them. In such an interview, respondent perspective on a program, idea, or subject are explored. They were conducted for various stakeholders such as – Gram Pradhans, School principals and teachers, ASHA workers and Anganwadi workers with broad open-ended questions to understand the project interventions. The study included interactions with Gram Pradhans and other panchayat members as they represent the entire village, and are involved in the village activities, hence their opinions are deemed significant for the evaluation.

Focused Group Discussion

Focus group discussions (FGD) involve gathering people from similar backgrounds or experiences together to discuss a specific topic of interest. It is a form of qualitative research where questions are asked about their perception, attitudes, beliefs, opinion, or ideas. In focus group discussion participants are free to talk with other group members; unlike other research methods it encourages discussions with other participants. It generally involves group interviewing in a small group of usually 8 to 12 people¹².

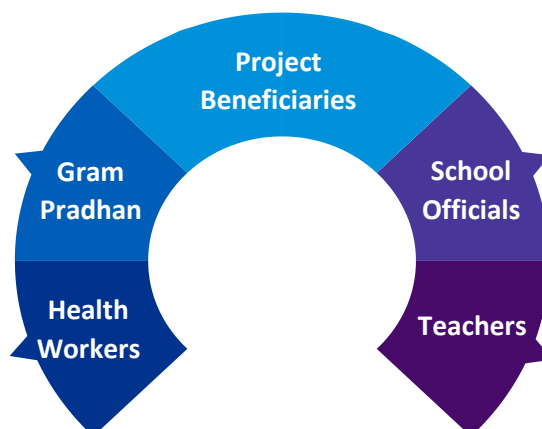


Figure 14 Key Stakeholders

¹²https://www.herd.org.np/uploads/frontend/Publications/PublicationsAttachments1/1485497050-Focus%20Group%20Discussion_0.pdf

3.8 Impact Map

To achieve the desired long-term changes, one needs to establish clear linkages between the project's activities and the desired impact. An Impact map is a representation of the workflow of the project and identifies the various aspects of project implementation, as mentioned below¹³.

1. **Inputs:** The financial, human, and material resources used for the development intervention by the implementing agency and other stakeholders.
2. **Activities:** The actual work on ground, actions taken, or work performed through which inputs, such as funds, technical assistance and other types of resources are mobilized to produce specific outputs
3. **Outputs:** The products, capital goods and services which result from a development intervention and may also include changes resulting from the intervention which are relevant to the achievement of outcomes.
4. **Outcomes:** Outcomes are the (long term) changes created for the stakeholders related to the activities in the scope/The likely or achieved short-term and medium-term effects of an intervention's outputs.
5. **Impact:** It is measured in terms of a significant change in the lives of the project beneficiaries due to the initiation of the project. Positive and negative, primary, and secondary long-term effects produced by a development intervention, directly or indirectly, intended, or unintended.

It is a tool for describing or illustrating how and why a desired change is expected to happen, that is, connecting the activities of the program with the outcomes, impacts and their contribution to achievement of the final goal.

Education

The following impact map was developed for education-related projects as part of the study.

Table 5: Impact map for education-related projects

Input	Activities	Output	Outcome	Impact
Fund allocated by NTPC Karanpura Time invested by NTPC Karanpura staff	Providing dual desk benches, furniture items, revolving chairs, etc.	Number of Desks and benches provided, No. of chairs provided.	<ul style="list-style-type: none"> Percentage increase in attendance of students Percentage students reporting reduction in education expenditure 	<ul style="list-style-type: none"> Percentage increase in enrollment of school children Percentage decrease in drop out of children Percentage beneficiaries reporting increase in the overall learning level of the children
	Distribution of books, school shoes, school socks, etc.	Number of books, school shoes, school socks distributed.		

¹³ <https://www.intrac.org/wpcms/wp-content/uploads/2016/06/Monitoring-and-Evaluation-Series-Outcomes-Outputs-and-Impact-7.pdf>

Time invested by community	Distribution of scholarships and awards to students.	Number of students provided with scholarships; No. of schools covered;	<ul style="list-style-type: none"> Percentage beneficiaries reporting holistic development of children
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Health & Sanitation

The following impact map was developed for health-related projects as part of the study.

Table 6: Impact map for health-related projects

Input	Activities	Output	Outcome	Impact
Fund allocated by NTPC Karanpura	Organizing health camps in the villages	No. of camps organized. No. of villages covered	<ul style="list-style-type: none"> Percentage beneficiaries experiencing timely availability of treatment 	<ul style="list-style-type: none"> Percentage beneficiaries reporting improved health
Time invested by NTPC Karanpura staff	MMU	Number of patients, No of villages covered, No of people provided with medicines	<ul style="list-style-type: none"> Percentage beneficiaries reporting more awareness about cleanliness and individual sanitation 	<ul style="list-style-type: none"> Percentage beneficiaries reporting increase in income due to improved health
Time invested by community	Construction of toilets Awareness camps	Number of villages covered, No of HH provided with toilets, No of community members involved in awareness programs	<ul style="list-style-type: none"> Percentage beneficiaries reporting an improved level of sanitation and hygiene in villages (due to construction of community toilets, SWM, etc.) 	

Water

The following impact map was developed for water-related projects as part of the study.

Input	Activities	Output	Outcome	Impact
Fund allocated by NTPC Karanpura Time invested by NTPC Karanpura staff Time invested by community	Provision of water tankers; extension of water pipelines; renovations of dams	No. of water tankers, No. of villages covered	<ul style="list-style-type: none"> Percentage beneficiaries reporting improved access to clean drinking water Percentage beneficiaries reporting reduction in water borne diseases Percentage beneficiaries reporting change in cost of availing water Percentage beneficiaries reporting more hours of economic activity 	<ul style="list-style-type: none"> Improved access to safe water Reduced expenditure on health Increase in income due to more productive/ working hours
	Installation of hand pumps and solar based pump systems	No. of hand pumps installed, No. of villages covered		
	Solar pump systems were installed	No. of pumps installed, Capacity of the pump		
	Improvement of water ponds	No. of villages covered No of beneficiaries covered		

Skill Development

The following impact map was developed for skill development projects as part of the study.

Input	Activities	Output	Outcome	Impact
Fund allocated by NTPC Karanpura Time invested by NTPC Karanpura staff Time invested by community	Establishing training centers for tailoring	No. of youth trained. No. of women trained	<ul style="list-style-type: none"> Percentage youth / women reporting enhanced skills Percentage youth / women receiving employment Percentage beneficiaries pursuing higher education 	<ul style="list-style-type: none"> Percentage beneficiaries reporting increase in income Improved levels of confidence and improved socio-economic status
	Enrollment and course fee payment for students at various Industrial Training	No. of students enrolled; No. of students who completed the course; number of students who		

Institutes, distribution of tailoring training kits	were placed after course completion
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Community Infrastructure

The following impact map was developed for community infrastructure-related projects as part of the study.

Input	Activities	Output	Outcome	Impact
Fund allocated by NTPC Karanpura Time invested by NTPC Karanpura staff Time invested by community	Installation of solar streetlights	No. of solar streetlights installed; No. of village covered	<ul style="list-style-type: none"> Percentage beneficiaries reporting improved access to community infrastructure 	<ul style="list-style-type: none"> Percentage beneficiaries reporting increase in income due to improved connectivity with market
	Construction or renovation of community halls	No. of community halls constructed or renovated	<ul style="list-style-type: none"> Percentage beneficiaries reporting improved connectivity with the market due to roads constructed 	<ul style="list-style-type: none"> Percentage beneficiaries reporting an enhanced sense of security due to installation of solar lights
	Construction of Roads and drains	No. of roads and drains constructed; No. of villages covered; Distance covered by roads and drains (in km)	<ul style="list-style-type: none"> Percentage beneficiaries reporting reduction in the accident rate post development of roads 	

Sports & Culture

The following impact map was developed for sports and culture-related projects as part of the study.

Input	Activities	Output	Outcome	Impact
Fund allocated by NTPC Karanpura Time invested by	Organizing sporting events and promoting various sports in the village	No. of sporting events organized, No. of training kits and equipment provided	<ul style="list-style-type: none"> Percentage beneficiaries developing their sports habit and interest. Percentage beneficiaries 	<ul style="list-style-type: none"> Percentage beneficiaries reporting improved health and physical fitness after getting

**NTPC
Karanpura
staff**
**Time
invested by
community**

Organizing
marriages,
cultural events,
festivals.

No. of cultural
events
organized; no.
of festivals
celebrated.

- reporting increased participation in regular sports and sports related competitions in villages
- Percentage beneficiaries reporting reduction in the expenditure on cultural events
- involved in sports activities
- Percentage beneficiaries reporting increased participation in community events and festivals

Community Development Work: Need, Status, and Activities

Chapter 4: Community Development Work: Need, Status, and Activities

A socio-economic impact assessment study for NTPC Karanpura was conducted in 2005 by the Indian Institute of Social Welfare and Business Management, Kolkata. The 2005 impact assessment report¹⁴ provided the following recommendations:

The report suggested NTPC to make efforts to minimize involuntary resettlement of communities and in case resettlement is absolutely necessary, mechanisms need to be put in place to ensure that the project affected communities are able to sustain themselves at the new locations. The study noted that it was essential for the project authorities to ensure that the affected communities are provided adequate compensations, both monetary and non-monetary and benefit from the project. Support should also be provided to them in moving, re-settling and improving their standard of living. It was recommended that the displaced community must be involved in the planning and implementation of the community development program. Further, the report highlighted that NTPC should provide support to physically challenged persons to become economically self-reliant through the provision of economic assistance/seed capital for self-employment schemes, medical equipment and aids, educational aids for them and their family members on priority basis. A provision of alternate sources of income or families that were dependent on the acquired land for their livelihood is essential in order to sustain them. Conducting trainings on skill development on priority basis for people from vulnerable groups is essential to assist them in taking up profitable self-employment initiatives. These trainings should be provided for self-employment initiatives that are relevant to their socio-economic condition and bear local employment potential. The Project Affected Population (PAP) should be provided with financial aid for these initiatives. The study recommended that the women of the community should be motivated and trained to take up home based occupation like poultry, piggery, planting and nurturing of fruit trees and cottage industries like mat and basket weaving, tailoring, knitting etc. NTPC should also conduct literacy and orientation programs for both male and female PAPs along with skill-development programs to improve the general level of literacy and awareness of the PAPs. The report recommended that the maximum benefit of the rehabilitation and resettlement packages should be provided to the Naiparam and Tandwa villages since these villages would be most affected by the project as they would lose around 49 and 52 residential and commercial structures along with agricultural land. To create a larger impact, the study shared that NTPC might engage NGOs to assist in the implementation of Rehabilitation Action Plans (RAPs) and its monitoring and evaluation. They could be engaged to do the following:

- Develop rapport between PAPs and project authorities.
- Communicate plans and programs of RAPs.
- Conduct workshops/seminars on different income generating programs.
- Plant trees in the project area.
- Assist vulnerable groups specially women, aged, children and destitute.

For the mental health of the beneficiaries, the report suggested conducting counseling programs with the help of NGOs to help the PAPs adjust themselves psychologically to the new environment. It was also recommended that NTPC should work towards establishing confidence and faith among PAPs by ensuring transparency in the working of the project by making people

¹⁴ Socio-Economic Impact Assessment Study for North Karanpura Super Thermal Power Project: Executive Summary NTPC Limited (November 2005)

aware of its pros and cons. The rehabilitation and resettlement plan should give special emphasis to community development plans in order to strengthen education, health care and awareness, communication facilities, rainwater harvesting besides the skill development program for the local people.

Overall, the report highlighted that NTPC needed to ensure that the PAPs are at the center of all efforts and the interventions were aimed at two objectives. First, to ensure definite means to counter impoverishment risks before the commencement of the project and secondly, to initiate a process towards empowering the PAPs through formation of peoples' institution in the villages and equipping them with information knowledge and required skills to make them capable of safeguarding their interests themselves. The recommendations and needs of the community identified during the 2005 assessment were then incorporated into the programmatic activities by NTPC Karanpura over the years. In 2020, NTPC Karanpura empaneled KPMG for conducting the need assessment survey for understanding the future needs and expectations of the community. The current needs and aspirations of the project affected villages have been captured in detail in Chapter 8: Need Assessment of this report.

Project Activities

Based on the needs and aspirations identified in the 2005 report, the following activities were implemented by NTPC in the projected affected villages across various thematic areas from 2016 to 2020¹⁵.

Education

Education	
Academic and cocurricular	Support for Coaching Classes for Class IX & X students (Session 2017-2018)
Academic and cocurricular	Support to DAV to organize quiz competition
Scholarship and awards	Meritorious award for 43 students at PAV's. (2016, 2017,2018)
Scholarship and awards	Tuition Fee reimbursement to Ms. Sujata Kumari for B.Ed. course.
Scholarship and awards	NKSTPP Balika Medha Award, 2018 to 40 Girls students
Scholarship and awards	NKSTPP Meritorious Award, 2019
Scholarship and awards	NTPC Utkarsh – Merit Scholarship to Vivek Kumar Nayak (1st yr. & 2nd yr.)
School Infrastructure and other support	Distribution of Books for 75 ITI Students for 2016-18.

¹⁵ Source: Data shared by NTPC Karanpura

School Infrastructure and other support	Distribution of school shoes and socks for students studying in class I - V of 32 Govt. schools.
School Infrastructure and other support	Distribution of Desk-Benches and other furniture items: <ul style="list-style-type: none"> ▪ SS +2 High School, Tandwa & Simaria Degree Mahavidyalaya, Simaria. ▪ Vananchal college Tandwa. ▪ 32 govt schools at PAV ▪ Swami Vivekanand Jagriti Sansthan, Tandwa ▪ Gram Vikas Sewa Sansthan library, Tandwa

Health & Sanitation

Health & Sanitation	
Health camps and medical facilities	Organize Mega Medical Health Camps at PAV's.
Health camps and medical facilities	MMU
Health camps and medical facilities	Pathological lab assistant for govt hospital Tandwa (2016 and 2017)
Health camps and medical facilities	Distribution of pathological materials for govt hospital Tandwa.
Health camps and medical facilities	Hiring of 02 Doctors for PAVs (2017)
Health camps and medical facilities	Provided assistance to Vijay Paswan for medical treatment
Sanitation	Repair work of existing drain from Jhanda chowk to shiv mandir at Garilong
Sanitation	Construction of toilet with water facility at Tandwa market.
Sanitation	Supply & Installation of 02 nos Prefabricated Toilet at Vananchal college Tandwa.
Sanitation	Swachh Vasundhar (Cleanliness Drive) program at Dundua
Sanitation	Construction of toilet at various locations in Chatra district.
Sanitation	Construction of 04 no. toilet block at bottom and top of mountain of Maa Koleshwari Mandir, Hunterganj
Sanitation	Construction of 150 nos. toilets in individual households to make PAV Naiparam open defecation free

Water

Water
Extension of Water pipeline at Tandwa
Construction of Tiling work & drinking water
Installation of Diesel Generator set 125 KVA at Tandwa PAV for water supply.
Additional PVC casing & bore at Ambedkar Bhawan, Tandwa
Provision of Water tanker for PAVs

Various arrangement (operator, fuel) to provide water (2018) by PHED overhead tank
Installation of 7 Solar based pump systems (including boring)
35 nos. of deep boring for 4KL & 10 KL
Installation and Repair of Handpumps at Project Affected Villages
Renovation of Hiru Dam at Chatra.
Deep boring & drinking water arrangement at DC office Chatra

Skill Development

Skill Development	
Sponsorship	2nd Yr. Course fee of 73 students (15-17) at different Govt ITI's.
Sponsorship	Enrolment of 75 students (56 students admitted) at different Govt ITI's for 2016-18 (2 yrs. course fee).
Sponsorship	2nd Yr. Course fee of 34 students (16-18) at different Govt ITI's.
Sponsorship	2nd Yr. Course fee of 21 students (16-18) at ITI (Gen) & ITI at Ranchi
Sponsorship	2nd Yr. Course fee of 01 students (16-18) at W.I.T.I, Hazaribagh
Training & support	Support for 07 Tailoring training center (3rd batch)
Training & support	Provided training kit for 175 trainees for tailoring training (3rd batch)

Community Infrastructure

Community Infrastructure
Construction of PCC roads, Paver Block, Drains in all the villages and nearby vicinity. Upgrading of existing village roads.
Electrification of 32 Govt Schools at PAV
Beautification of Ponds: Bargaon Chath Talab , Jhanjharia Talab, Kairvagarha talab at Raham village, Joda Talab, Tandwa etc.
Construction/renovation of Multipurpose Community halls in PAVs and vicinity.
Renovation & Beautification and Electrification of Town Hall and Panchayat Bhawan
Construction of boundary walls, additional classrooms in schools, etc. Construction of rooms in K M Smarak Inter College.
Construction of guard wall at mandir road at Raham, platform/stage at Surya Mandir Tandwa, platform for Ambedkar statue at Ambedkar Chowk, Garilong, Cremation Ground & Platform at Riverbank of Tandwa.
Construction of Pipe culvert bridge near Chundru Dham on Gerua river. Construction of shed, steel railing around temple, edge of river, shed on stage & toilets at Chundru Dham Tandwa
Installation of solar streetlight, solar lights, solar high mast lights at PAV's.
Electrification of 50 houses at Naiparam & 60 houses at Chatti Garilong through Roof top solar plant. & Support provided for Training Centre at Chatra.
Renovation of DLAO Chatra residence cum Office
Civil & Electrical works for const. of Multipurpose hall at Simaria Inter College
Support for PA system for Vikas Bhawan
Distribution of 10 nos. of 3-seater chairs for Bhadrakali temple, Itkhor. 30 KVA Diesel Generator Set to Maa Bhadrakali Mandir Prabandhan Samiti, Itkhor, Chatra

Sports & Culture

Sports & Culture
Distributed more than 8000 blankets among marginalized population.
Financial assistance for various social & cultural events such as Ganesh puja, Chhat puja, Ravi das Jayanti, Durga puja, Ramanavami, Sarhul puja, Rah puja , Kali puja, Baba Bhim Rao Ambedkar jayanti, Manda puja, Sarhul Festival, Rastriya Yuwa Mahotsav, Itkhor Mahotsav, Rastriya Shakti Samellan. Bonfire arrangements, etc.
Providing financial assistance for daughters' marriage in PAV's
Procurement of 500 nos pen & notebook for Vivekanand Jayanti. (2017)
Distribution of wheelchair for Smt. Balmadina Ecka
Distribution of 200 nos. of Umbrella among PAPs on 16.08.2019
Provide financial assistance to Prakhand Sarna samiti Tandwa, Faizan-e-Islam Anjuman committee
Distribution of 12 sets Musical Instruments to PAVs
Cash Reward tribal girl's youth for cultural performance
Support for tentage & sound arrangement for World Tribal Day, 2019
Furniture items to New Jyoti Club Tandwa
Distribution of sports items for tribal sports (include additional 02 teams)
Support for sports events: Cricket and Football Tournament, 2018 at Atal Ground, Tandwa, NKSTPP Cricket Tournaments, Cricket tournament 2019, 2nd NKSTPP Tribal Tournament 2019, OORJA – for youth under-19 football hunt tournament.
Distribution of footballs to 04 panchayats
Excavation for drinking water for cattle, Increasing depth of Talab at Kamta to provide drinking water for cattle at Tandwa.
Distribution of 200 sewing machines for Tailoring training of PAP's.
Various kinds of support to Birhor Tribe (only umbrella & sports item)
Distribution of 2400 smokeless Chulhas for Kandinagar, Chatra & PAV's.
Assistance for organizing Football Tournament at Simaria
Financial Assistance for Voter Awareness Campaign (Jharkhand Constituency election, 2019) and Lok Sabha Election at Chatra
Supported Vanwasi Kalyan Kendra, Ranchi
Financial assistance for sponsoring trophies mementoes & certificates to DAV school Hazaribagh (2017)
Construction of one toilet and bathroom with solar water pump at house of Smt. Balmadina Ecka

Analysis and Findings

Chapter 5: Analysis and Findings

The section below showcases the findings and observations ascertained based interviews conducted with beneficiaries of different R&R-CD projects implemented by NTPC Karanpura across 6 villages in Chatra district, Jharkhand.

5.1 Analysis of key social development indicators

In order to effectively monitor the progress and impact of R&R-CD interventions, NTPC has selected the following thirteen key social development indicators (SDI) based on the sustainable development goals: (i) percentage of population below poverty line, (ii) per capita income, (iii) literacy rate, (iv) percentage of children (6-14) attending school, (v) percentage of children dropping out after grade 5, (vi) percentage of population having higher education (graduation, post-graduation, technical education), (vii) infant mortality rate per thousand, (viii) maternal mortality rate per lakh, (ix) proportion of population having house/ shelter, (x) proportion of household having pucca house, (xi) proportion of house having access to drinking water (within premises & near to premises), (xii) proportion of household having toilet facilities and (xiii) proportion of household having electricity. The performance of the treatment villages across the selected thirteen key social development indicators vis-à-vis the national, state, district, block level, as well as the selected control group villages (Badagaon and Mander) have been presented in the charts below. Data on the other key indicators mentioned in ToR have been collected and presented in Annexure 1,2,3 and 4.

- i. **Percentage of population below poverty line¹⁶:** The average percentage of population below the poverty line for both the treatment and control groups were at a similar level. For the treatment districts, 56% of the population was below the poverty line whereas for the control group, this percentage was 55%. Kamta had the highest percentage of population below poverty line among the treatment villages, whereas Mander, a control group village had 80% population below poverty line. With an average of 36% of population below poverty line for Chatra district, both treatment and control villages demonstrate need for poverty alleviation programs.

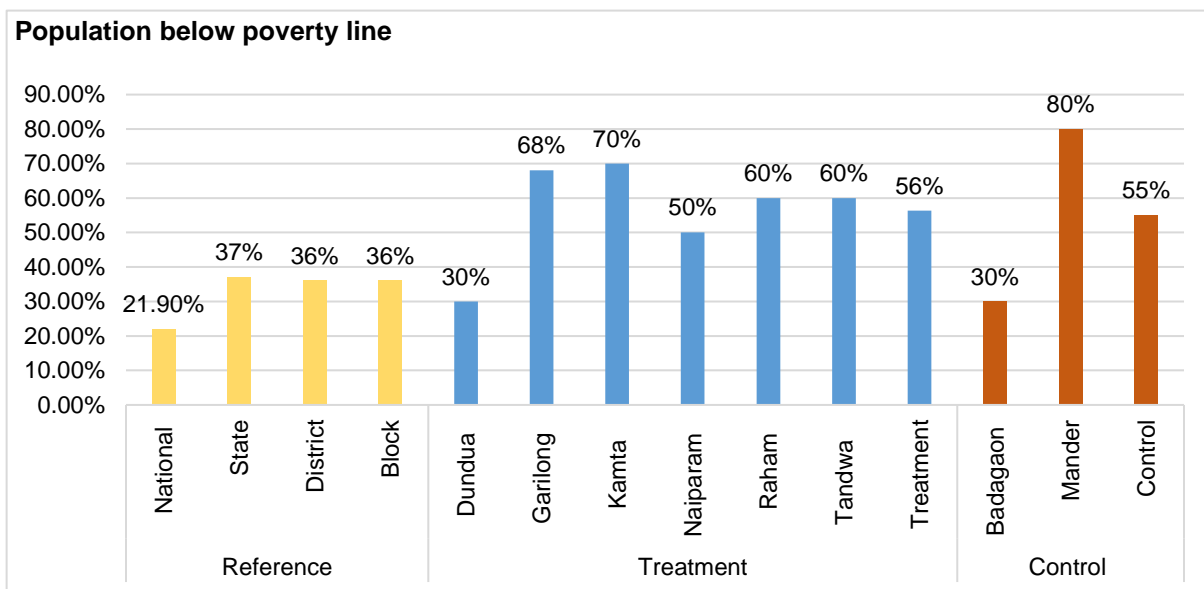


Figure 15 SDI 1. Below Poverty Line

¹⁶ World Bank Group, May 2016. Jharkhand: Poverty, Growth & Inequality



- ii. **Per capita income**¹⁷: The average annual per capita income for the treatment villages was INR 45833.33 whereas the amount for the control group was INR 55000. This difference can be attributed to the low annual per capita income of the Raham village (INR 25000) in the treatment villages. Treatment villages tend to perform better than the district level per capita income.

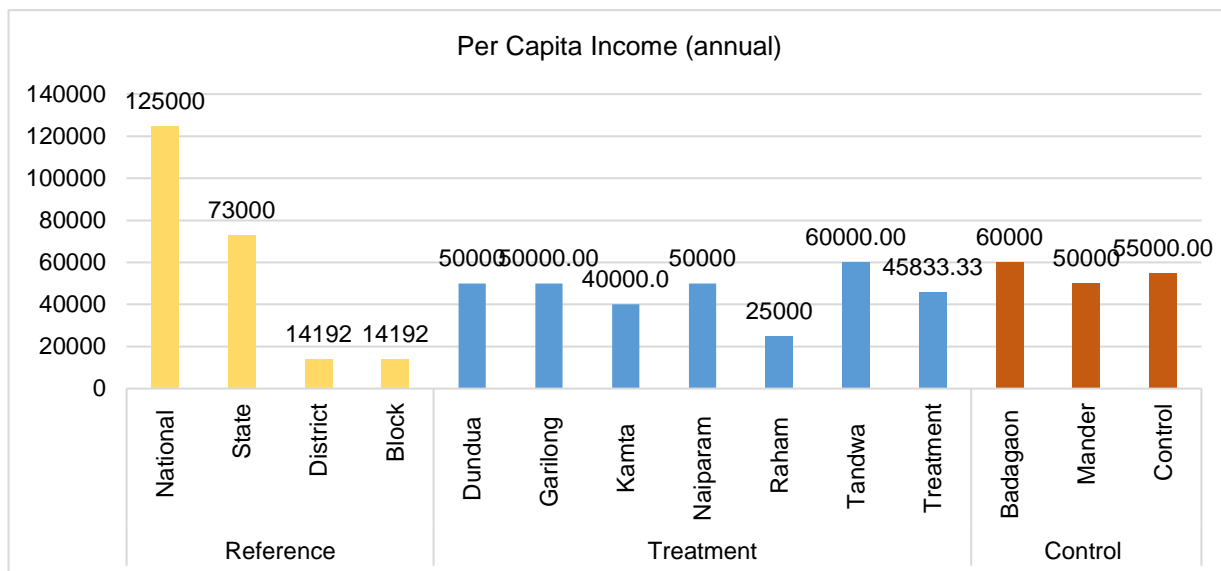


Figure 16 SDI 2 Per Capital Income (Annual)

- iii. **Literacy rate**¹⁸: The literacy rate was 70% for the treatment villages and 65% for the control villages. All treatment villages except Kamta had a higher literacy rate than the District and Block levels. Also, survey with beneficiaries reported that on an average 70% of the family members were literate and could read and write in at least one language.

¹⁷ Statista Research Department, May 31, 2021. Per capita income in Jharkhand India FY 2012-2019,

¹⁸ Census 2011

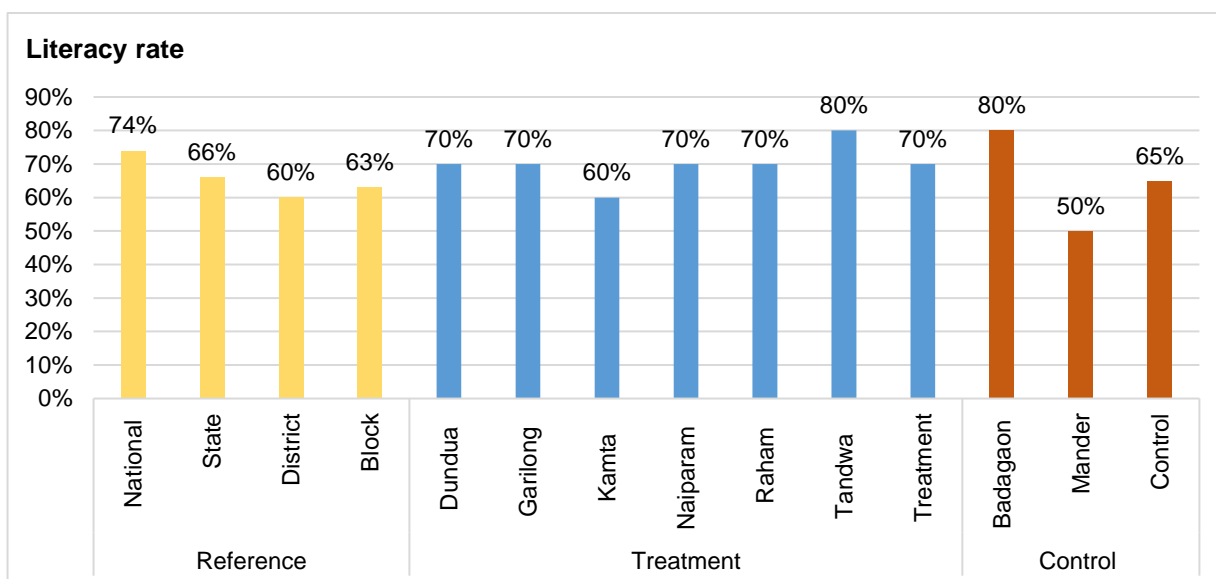


Figure 17 Literacy Rate

- iv. **Percentage of children (6-14) attending school¹⁹:** In the treatment districts, 70% of the children between the age of 6-14 years were attending school whereas in the control group 74% of the children attended school. In the area of education, NTPC has undertaken various initiatives in the treatment districts through distribution of benches to schools, resource materials and scholarships for the students.

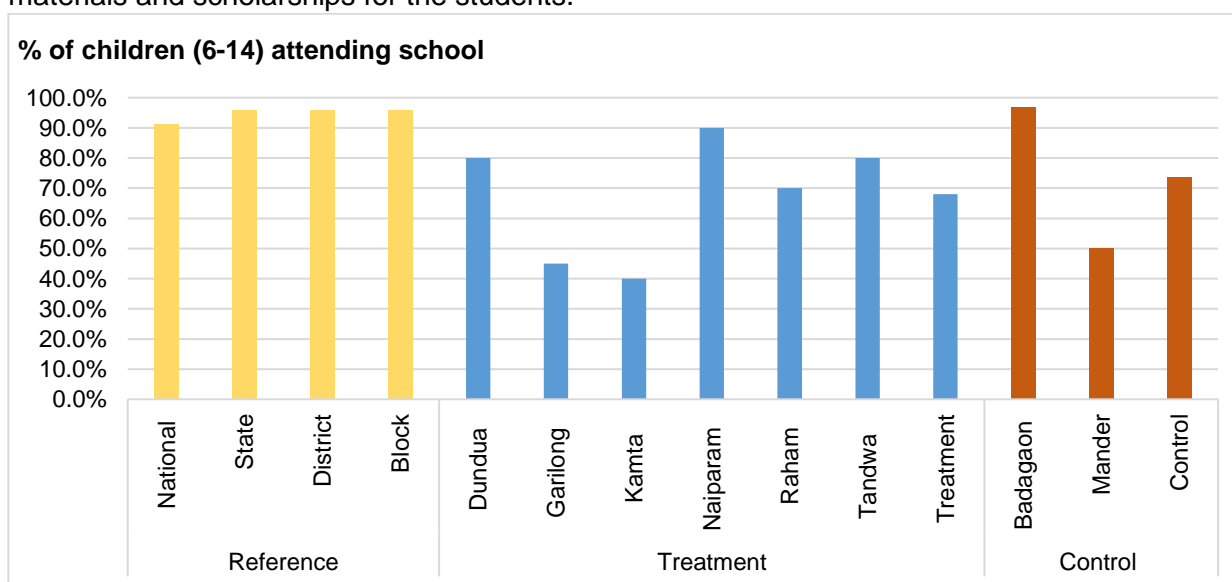


Figure 18 Percentage of children attending school

- v. **Percentage of children dropping out after grade 5²⁰:** The dropout rate of children after the completion of grade 5 was 23% for treatment villages and 21% for control villages. Kamta with

¹⁹ Jharkhand Education Project Council, Educational Indicators

²⁰ Ministry of Human Resource Development, 2014. Statistics of School Education

the highest dropout rate with about 50% of children dropping out of school after grade 5, would benefit from focused interventions to promote attendance and ensure retention of school going children. Naiparam, one of the treatment villages performed better than the District level with only 5% of children dropping out.

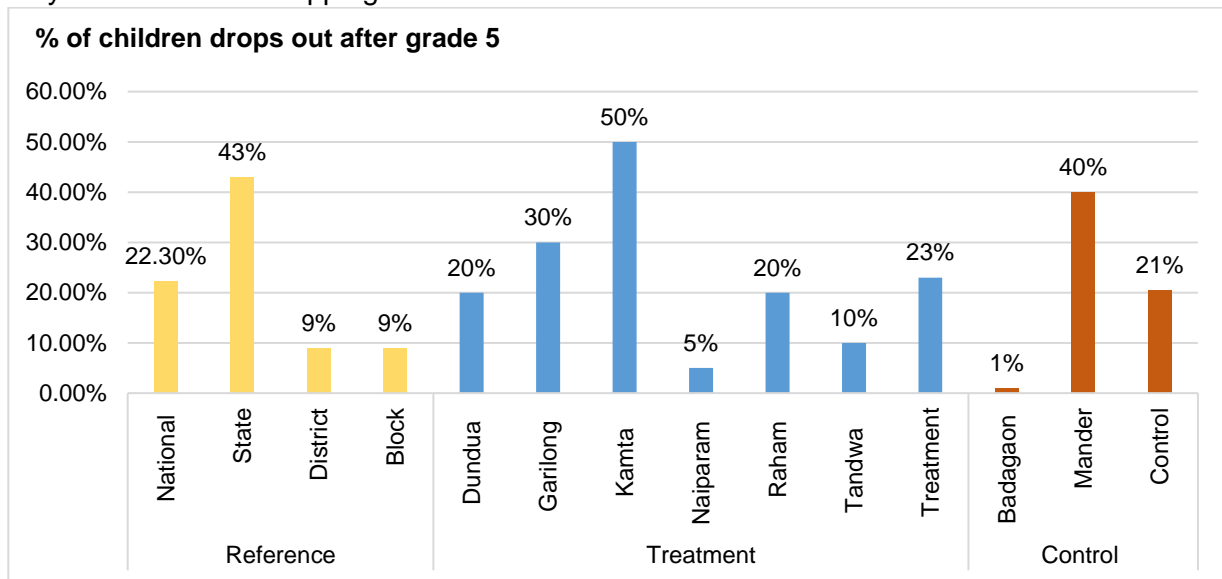


Figure 19 Drop-out rate

- vi. **Percentage of population having higher education (graduation, post-graduation, technical education)²¹:** 13% of the population had pursued higher education (graduation, post-graduation, technical education) in the treatment villages which was 5% higher than the control villages where this statistic was 8%. This difference can be attributed to NTPC's support to educational initiatives (e.g., funding of vocational trainings for the beneficiaries).

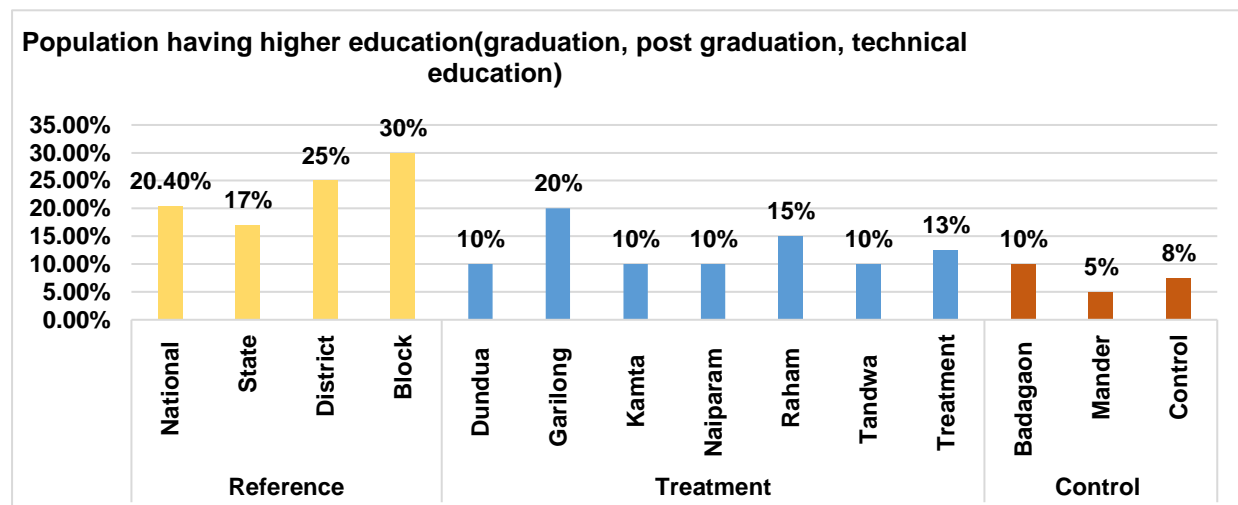


Figure 20 SDI 6: Population with Higher Education

²¹ Jharkhand Education Project Council, Educational Indicators



- vii. **Infant mortality rate per thousand**²²: In the treatment villages, the infant mortality rate was found to be 30 while in the control villages, it was 75. Garilong and Naiparam had higher infant mortality rate than other treatment villages. Tandwa, one of the treatment villages performed better than the district level with infant mortality rate at 10. Control villages on the other hand had a significantly higher infant mortality rate with an average of 75, almost 60% increase as compared to the treatment villages.

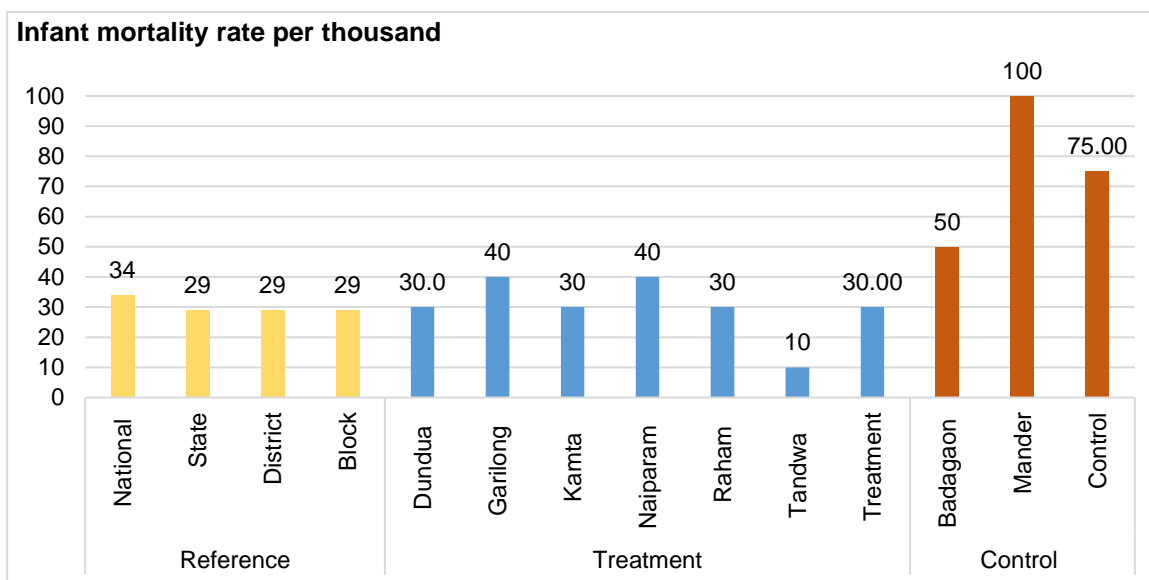


Figure 21 SDI 7: Infant mortality rate

²² Ministry of Home Affairs, 2012-13, Annual Health Survey Fact Sheet

- viii. **Maternal mortality rate per lakh**²³: The maternal mortality rate was 230 for the treatment villages which was lower than the rate of the control districts (350) by about 34%. This difference can be linked to the health camps and MMUs organized by NTPC since maternal health is one of their focus areas. Tandwa, one of the treatment villages with maternal mortality rate at 136, performed better having 35% lower MMR than the district level.

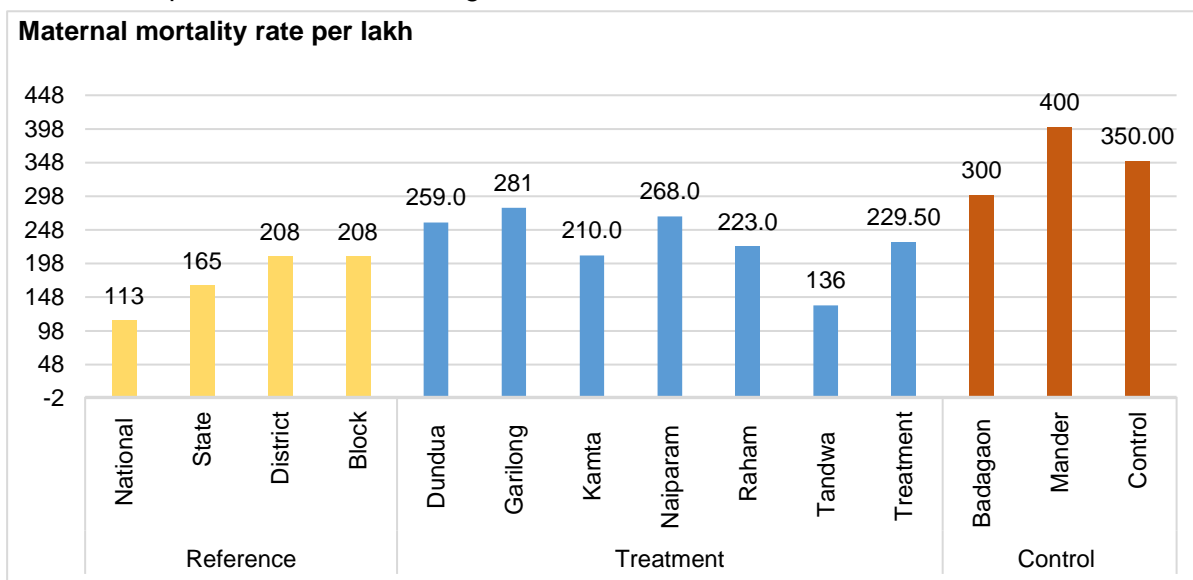


Figure 22 SDI 8: Maternal mortality rate

- ix. **Percentage of people having house/ shelter (owning a house)**²⁴: A slight difference was observed in the percentage of people having a house or a shelter between the treatment and control villages. While in the treatment villages 97% of the population had a house or a shelter, this number rose to 100% in the control villages. Overall, treatment villages performed better than the national, state and block levels.

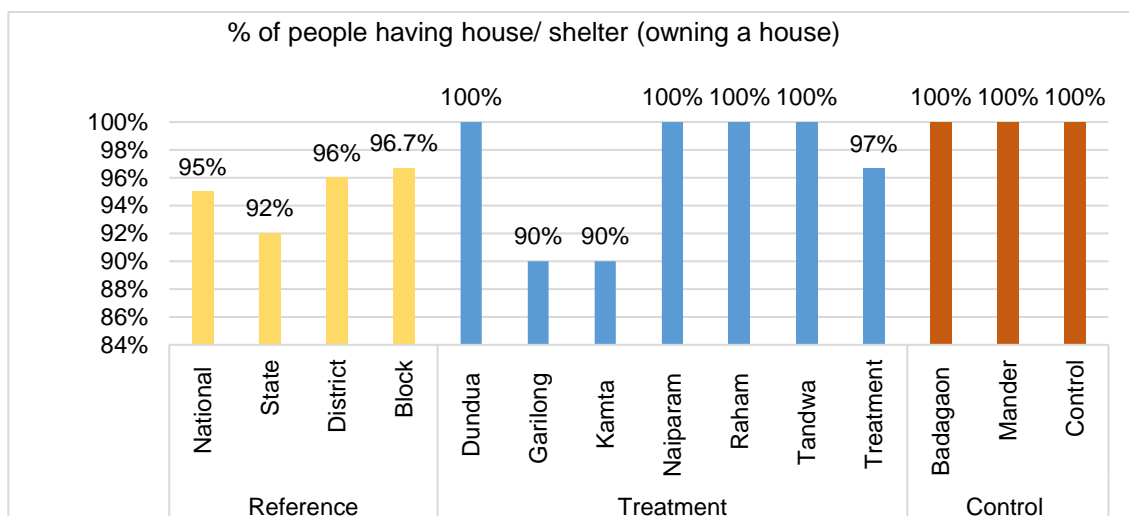


Figure 23 SDI 9: Owning a house

²³ Ministry of Health and Family Welfare, 2021, Maternal Mortality Rate (MMR)

²⁴ Source: Census 2011



- x. **Percentage of population living in pucca house²⁵:** In the treatment villages, 61% of the population was living in a pucca house while in the control villages, this percentage was reduced to 47%. Overall, treatment villages performed better than the district level with 60% increase.

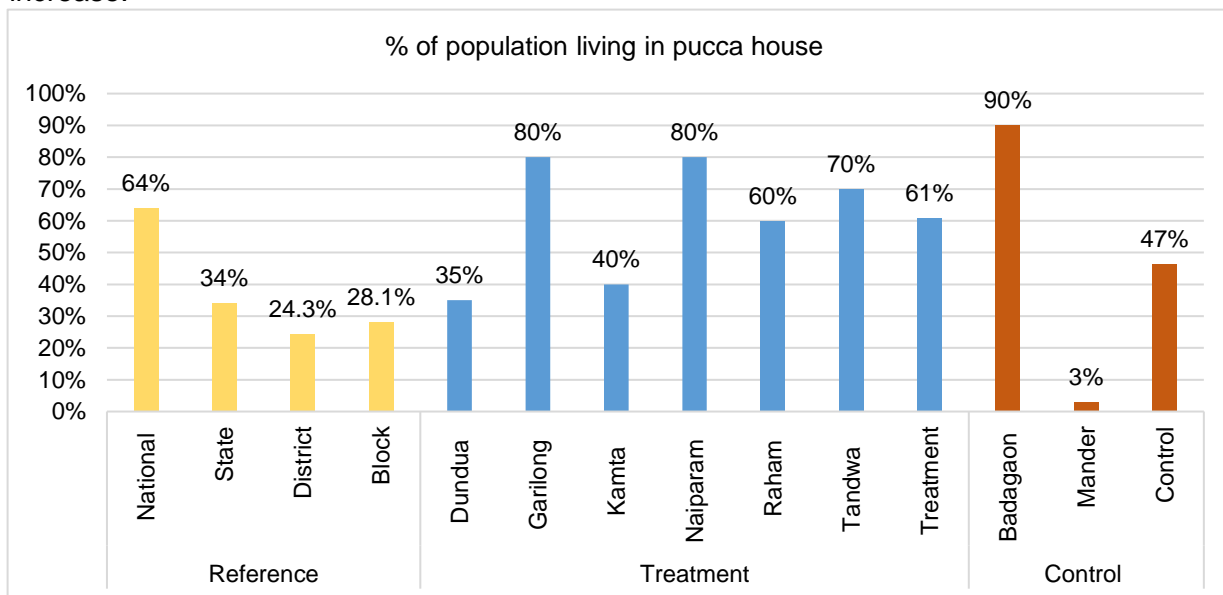


Figure 24 Pucca house

- xi. **Percentage of HHs with access to drinking water (near premises)²⁶:** 55% of the households in the treatment villages had access to drinking water near their place of residence. In control villages, around 71% of the households had access to drinking water in these villages. NTPC has supported initiatives in the treatment villages to increase access to clean drinking water in the treatment villages through the means of water tankers and pipelines. Dundua and Raham have high percentage of households with access to drinking water.

²⁵ Source: Census 2011

²⁶ Source: Census 2011

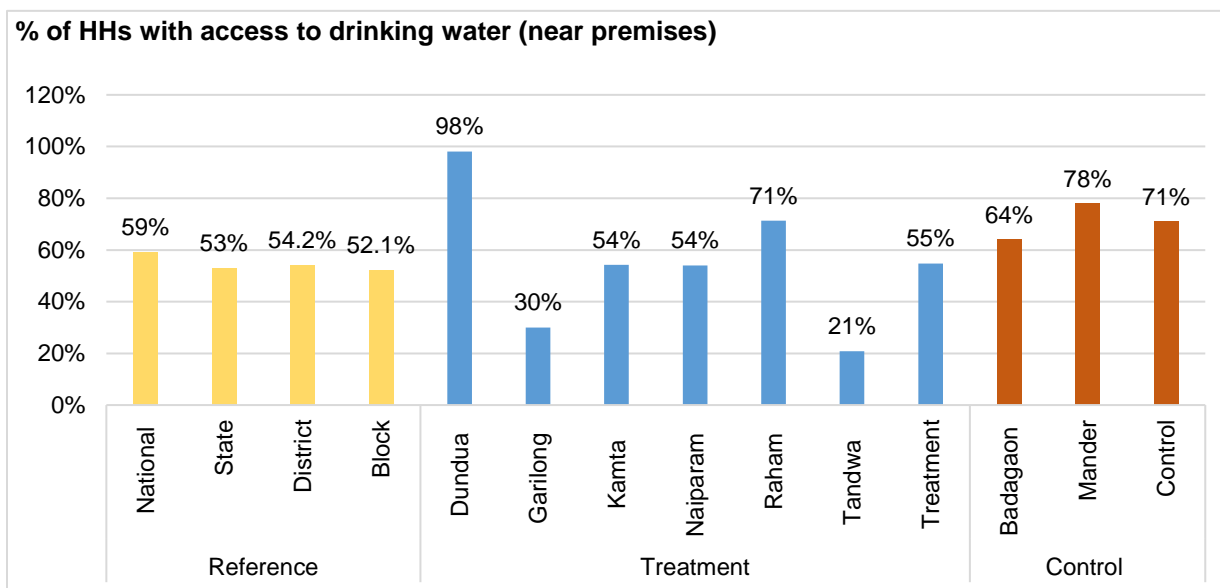


Figure 25 Drinking water

- xii. **Percentage of people having toilet facility²⁷:** With respect to the larger domain of health and sanitation, 63% of the population had access to toilet facilities in their treatment villages while this number was reduced to 35% in the control villages. This difference can be attributed to the fact that NTPC has done significant work pertaining to the construction of toilets in the treatment communities to help the residents achieve a better standard of health and sanitation.

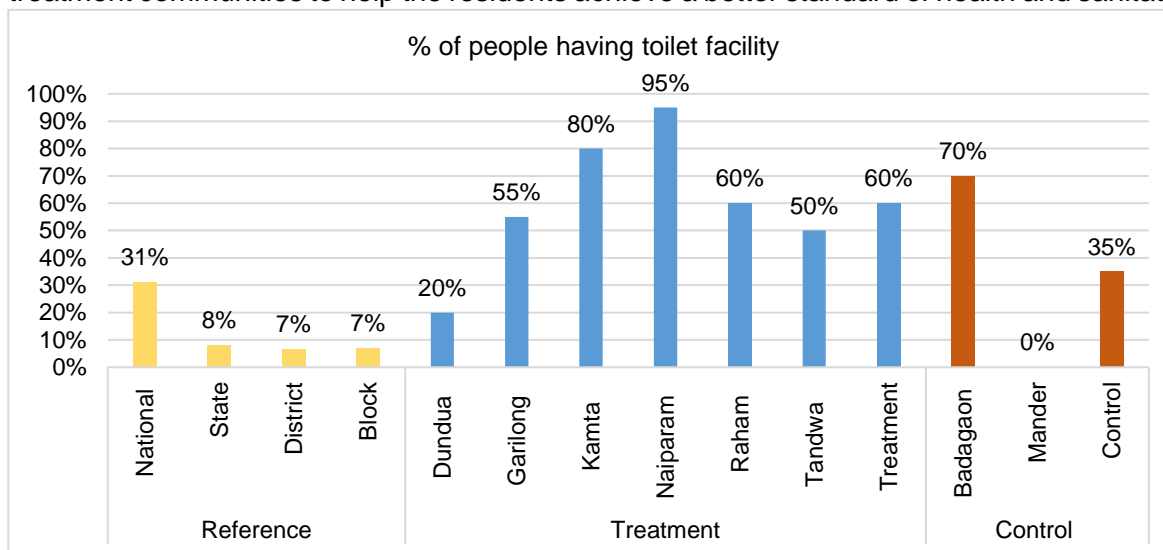


Figure 26 SDI 12: Toilet facility

²⁷ Source: Census 2011

- xiii. **Percentage of people having electricity connection**²⁸: 75% of the population in the treatment villages have had access to electricity connections while in the control villages, 88% of the population had access to electricity.

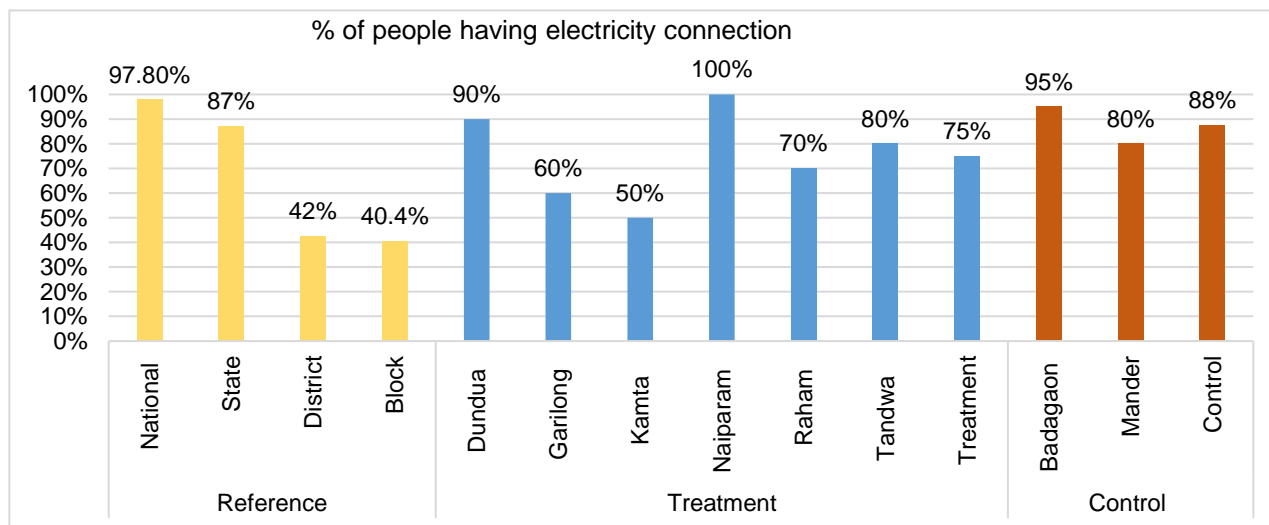


Figure 27 SDI 13: Electricity

²⁸ Source: Census 2011

5.2.1 Evaluation criterion 1: Relevance

'Relevance' is a measure of the extent to which the program has been able to support the suited needs and priorities of the stakeholders".

Relevance measures the extent to which the program was aligned with priorities and policies of the respective government where it is being implemented. It also aims to measure if the program is relevant to the needs of the beneficiaries.

Linkage of the program with Government priorities

NTPC's R&R community development programs have been implemented in the targeted villages in different thematic areas which comprise of education, health, water, livelihood, and community infrastructure.

Various programs executed by NTPC in these sectors correspond to the national priorities of the government, it can be said that the programs have linkages to the following Government programs-

- Swachh Bharat Abhiyan

This program has linkages with the Swachh Bharat Abhiyan launched on 2nd October 2014 to accelerate the efforts to achieve universal sanitation coverage. This mission promotes access to sanitation along with ensuring proper solid and liquid waste management. NTPC has been supporting and providing support under the program for constructing community toilets in the villages along with prefabricated toilets in school for students. The construction of these toilets not only promotes the habit of using toilets and avoid open defecation but, at the same time promotes sanitation and hygiene in the entire village that would in turn help in the reduction of diseases and illness amongst the people in the village.

- Pradhan Mantri Kaushal Vikas Yojana

Pradhan Mantri Kaushal Vikas Yojana (PMKVY) is the flagship scheme of the Ministry of Skill Development & Entrepreneurship (MSDE) for skilling the youths in India that would not only upgrade their existing skills but, also help them develop new skills which would make them marked ready and employable. NTPC has been investing its resources in providing vocational training to the youths, especially women in targeted villages under its R&R community development program. The youths and women in the village can get enrolled for the vocational trainings as per their preferences amongst different trades like sewing, tailoring, beautician, and computers. These trainings not only help the youth to find gainful employment but also helps them generate additional income due to their skill upgradation.

- National Rural Drinking Water Program

The National Rural Drinking Water Program aims to provide rural communities with adequate safe water for drinking, cooking, and other domestic basic needs. Under the National Rural Drinking Water Program, the Government has initiated a project in the name of "Swajal" in February 2018 that is designed as a demand driven and community centered program to provide sustainable access to drinking water to people in rural areas. Through NTPC's R&R community development program water infrastructure has been

made available in the villages through installation of RO water system, handpumps and submersible water pumps. The water initiative through NTPC is not only helping the beneficiaries have access to clean water but, also contributing in the reduction of various water borne diseases which in turn is allowing them to save money which was otherwise spent on healthcare related expenditure.

- Pradhan Mantri Jan Arogya Yojana


Ayushman Bharat also known as Pradhan Mantri Jan Arogya Yojana (PM-JAY), launched on September 23, 2018 is one of the most important government schemes enabling India to achieve its affirmed goal of Universal Health Coverage (UHC) by 2030. NTPC's health initiatives align with this program since it has been organizing free health camps in the villages and schools that allows the community to get free health screening. The program not only helps in early detection and diagnosis of diseases but, it also saves time and cost.




- Sarva Shiksha Abhiyan




Sarva Shiksha Abhiyan is one of government's flagship program for promoting universal access to elementary education, bridging of gender and social category gaps in education and enhancement of learning levels of children. It is a comprehensive scheme for universalizing elementary education that promotes community ownership of the school system through a decentralized planning and implementation strategy. NTPC has been contributing towards quality education through providing scholarships, improving school infrastructure, distributing books, school shoes & socks, etc.

Linkage of the program to SDGs and its alignment

The R&R-CD projects of NTPC are in alignment with the Sustainable Development Goals (SDGs). SDGs, also known as the global goals, were adopted in 2015 by all member states of the United Nations to work towards ending poverty, protecting the planet, and ensuring that all people enjoy peace and prosperity by 2030. India had played a crucial role in shaping the SDG goals and is committed to achieving the same by 2030.

SDG	SDG Targets	How is it aligned?
SDG 3: Good Health and Well-Being 	Target 3.1 — By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births. Target 3.2 — End preventable deaths of new-borns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births. Target 3.4 — Reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.	The project interventions aimed at promoting access to healthcare and reducing diseases. — Health and Sanitation

	<p>Target 3.8</p> <ul style="list-style-type: none"> — Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality, and affordable essential medicines and vaccines for all. 	
<p>SDG 4: Quality education</p> 	<p>Target 4.1</p> <ul style="list-style-type: none"> — By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and Goal-4 effective learning outcomes <p>Target 4.5</p> <ul style="list-style-type: none"> — Eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous people, and children in vulnerable situations 	<p>The education related activities are aimed at promoting access to quality school education.</p> <ul style="list-style-type: none"> — Education — Community Infrastructure
<p>SDG 5: Gender Equality</p> 	<p>Target 5.1</p> <ul style="list-style-type: none"> — End all forms of discrimination against all women and girls everywhere 	<p>Through various activities such as provision of vocational training for women, construction of toilets, and distributing sanitary napkins, the project works towards promoting equal access to education, and decent work for girls and women.</p> <ul style="list-style-type: none"> — Education — Skill Development — Community Infrastructure
<p>SDG 6: Clean Water and Sanitation</p> 	<p>Target 6.1</p> <ul style="list-style-type: none"> — By 2030, achieve universal and equitable access to safe and affordable drinking water for all <p>Target 6.2</p> <ul style="list-style-type: none"> — By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations <p>Target 6.4</p> <ul style="list-style-type: none"> — By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and 	<p>The project activities included installing RO water plants and pipelines in the project villages to ensure that the community members have access to safe drinking water.</p> <ul style="list-style-type: none"> — Water

	substantially reduce the number of people suffering from water scarcity.	
SDG 7: Affordable and Clean Energy 	Target 7.1 — By 2030, ensure universal access to affordable, reliable, and modern energy services Target 7.2 — By 2030, increase substantially the share of renewable energy in the global energy mix	The project activities have improved access to clean lighting sources for project affected villages through installing solar streetlights. — Community Infrastructure
SDG 8: Decent work and economic growth 	Target 8.5 — By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value Target 8.6 — By 2020, substantially reduce the proportion of youth not in employment, education, or training	The project activities promote access to skill development courses for marginalized youth to make them employable and help them contribute to the workforce and economy. — Skill Development
SDG 11: Sustainable cities and communities 	Target 11.2 — By 2030, provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons Target 11.7 — By 2030, provide universal access to safe, inclusive, and accessible, green, and public spaces, in particular for women and children, older persons and persons with disabilities	The project activities work towards improving community infrastructure through constructing roads, drains, community buildings, boundary walls, toilets, etc. — Community Infrastructure

Among the beneficiaries surveyed, 22% of the beneficiaries stated that the education projects executed by NTPC in their respective villages were relevant to their needs. About 34% of the respondents stated that the health and sanitation related interventions were relevant and had been able to address villages' requirement. Around 44% of the beneficiaries surveyed shared that the water related interventions to promote access to safe drinking water were relevant and aligned with the needs of the target community. Among the respondents, 78% of them indicated that the skill development trainings were relevant to the needs of the community. About 34% of the

beneficiaries surveyed noted that the community infrastructure activities were relevant and aligned to their needs. Overall, on an average 44% of beneficiaries reported that NTPC's interventions were relevant across various thematic areas.

Other government schemes and programs:

- *Jharkhand State Post Matric Scholarship*²⁹: Students who have passed class 10th and are pursuing their studies from class 11th to postgraduation level can apply for this scholarship if the annual income of the family is less than INR 2.5 Lakh (for SC/ST category) and INR 1.50 Lakh (for BC category).
- *Morang Gomke Jaipal Singh Munda Foreign Scholarship*³⁰: In order to promote access to foreign education, the Jharkhand government has launched the Morang Gomke Jaipal Singh Munda Foreign Scholarship scheme to send six Adivasi youth to foreign universities for higher studies. This scheme is an annual scholarship program with tribal students provided opportunities every year to study overseas. The entire cost of their studies is to be borne by the state government under the state government's flagship program named after Jaipal Singh.
- *Phoolo Jhano Ashirwad Abhiyan*³¹: The Phoolo Jhano Ashirwad scheme aims at identifying women involved in the manufacture and sale of Hadiya-Daru (brewed rice beer and liquor) and connecting them with the means of respectable livelihood. Jharkhand government has identified 15,456 liquor selling women till date and around 13,356 women have benefited from the scheme and were provided a loan of INR 10,000 which has helped them find alternate source of livelihood.
- *Bishisht Janjati Khadyanna Yojana or Dakia Yojana*³²: The Dakia Yojana provides particularly vulnerable tribal groups (PVTGs) with assured delivery of 35kg rice free of cost every month. This scheme provides 35kg of rice every month to around 73,000 families belonging to the following 8 tribes identified as PVTGs in Jharkhand- Asur, Birhor, Birjia, Korwa, Parahiya (Baiga), Sabar, Mal Paharia and Souriya Paharia.
- *Sona Sobran Dhoti Saree Scheme*³³: Through this scheme, the government provides one saree and one lungi or dhoti to 57.10 lakh families that fall below the poverty line twice a year at a subsidized price of Rs. 10 per piece.
- *Jharkhand Sahai Scheme*³⁴: The Sahai Yojana aims to create goodwill between the people and the police force through sports while identifying and grooming budding sportspersons from the area. The government organizes various sports tournaments in collaboration with national and state-level sports federations under this scheme.
- *Poto Ho Khel Vikas Yojana*³⁵: The government provides support to build a sports ground in every panchayat and provide players with a scholarship of INR 3000 to INR 6000 every month.
- *Jharkhand Samekit Birsa Gram Vikas Yojana (Krishak Pathshala)*³⁶: This scheme aims to promote the welfare of the state's farmer through improving access to the following: state-of-the-art technologies, tools of modern-day farming for horticulture, livestock rearing and pisciculture, new irrigation techniques, and training.

²⁹ <https://www.scholarshipsinindia.com/scholarships-in-jharkhand.html>

³⁰ <https://scholarshiparena.in/marang-gomke-jaipal-singh-munda-transnational-scholarship/>

³¹ <https://avenuemail.in/phoolo-jhano-ashirwad-abhiyan-a-game-changer-for-rural-womens-livelihood/>

³² <https://www.telegraphindia.com/jharkhand/jharkhand-govt-to-conduct-social-audit-into-free-foodgrain-scheme-for-primitive-tribes/cid/1833381>

³³ <https://sarkariyojana.com/sona-sobran-dhoti-saree-scheme>

³⁴ <https://www.newindianexpress.com/nation/2021/sep/01/jharkhand-plans-sahai-to-promote-sports-in-naxal-hit-areas-2352933.html>

³⁵ <https://www.sarkariyojnaye.com/jharkhand-poto-ho-khel-vikas-yojana/>

³⁶ <https://sarkariyojana.com/samekit-birsa-gram-vikas-yojana/>

- *Jharkhand Mukhyamantri Kanyadan Yojna*³⁷: The state government provides support towards daughter's marriage for poor people who cannot afford the cost of marriage. Jharkhand government aims to provide INR 30,000 to each beneficiary so that the condition of women in the state gets improved.

5.2.3 Evaluation criterion 2: Effectiveness

'Effectiveness' is an assessment of the factors affecting the progress towards outcomes for every stakeholder and validation of robustness of systems and processes. It helps in ensuring that the implementation and monitoring systems are robust to achieve optimum social impact."

Effectiveness of the program is measured by evaluating how effectively the programs activities were implemented and the effectiveness of systems and processes deployed for the program. NTPC has executed the R&R community development projects with different thematic areas on the field with the support of village heads/ Gram Pradhan's in the respective villages. Timelines and milestones for the project are decided in consultation with village heads and accordingly the program gets executed on time in these villages.

NTPC has executed the educated related activities on the field with the support of village heads/ Gram Pradhan's in the respective villages. Timelines and milestones for the project are decided in consultation with village heads and accordingly the program gets executed on time in these villages.

Since these programs were aligned to the needs of the beneficiaries, and were accomplished within the agreed timeline, it can be said to be effective in nature. However, based on the feedback received from the beneficiaries, it is recommended to have a robust monitoring mechanism in place to ensure better implementation of activities for more substantial and sustainable impact.

5.2.4 Evaluation criterion 3: Efficiency

'Efficiency' criterion aims to measure if the project was implemented in a cost-effective and timely manner.

The purpose is to understand if the inputs (funds, expertise, time, etc.) were utilized efficiently to achieve the intervention outcomes. Factors such as budget utilization and timelines have been reviewed.

This evaluation criteria aims to measure if the program was executed in a cost-effective and timely manner. NTPC's R&R community development program has been able to cater to the needs of the beneficiaries in an efficient manner in the respective villages of intervention. The program has been efficiently implemented in the villages with the support of Gram Panchayats (GP) and beneficiaries themselves.

I. Timeliness of delivery or implementation of project interventions

On yearly basis NTPC plans on R&R community development activities at the villages in the vicinity of their operational area. Timelines are set up in consultation with the Panchayat for the completion of different activities under thematic areas of the project in a phased manner which includes planning phase, implementation phase and evaluation phase. Projects were

³⁷ <https://www.rojgardunia.com/jharkhand-mukhyamantri-kanyadan-yojana/>

implemented by NTPC in the villages as per the recommendations made by the village head, local leaders, community representative.

II. Cost efficiency of project activities

NTPC allocates budget for each thematic area under its R&R community development program. The budget is allocated for 6 villages in Chatra district of Jharkhand for NTPC Karanpura's education related activities. NTPC makes sure that the budget is well distributed amongst all the activities across all the thematic areas that are education, health, water, community infrastructure, skill development, and sports and culture. It was also found out through interaction with the NTPC team members that there was no overshooting of the budget and all the activities were executed well within the allocated budget. Payment milestones were clearly defined as such, projects activities are implemented in the villages by NTPC as per the suggestions given by the village heads.

Table 7: NTPC's R&R-CD spent for last 4 years ³⁸

Year	Education	Health	Water	Community Infrastructure	Skill Development	Sports & Culture
2016-17	7938726	8883338	14875963	43319240.15	4197599	11066925.2
2017-18	1231709	5810544	16070232	35256651.13	277200	1847697
2018-19	313966	5662707	14416500	24375543.7	482130	3051566
2019-20	2521509	6281241	26301848	21322309	72599	3426901
Total (INR)	12005910	26637830	71664543	124273744	5029528	19393089.2

III. Human resource plotting

NTPC has appointed one dedicated CSR staff member at the Karanpura plant location who is responsible for overseeing the R&R community development programs being implemented in each of the villages in its operational area. Apart from this NTPC's CSR division is layered on a three-tiered structure which is corporate level, regional level and station level having separate board level committee guiding corporate social responsibility, and also responsible for approving and reviewing CSR activities from time to time.

IV. Duplication/ overlap of project activities

Duplication of effort arises when more than one project or intervention is needlessly implementing similar activities within the same area or location arising often due to poor knowledge management and inadequate coordination of projects, thereby resulting in fund and resource inefficiency. No such duplication of project activities was found during the evaluation phase. Only

³⁸ Source: Data Provided by NTPC Karanpura

one village (Dundua) out of the six project affected villages reported a similar intervention which covered less than 20% of their needs.

5.2.5 Evaluation criterion 4: Impact

'Impact' has been measured in terms of the proportion of respondents who reported having a significant change in their lives due to the initiation of the project.

The purpose of measuring the impact is to ascertain the primary or secondary long-term effects produced by the project. This could be directly or indirect and intended or unintended. Unintended effects are effects that were not planned as a result of the intervention and can be positive or negative.

Education

NTPC has conducted various project activities to promote access to quality education for children residing in the project affected villages. According to the survey data, there has been an increase in the school attendance of the children and children have become regular in attending school. Overall, 32% of the respondents stated that the attendance and regularity of their children have gone up after NTPC's intervention in the schools under their community development projects. Furthermore, 33% beneficiaries surveyed shared that there has been an increase in attendance and regularity of girls. Around 32% beneficiaries surveyed shared that enrolment of girls have increased post the intervention. During stakeholder interactions, the attendance rate for children in treatment villages was reported to be approximately 78%, whereas attendance rate for control group stands at 75%. This impact has been created through provision of various amenities to students in school like desk and benches, books, school shoes and socks, to the children, sanitary napkins to school-going girls and other infrastructural support including construction of classrooms and separate toilet blocks for girls in schools. Supply of these basic amenities to the children in schools have also reduced the dropout rate. Amongst the beneficiaries surveyed, 37% shared that there has been a reduction in overall dropout rate in schools as well as decrease in dropout rate of girls in particular. Basis interactions with key stakeholder, it was noted that the dropout rate in treatment villages stands at 8% whereas control group villages had a dropout rate of 26%. This significant difference in dropout rate between treatment and control villages highlight the impact of NTPC interventions at promoting retention of children in school. Similarly, there has been a decrease in dropout rate of girls from 8.3% before intervention to 6% currently. Dropout rate for girls in control group stands at 16% as compared to 6% in treatment villages.

40% of the parents of the children who were surveyed reported an overall increase in the learning level of their children as their regularity to school has improved due to NTPC's intervention with the provision of various facilities for students. Also, during the stakeholder interactions, it was noted that there has also been an improvement in the passing percentage of students. Supply of basic amenities like books, desk-cum benches, school shoes and socks, etc., enhanced their interest levels and motivated them to attend schools and improve their learning levels. 37% of the beneficiaries surveyed also stated an average annual reduction in education related expenditure contributing to average saving of approximately INR 1041. During the focused group discussions, it was shared that the beneficiaries found the distribution of desk and benches to be helpful. However, they had concerns around the education interventions, which according to them were not able to substantially improve access to quality education for all.

Village wise levels of beneficiaries reporting increase in regularity and attendance and decrease in drop-out rate is presented in the table below.

Villages	Beneficiaries reporting increase in attendance and regularity of their children	Beneficiaries reporting increase in attendance and regularity of their children (girls)	Beneficiaries reporting increase in enrolment	Beneficiaries reporting increase in enrolment (girls)	Beneficiaries reporting reduction in the drop-out rate	Beneficiaries reporting reduction in the drop-out rate (girls)
Dundua	9	27	27	18	27	18
Garilong	54	23	15	15	31	23
Kamta	67	33	42	50	42	58
Naiparam	25	33	33	33	58	58
Raham	17	33	33	33	25	25
Tandwa	15	46	31	38	38	38
Total	32	33	30	32	37	37

Health & Sanitation

To cater to the healthcare needs of the community, NTPC has been organizing free health camps in the villages periodically, for the community to avail free health care services. NTPC Mobile Medical-care Unit (MMU) visits the project villages on a weekly basis to conduct regular health check-ups including blood pressure, sugar, and other diagnostic checks and provide medicines free of cost to the beneficiaries. During the focused group discussion, it was indicated that these mobile health care units have helped the beneficiaries in accessing basic healthcare service. According to the field survey, 45% of the beneficiaries surveyed shared that access to health services has improved after NTPC's intervention. With an improved access to infrastructure, 24% beneficiaries reported reduction in incidence of diseases.

Around 97% of the beneficiaries shared that NTPC organizes free health camps for the community. These health camps are organized once a week by NTPC as reported by 77% of the beneficiaries. Amongst the beneficiaries surveyed, 76% of respondents noted that MMU service is available for their community. Mobile healthcare unit conducts free health check-ups once a week and provides medicines, as reported by the beneficiaries. Around 72% of the beneficiaries were satisfied with the service provided in the MMU. However, the beneficiaries noted that provision of medicines needs improvement and pathological tests can be added for better healthcare service.

Furthermore, provision of free medical services has contributed to decrease in health expenditures. Overall, 68% of the beneficiaries surveyed reported reduction in such expenditures and the average annual expenditure on health expenses INR 3247. Access to improved health



Figure 28 Mobile Medical Unit

care services have helped people in having more productive hours of work which has eventually helped them in increasing their income over a period. 4% of the total respondents reported an average increase in their income by INR 149.

Villages	Beneficiaries reporting improvement of health infrastructure in the village	Beneficiaries reporting improved access to affordable health care	Beneficiaries reporting timely availability of treatment	Beneficiaries reporting reduction in health expenditure
Dundua	25	33	33	50
Garilong	50	36	57	64
Kamta	67	58	25	25
Naiparam	50	50	42	58
Raham	33	50	58	50
Tandwa	17	42	42	50
Total	41	45	43	50

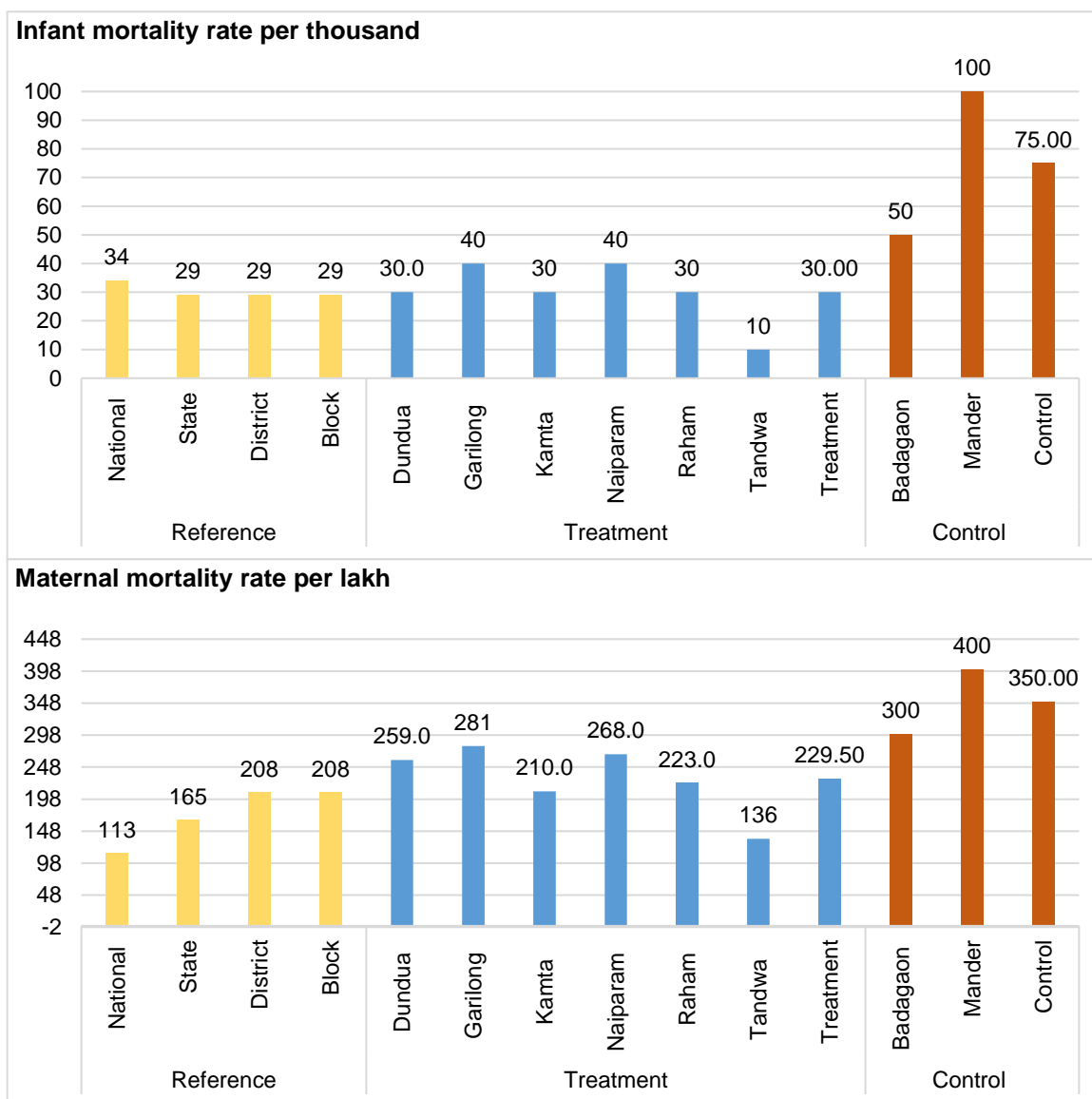


Figure 29 Treatment vs Control: Health Indicators

A comparative view of treatment and control group data shows impact of NTPC's project interventions and highlights scope of improvement as well. As per the graph above³⁹, the data collected on key social development indicators for health shows that the treatment villages performed better on maternal mortality rate and infant mortality rate as compared to the control group. In case of control villages, 100% of stakeholders noted challenges around poor quality of health services and inadequate health staff. Around 67% of stakeholders from treatment villages remarked that they face similar challenges, which shows that NTPC's health interventions are addressing the needs of the community and improving access to healthcare.

³⁹ Source: KPMG Primary Data Analysis

Around 24% of the beneficiaries surveyed reported that construction of toilets has reduced open defecation and improved sanitation. Overall, 24% of the beneficiaries across the treatment villages noted that NTPC had constructed toilets in their house. Around 67% of the beneficiaries from Naiparam reported the same as NTPC focused its effort to make Naiparam open defecation free through construction of toilets in individual households. As per the data collected on development indicator, it was noted that 60% of the population in treatment villages had toilet facility as compared to 35% of population in control group. Also, 95% of the population in Naiparam were reported as having toilet facility, as shown in the graph above. 5 out of the six treatment villages had over 50% of the population having access to toilet facility. One of the control group villages-Mander, noted severe lack of sanitation facilities. Treatment villages performed better with an additional 25% of population having access to toilet facilities, as compared to control group. This highlights the significant impact generated by NTPC’s sanitation interventions in improving access to toilet facilities for the beneficiaries.



Figure 31 Toilet Facility, Dundua

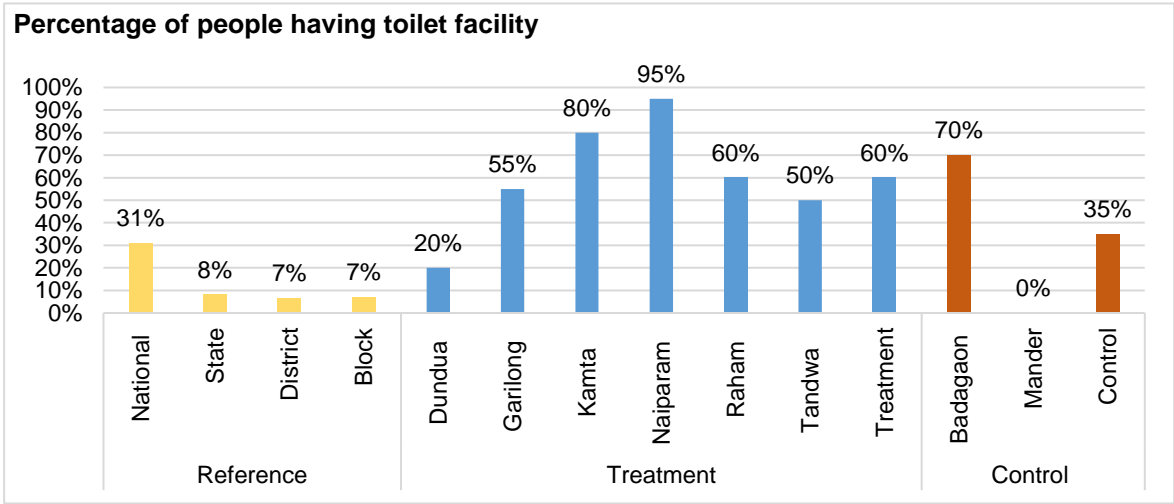


Figure 30 Treatment vs Control: Toilet Facility

Water

To address the water needs of the community, NTPC has supported in the provisioning of water tankers, installation of hand pumps and solar pump systems, construction of borewells and extension of pipelines in the villages to facilitate people with clean and safe drinking water. 75% beneficiaries reported that the overhead tank installed by NTPC is primary source of drinking water for the community. Village wise levels of beneficiaries reporting improved access to safe and reliable water, and reduction in water borne diseases are presented in the table below.

Table 8: Percentage of beneficiaries reporting improved access to clean water⁴⁰

Villages	Beneficiaries reporting access to clean water	Beneficiaries reporting decrease in water borne diseases
Dundua	58	58
Garilong	71	64
Kamta	83	50
Naiparam	67	33
Raham	75	50
Tandwa	18	18
Total	63	47



Figure 32 Water Tank in Dundua (left) and Raham.

Access to regular supply of good quality water is important for health and economic well-being of people. Beneficiaries reported that typhoid, dysentery, and giardia were the most common water-borne diseases in the area. Among the beneficiaries surveyed, 47% reported reduction in the onset of water borne diseases. Around 16% of the beneficiaries surveyed noted a reduction in health expenditure due to water borne diseases. The average reduction of medical expenditure was INR 209 annually. Furthermore, 15% of the respondents stated that there has been an increase in income due to engagement in economic activities in the time saved due to reduced illness. Around 29% of the beneficiaries experienced an overall improvement in health due to installation of water infrastructure. Before the intervention, the beneficiaries faced major challenges in accessing water, specifically pertaining to travelling long distances to fetch water.

⁴⁰ Source: KPMG Primary Data Analysis

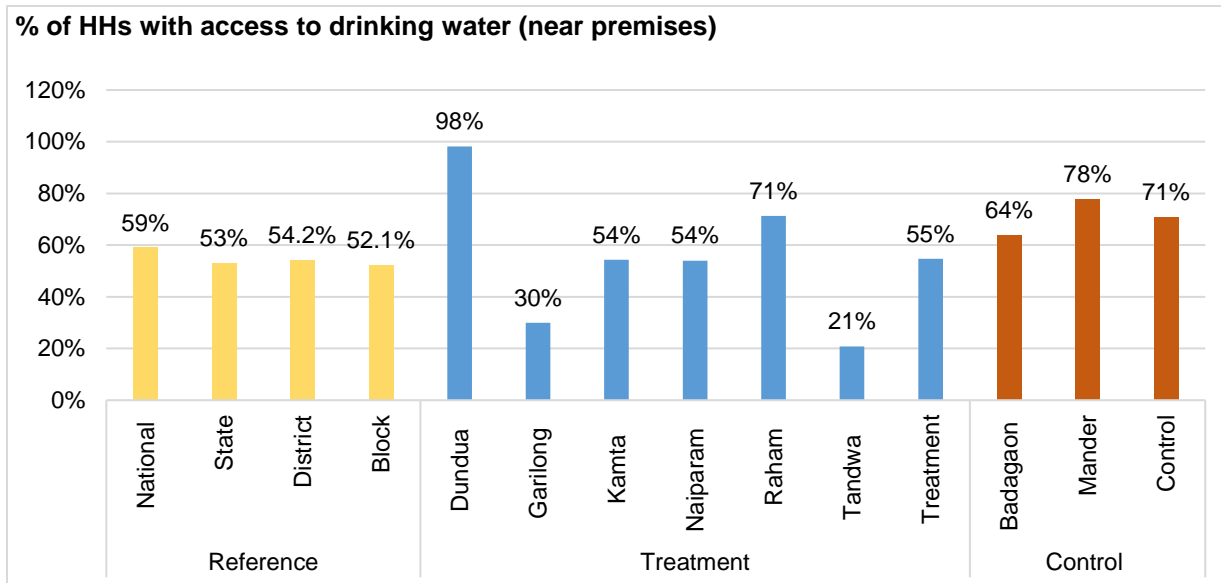


Figure 33 Treatment vs Control: Access to drinking water

According to 53% of the beneficiaries surveyed, installation of water supply related infrastructure such as water tankers and pipelines has helped them save time. Around 75% had reported lack of access to clean water for drinking and domestic purposes before intervention. Around 63% of the beneficiaries surveyed reported having access to safe drinking water due to NTPC's interventions which resolved their concerns around water to a large extent. Approximately 69% of the women beneficiaries surveyed reported improved water supply system in villages post intervention. During stakeholder interactions, 67% noted that NTPC has helped improve the water supply system in the village with 50% of them reporting reduction in onset of water-borne diseases and health-related expenses for the villagers. Overall, around 83% of the key stakeholders from the treatment villages noted improvement in access to safe drinking water in their village. Among the two control group villages surveyed, the village Mandir did not have access to clean water for the villagers. During stakeholder interactions with the control group, it was noted that there was a lack of regular supply of safe water and maintenance of water pipelines and tankers. As the graph below shows, percentage of households with access to drinking water within premises and/or near to their premises is lower for treatment (55%) than control (71%) villages. With 55% of the households in treatment villages having access to drinking water, there is a scope of improvement and scaling up of water-related interventions by NTPC.



Figure 34 Water Tap in household, Dundua

Skill Development

NTPC's interventions in skill development included provision of sponsorship for programs in various government ITIs, provision of training in skills such as tailoring, mushroom cultivation, etc. Around 63% of the beneficiaries reported that the training was accessible for those who needed it. The training program had a positive impact on both the theoretical and practical learning of the beneficiaries. About 67% of the surveyed beneficiaries found the training to be effective and noted that they were able to understand and apply the concepts that were covered during the course. Around 33% of the beneficiaries suggested that the intervention could be improved through focusing on quality of training and course content, as well as building capacity of the trainers. Among the beneficiaries surveyed, about 52% remarked that their skills had been improved after attending NTPC's skill development activities.

Villages	Beneficiaries who found the training to be accessible for those who needed it	Beneficiaries who found the training useful for understanding and applying the subject
Dundua	100	100
Garilong	40	50
Kamta	71	57
Naiparam	50	50
Raham	100	100
Tandwa	75	100
Total	63	67

About 37% of the beneficiaries expressed that the program had played a role in enhancing their employability. Around 52% of the beneficiaries felt that there was an increase in their confidence levels after the completion of the training. With reference to social aspects, 56% of the beneficiaries reported that their role in making family decisions has increased post completion of the training. Social praise was another aspect which was increased in value for them, with 44% stating that they received praise from the other residents of the village. Around 19% of the beneficiaries also noted that they had also increased their participation in decision-making at the village or community level. Moreover, around 22% of beneficiaries noted improvement in other aspects of their social and personal lives. Around 11% of the beneficiaries also reported that the program increased their access to government schemes. Overall, 63% of the surveyed beneficiaries were satisfied with the skill development program.

One of the main concerns were around employment opportunities for the beneficiaries. Although the skill development interventions by NTPC have helped in improving access to skill trainings and enhancing their skillsets, there has not been significant positive impact on their livelihood. Only 4% of the beneficiaries reported that they were able to secure an employment post completion of training, whereas 30% of the beneficiaries engaged in some form of entrepreneurial activity. Around 7% of the beneficiaries reported an increase in income. A comparative view of treatment and control group data shows impact of NTPC's project interventions in improving access to skill development training in the treatment villages as the none of

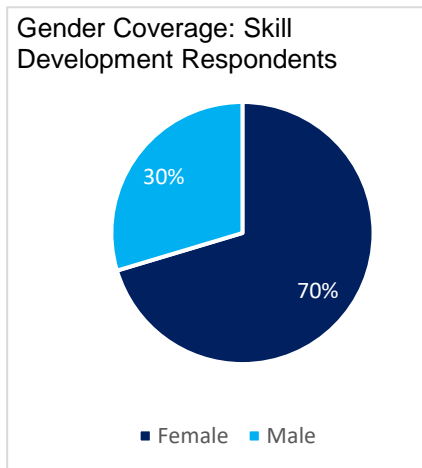


Figure 35 Skill development: Gender distribution

the control group villages had access to any skill development program. The impact of skill development interventions by NTPC could be strengthened through focusing on employment opportunities and providing the beneficiaries with a sustainable source of livelihood.

Community Infrastructure

As part of R&R-CD activities, NTPC has installed streetlights, constructed internal roads, boundary walls in the villages. Overall, 34% of the beneficiaries surveyed shared that the community infrastructure and welfare related intervention of NTPC Karanpura were aligned to the community needs. NTPC's community infrastructure interventions included installation of solar streetlights in the project affected villages. 30% beneficiaries surveyed shared that the installation of solar streetlights has improved reliable outdoor lighting in the villages.



Figure 36 Streetlights in Dundua (first and second photograph from the left) and Tandwa

On the security front, 38% of the beneficiaries reported that there has been a reduction in incidences of crime in the villages. Moreover, around 39% respondents shared that they experience an enhance sense of safety for women and children post installation of streetlights in the villages. About 38% of the beneficiaries surveyed shared that there has been a reduction in accident rates as well as an increase in social activity after dark in the villages due to improved safety. Also, 19% of the respondents shared that this intervention has helped them engage in commercial activity after dark as they can continue with their work due to the installation of streetlights. Village wise percentages of beneficiaries reporting impact of improved lighting



Figure 37 Streetlights, Tandwa

in the villages post installation of streetlights by NTPC is presented in the table below:

Table 9: Percentage beneficiaries reporting improved lighting in the villages post installation of streetlights by NTPC

Villages	Reliable outdoor lighting %	Reduced incidence of crime %	Less accident rate %	Enhanced sense of safety for women and children %	Increased social activity and interactions, particularly after sunset %
Dundua	8	15	23	23	23
Garilong	57	71	71	64	50
Kamta	75	83	83	83	83
Naiparam	8	0	0	8	8
Raham	8	17	8	17	17
Tandwa	18	36	36	36	36
Total	30	38	38	39	36

During the focused group discussion with the beneficiaries, the beneficiaries expressed satisfaction with NTPC 's support in construction of roads. They shared that NTPC carried out repair work for existing roads and also constructed various roads within the villages. They noted that before construction of these roads, they faced difficulties in commuting from one place to the other, especially during monsoons due to extensive water logging. With the construction of these roads, connectivity has improved to a significant extent. Furthermore, 38% of the beneficiaries surveyed reported enhanced connectivity to rural infrastructure such as schools, hospitals, etc., due to construction of the roads.

The construction of new roads has also led to reduced accident rates in the villages. Around 62% of the beneficiaries surveyed noted that there has been a reduction in accident rate. Further, about 64% of the beneficiaries reported that they have experienced a sense of safety while commuting after these roads were constructed by NTPC. 31% of the respondents reported that road construction has reduced their travel time and helped them earn an average additional income of INR 4467 annually. Village wise percentage of beneficiaries reporting impact on enhanced connectivity, safety, and reduction in travel time due to construction of roads is presented in the table below

Table 10 Beneficiaries reporting impact due to construction of roads in the village

Villages	Beneficiaries reporting that NTPC has developed the market area in Tandwa	Beneficiaries reporting improved access to basic rural infrastructure post development of roads	Beneficiaries reporting reduction in the accident rate post development of roads	Beneficiaries reporting enhanced sense of security after construction of road	Beneficiaries reporting that reduction in travel time and increase in number of hours of economic activities

Dundua	85	23	54	62	8
Garilong	93	71	86	93	71
Kamta	100	42	67	75	50
Naiparam	83	33	67	58	8
Raham	83	42	50	50	25
Tandwa	73	9	45	36	18
Total	86	38	62	64	31

According to 38% beneficiaries surveyed, NTPC had constructed drains in their villages to prevent water logging, mosquito breeding and spread of diseases. 19% of the respondents noted that there has been a decrease in the incidence of water-borne diseases in the family after implementation of the project/ constructions of drains in the village. The beneficiaries shared that since the drainage systems were either recently constructed or still under construction, there has not been a significant impact on the prevalence of water-borne diseases due to the intervention.

Sports & Culture

Around 40% of the surveyed beneficiaries reported that the activities that were arranged by NTPC led to an improvement in their participation in regular sports and sports related competitions. About 51% of the surveyed beneficiaries mentioned that the sports initiatives by NTPC helped them in developing their sports habits and enhance their interest in them. NTPC's sports interventions had a significant impact on the health of the beneficiaries. 92% of the surveyed beneficiaries reported that they have experienced improved physical fitness after getting involved in sports activities and initiatives conducted by NTPC. Village wise percentage of beneficiaries reporting improved health and physical fitness due to NTPC interventions is presented in the table below:

Table 11 Beneficiaries reporting improved health and physical fitness



Figure 38 Road built, Raham

Villages	Beneficiaries reporting improved health and physical fitness
Dundua	93
Garilong	100
Kamta	83
Naiparam	100
Raham	89
Tandwa	92
Total	92

Around 89% of the beneficiaries surveyed noted that sports events were organized in their village by various stakeholders such as NTPC, government, schools, community, or other organizations. During stakeholder interaction with control group villages, it was noted that there was no provision of organizing sport events except few events at the school level. There was no effort from the government, panchayat, or any other stakeholder to promote sports, and interested players had to support themselves to pursue sports.

NTPC has also provided various financial resources for the organization of cultural events and festivals across the intervention villages. This has led to a reduction in the expenditure on cultural events of the surveyed beneficiaries after NTPC's intervention. The average annual expenditure across villages was INR 2,977 which has now been reduced to INR 1,847. Thus, on an average there has been a reduction of INR 1130 in the annual expenditure on cultural events organized in the treatment villages. Village wise percentage of beneficiaries reporting pre and post intervention average annual expenditure on cultural events is presented in the table below:

Table 12 Beneficiaries reporting pre and post intervention average annual expenditure on events


Villages	Average annual expenditure on cultural events (pre-intervention)	Average annual expenditure on cultural events (post-intervention)	Delta change in average annual expenditure on cultural events
Dundua	1,400	1,031	369
Garilong	2,921	1,957	964
Kamta	3,283	1,575	1,708
Naiparam	2,642	2,033	609
Raham	3,250	1,900	1,350
Tandwa	4,368	2,586	1,782
Total	2,977	1,847	1,130

5.2.6 Evaluation criterion 5: Sustainability

This criterion assesses the likelihood that project achievements will continue after the project. This includes an examination of the capacities of the systems needed to sustain benefits over time. The criterion analyses the resilience, risks, and potential trade-offs.

Sustainability means continuation of benefits from an intervention after development assistance has been completed. The probability of continued long-term benefits and resilience to risk are important components of this evaluation criterion. Ensuring sustainability requires putting in place governance structure, finance model and operating system.

NTPC has implemented the projects in the villages as per the recommendations made by the community. However, during the interactions with the community stakeholders such as village head, local leaders, community representative, etc., it was indicated that their involvement in all the phases of project implementation (designing, selection of beneficiaries, monitoring and feedback) was relatively low. NTPC team will need to focus more at developing the capacity of different stakeholders, especially gram Pradhans, ASHA workers, school officials, etc., so that they get involved in planning and implementing the activities and designing a robust monitoring mechanism to enforce accountability and take corrective actions. Also, NTPC can form and strengthen a local management committee through capacity building exercises and empower them to play a key role in project implementation and monitoring, which would also help sustaining the project impact over longer period. Maintenance and repair of the infrastructure and assets



created through project interventions is one of the key concerns shared by the stakeholders and beneficiaries. Thus, in order to ensure and enhance sustainability of the impact created mechanisms around management and monitoring at the community level need to be formulated and bolstered.

Qualitative Observations

Chapter 6: Qualitative Observations

The section below showcases the testimonies and field level observations based on data collected across 6 villages in Chatra district, Jharkhand for various R&R-CD project activities implemented by NTPC Karanpura.

Education

As per the survey data, an increase has been observed in the school attendance of the children and regularity of female students. Supply of amenities such as desk and benches, books, school shoes and socks, to the children, sanitary napkins to school-going girls have also reduced the dropout rate and enhanced the interest levels as well as the motivation of the students. Stakeholder interactions also revealed that there has been an improvement in the passing percentage of students. Field level observations also indicated that scholarships are provided to 3 students in a year. According to Shankar Prasad Chaurasiya, the Pradhan of Garilong, *“There has been no shortage in the cost of education”*, indicating that he is satisfied with the initiative. Some of the surveyed beneficiaries also stated an average annual reduction in education related expenditure, leading to an average saving of approximately INR 1041. However, some beneficiaries had concerns around the education interventions, which according to them were not able to substantially improve access to quality education for all. Although DAV school(s) are present, an area of challenge for most beneficiaries is the high fee of the school. The toilet facilities are not adequate and require maintenance. Other costs that further increase the cost of studying at a DAV school include purchasing books. At the same time, Madrasas are present and the cost of studying at a Madrasa is not as high as a DAV school, making it the first preference for many.) During his interview, Jamindra, the Pradhan of Naiparam shared, *“The school/s have a poor infrastructure and do not have Teachers of good quality”*. Some beneficiaries and stakeholders also recommended that there should be improvement in the infrastructure of the schools such as maintenance of the boundary walls and toilets. Akshaybat Pandey, the Pradhan of Raham indicated, *“There is a shortage of school staff and lack of infrastructure”*.

Health and Sanitation

NTPC has been organizing free health camps and has setup a Mobile Medical-care Unit (MMU) that visits the project villages on a weekly basis to conduct regular health check-ups for the beneficiaries. This includes checkups for blood pressure, sugar, and other diagnostic checks and the provision of free medicines. Beneficiaries indicated that these mobile health care units have helped them in accessing basic healthcare services and has improved which has also led to a reported reduction in incidence of diseases. However, the beneficiaries noted that for better healthcare services, there needs to be an improvement in the provision of medicines, an addition of pathological and an increase in the frequency of the MMU. Field observations indicated that currently similar medicines are provided for multiple illnesses, reducing the effectiveness of the program. The Pradhan of Naiparam, Jamindra has recommended that in order to strengthen the initiative, the distance from the hospital needs to be reduced and the number of quality doctors should be increased. NTPC’s intervention has created a positive impact in the lives of the beneficiaries as it has reduced open defecation and improved sanitation to a certain extent. NTPC had constructed toilets in the houses of the beneficiaries. The Pradhan of Garilong, Shankar Prasad Chaurasiya, has a positive view of the initiative. According to him, *“NTPC has built good hospitals and there is an availability of good doctors. For sanitation, initiatives such as*

reinstatement of the garbage collector and construction of toilets has been undertaken for the benefit of the community”.

Water


NTPC has extended support to the villages through the provision of water tankers, installation of hand pumps and solar pump systems, construction of borewells and extension of pipelines to facilitate people with clean and safe drinking water. It was observed that the overhead tanks installed by NTPC were the primary source of drinking water for majority of the beneficiaries surveyed. Reduction in the onset of water borne diseases after NTPC’s intervention leading to a reduction in health expenditure and an increase in income due to engagement in economic activities in the time saved was also reported. The beneficiaries reported an overall improvement in health due to installation of water infrastructure with over 50% of the surveyed beneficiaries noting that the installation of water supply related infrastructure such as water tankers and pipelines has helped them save time. Also, it was observed that the intervention has been beneficial for women beneficiaries with around 69% of them reporting improved water supply system in the villages post NTPC’s intervention. However, maintenance of the water supply infrastructure has been noted as an area of concern for the beneficiaries, and stakeholders have recommended that the water tanks should be cleaned regularly, especially in Naiparam. Further, it was highlighted that the pipelines from the overhead tank should be broader in size to facilitate greater water pressure flow and should be provided for every household.

Skill Development

To support skill development, NTPC provided sponsorship programs in various government ITIs, skill training for beneficiaries in tailoring, mushroom cultivation, etc. The study noted that the beneficiaries found the training to be accessible and reported that it created a positive impact on both the theoretical and practical learning of the beneficiaries. However, it was observed that employment was one of the main concerns for the skill development trainees. Despite receiving training from ITIs and other skill development training, beneficiaries expressed concern over the lack of employment opportunities. The skill development interventions by NTPC could be strengthened through focusing on employment opportunities and providing the beneficiaries with a sustainable source of livelihood. Beneficiaries have recommended a proper utilization of the skill development center to make it accessible for the larger community as well. It was suggested that the intervention could also be improved through focusing on quality of training and course content, as well as building capacity of the trainers. Punam Devi the Pradhan of Dundua recommended an increase the number of trainings. In her opinion, *“Work has been partially done and only a one-time training was conducted in skill development”*. Shankar Prasad Chaurasiya (Pradhan- Garilong) and Jamindra, the Pradhan of Naiparam have also recommended increasing the number of trainings and creating employment opportunities. According to Akshaybat Pandey, the Pradhan of Raham, *“NTPC should accelerate the work that is being done and efforts should be made to train people and provide employment at the village level.”*

Community Infrastructure

As part of R&R-CD activities, NTPC has installed streetlights, constructed internal roads, boundary walls in the villages. The surveyed beneficiaries surveyed shared that the community infrastructure and welfare intervention was aligned to the community needs which included installation of solar streetlights in the project affected villages. The installation of solar streetlights has improved reliable outdoor lighting in the villages and a reduction in incidences of crime in the



villages has been noted. Women and children safety has also improved post this intervention along with a reduction in accident rates and an increase in social activity after dark in the villages. The stakeholders have expressed a sense of satisfaction with NTPC's support in construction of new roads as well as the maintenance of existing ones. It was noted that the intervention has led to a decline in accident rates and increased the sense of safety for the beneficiaries. This has also led to enhanced connectivity to rural infrastructures such as schools, hospitals, etc. However, it was also observed that maintenance of the roads and other assets installed was needed on a regular basis. NTPC had also constructed drains in the villages to prevent water logging, mosquito breeding and spread of diseases. Some of the surveyed respondents noted that there has been a decrease in the incidence of water-borne diseases in the family after the construction of the drains. It was observed that the drainage systems were either recently constructed or still under construction. Jamindra, the Pradhan of Naiparam, applauded the initiative and has recommended NTPC to construct more drains for the greater development of the community. Construction of ponds, cemented pavements and community halls have been beneficial for the community. Community stakeholders have also expressed a positive response towards these initiatives. In some locations, an absence of these initiatives has also been expressed as the Pradhan of Kamta, Amant Hussain noted that *"no community center has been made here"*.

Sports and Culture

Some of the surveyed beneficiaries were of the view that the sports activities arranged by NTPC resulted in an increase in their participation in regular sports, sports related competitions and helped in developing their sports habits. According to Shankar Prasad Chaurasiya, the Pradhan of Garilong, *"There is an availability of a sports teacher and good playground"*. The project interventions have also led to a significant impact on the health of the beneficiaries, as reported by the beneficiaries and the stakeholders.

Jamindra, the Gram Pradhan of Naiparam, holds a similar view and shares that, *"there is a sporting event every year and the beneficiaries now have access to sports field, training facilities, and equipment/kits."* Some of the beneficiaries also recommended an increase in the frequency of sporting events. Cricket and football tournaments had been initiated by NTPC Karanpura to promote sports in the villages. However, it was noted that there is a need to increase the frequency of these events and to make them accessible and inclusive for all. NTPC has also provided various financial resources for the organization of cultural events and festivals across the intervention villages, which has led to a reduction in the expenditure on cultural events.

Social Return on Investment

Chapter 7: Social Return on Investment

As elaborated in chapter 1, this report has used two evaluation frameworks which are OECD-DAC and SROI. Generally, OECD DAC helps in gaining qualitative understanding of the impact. On the other hand, SROI helps organizations in evaluating changes which are being created by measuring social, environment and economic outcomes and providing monetary values to represent them. SROI also helps in understanding the total value generated for every rupee invested for interventions.

There are two types of SROI:

- **Evaluative**, which is conducted retrospectively and based on actual outcomes that have already taken place
- **Forecast**, which predicts how much social value will be created if the activities meet their intended outcome⁴¹

For the purpose of this study only evaluative SROI has been conducted. SROI primarily involves six stages which are as follows:



The stages have been elaborated in the section below:

7.1 Setting the Scope

Before starting an SROI analysis, it is important to gain clarity on what will be measured, how it will be measured, and the reasoning behind undertaking the measurement process. There are three steps in this stage:

- 3.1.1 Establishing scope
- 3.1.2 Identifying stakeholders
- 3.1.3 Describing the best method of involving stakeholders

⁴¹ A guide to Social Return on Investment | The SROI Network Accounting for Value | January 2012

7.1.1 Establishing Scope

The scope of an SROI analysis defines the boundaries of what is being considered. NTPC Karanpura has considered the R&R-CD projects conducted in 2016-17, 2017-18, 2018-19 and 2019-2020 for the SROI analysis. As part of this study, 6 project affected villages were covered in Karanpura.

The SROI analysis aims at assessing the following impacts made on the primary beneficiaries of the project

- The Social impact
- The Economic impact
- The Behavioral Changes brought about in the beneficiaries after the R&R-CD projects were implemented

Thus, this SROI includes:

- The beneficiaries of the projects, who are basically the residents of the community, where the R&R-CD activities of NTPC were conducted in the 2016-17, 2017-18, 2018-19, 2019-20
- Investments incurred by NTPC in 2016-17, 2017-18, 2018-19, 2019-20 on these projects.

Thus, this SROI excludes:

- Financial assessment of the program
- Other activities conducted separately by NTPC Karanpura
- Resources provided by other donors (if any)

7.1.2 Identifying Stakeholders

Stakeholders are those individuals, groups, organizations, or entities that experience change, whether positive or negative as a result of the activity that is being analyzed. The first step is to identify all of the stakeholder groups that are material or pertinent to the scope of the analysis and then to decide whether they are relevant in being considered within the analysis.

As a part of the SROI analysis for this project, following stakeholders were included / consulted-

- Residents of the villages (primary beneficiaries of R&R-CD projects in Karanpura)
- School principals/ teachers
- Health workers
- Gram Pradhan

This SROI analysis explores the changes and outcomes experienced by only the primary beneficiaries of this project.

Method for engaging stakeholders: We used questionnaires to interview / interact with the beneficiaries and stakeholders for collecting data related to impact that the projects would have generated. Detailed methodology has been explained in chapter 1 of the report.

7.2 Mapping outcomes

Stakeholder engagement feeds into the construction of an Impact Map. The Impact Map, which documents the links between resources contributed to the project (inputs), the results of the

activity (outputs) and the outcomes of the project are a pivotal part of an SROI analysis. The Impact Map, also known as a 'logic model' or 'theory of change', is a snapshot of how the intervention affects the beneficiaries. Impact map for all the projects have been discussed in chapter 1.

7.3 Evidencing outcomes

After formulating the impact map, indicators to measure the outcomes were developed based on the evaluation team's interaction with beneficiaries, and other relevant stakeholders. The evidences of outcomes were collected using primary and secondary data.

7.3.1 Evidence indicators and quantity of change

Depending on the responses received during the data collection stage of the 394 beneficiaries interviewed and the changes observed / shared by them, proportionate percentage of the total impacted beneficiaries are assumed to have experienced similar change. The table below provides details about the evidence indicators against each outcome and the quantity of change, which are observed against each indicator

Table 13: Evidence indicators and quantity of change

Themes	Outcome	Indicator (s)	Quantity of change (%)
Education	Increase in enrollment, attendance, and academic performance of children	Percentage of beneficiaries reporting the change	34
	Reduced expenditure on education	Percentage of beneficiaries reporting the change	37
Health	Improved access to health care facilities	Percentage of beneficiaries reporting the change	41
	Improved levels of hygiene and sanitation (due to drains, solid waste management sheds, toilets)	Percentage of beneficiaries reporting the change	5
	Reduced expenditure on health	Percentage of beneficiaries reporting the change	68
	Increased income due to engagement in economic activities during the time saved (because of reduced illness)	Percentage of beneficiaries reporting the change	4
Water	Improved access to safe water	Percentage of beneficiary reporting the change	63
	Change in cost of availing water	Percentage of beneficiaries reporting the change	16

	Reduced expenditure on health due to lesser incidence of water borne diseases	Percentage of beneficiaries reporting the change	16
	Increased income due to engagement in economic activities in the time saved due to reduced illness	Percentage of beneficiaries reporting the change	15
	Additional income from time saved in fetching water	Percentage of beneficiaries reporting the change	4
Skill Development	Improved self-confidence of beneficiaries trained	Percentage of beneficiaries reporting the change	52
	Increased income due to skills acquired	Percentage of beneficiaries reporting the change	7
	Improved Social Standing	Percentage of beneficiaries reporting the change	56
Community Infrastructure	Improved access to infrastructure	Percentage of beneficiaries reporting the change	38
	Improved connectivity due to construction of roads	Percentage of beneficiaries reporting the change	26
	Enhanced sense of security due to reduced chances of accident,	Percentage of beneficiaries reporting the change	64
	Increase in income (due to improved commercial activity) due to installation of solar streetlights	Percentage of beneficiaries reporting the change	31
	Amount saved as social events could now be organized in community halls instead of private halls	Percentage of beneficiaries reporting the change	8
	Improved sanitation due to construction of drains	Percentage of beneficiaries reporting the change	19
Sports and Culture	Improved health due to physical activity	Percentage of beneficiaries reporting the change	92

	Improved access to cultural events	Percentage of beneficiaries reporting the change	23
	Reduced expenditure in organizing events	Percentage of beneficiaries reporting the change	39

Source: KPMG Primary Data Analysis

7.3.2 Duration of the change

While some outcomes may last a person's life, others may be short-lived i.e., the outcome lasts till the activity lasts. For the SROI analysis the duration of the outcomes has been estimated. The table below shows the duration of change for outcomes across sectors.

Table 14: Duration of change for project outcomes

Sectors	Outcomes	Duration of Change
Education	Increase in regularity, attendance, and improved academic performance of children in school	Service provided include infrastructural support to schools and supply of stationary items to children. A duration of change (i.e., the length of time following school completion, when children passing out of class X, will have greater opportunities to find employment and earn a higher average monthly salary) of five years has been estimated.
	Reduced expenditure on education	
Health	Improved access to health care facilities	Service provided include organising health camps, MMUs and Mega medical camps in the community, organising health and sanitation awareness programs in schools providing infrastructural support to Govt. hospital (Tandwa). A benefit period (i.e., the length of time following access to the health services, when the beneficiaries would experience lesser incidence of diseases and reduced chances of advanced diseases due to timely detection) of five years has been estimated. Regular tests and follow up activities will need to be conducted to ensure a sustained positive impact on health.
	Improved levels of hygiene and sanitation (due to awareness programs)	
	Reduced expenditure on health	
	Increased income due to engagement in economic activities during the time saved (because of reduced illness)	
Water	Improved access to safe water	Service provided included installation of water tankers, water pipelines, tube wells, handpumps, etc. in the
	Change in cost of availing water	

	Reduced expenditure on health due to lesser incidence of water borne diseases	community. The duration of change (i.e., the time when the beneficiaries continue to access clean water) of five years has been estimated. Subsequently, the existing infrastructure will need to be repaired or new pumps will need to be installed in the community
	Increased income due to engagement in economic activities in the time saved	
	Additional income from time saved in fetching water	
Skill Development	Improved self-confidence of beneficiaries trained	Service included provision of skill development trainings to the youth. It has been estimated that the benefit of this activity will last for a maximum period of five years . Based on their job profile and requirements, the candidates will need to build new skill sets over a period of five years .
	Increased income due to skills acquired	
	Improved Social Standing	
Community Infrastructure	Improved connectivity and enhanced sense of security due to reduced chances of accident, due to construction of roads	Service included provision of solar streetlights, construction of roads, community halls, etc. It has been estimated that the benefits of these activities will last for maximum five years . Subsequently, the infrastructure provided will need to be renovated, repaired, or replaced.
	Increase in income (due to improved commercial activity) due to installation of solar streetlights	
	Amount saved as social events could now be organized in community halls instead of private halls	
Sports and Culture	Improved health due to physical activity	Service provided include organization of sport events and financial assistance to organise cultural events in the villages. It has been estimated that the benefit of this activity will last for a period of one year . Subsequently, new sports event will need to be organized to motivate the beneficiaries to stay fit and financial assistance need to be provided to improve the beneficiaries access to cultural events
	Improved access to cultural events	
	Reduced expenditure in organizing events	

Source: KPMG Primary Data Analysis

The R&R-CD interventions of NTPC Karanpura is and will continue to remain significant for community development. This evaluative study estimates that the strategies, methods and means for designing, implementing, monitoring, and reviewing will continue creating value for years as mentioned in the table above. Beyond these years, it is expected that a new intervention will be required to meet the needs and expectations of the community

7.3.3 Financial proxy (FP) and value of financial proxy

An SROI analysis uses financial proxies to establish a value of identified outcomes. As a standard practice, prices are used as a proxy for value of services. In certain scenario, the outcomes reported by stakeholders are intangible and cannot be traded in a market. In such cases, the closest, comparable value is identified for that outcome. The table below presents the details of financial proxies and its value assumed against each outcome:

Table 15: Financial proxies and values

Sectors	Outcome	Financial Proxies	Values (INR/ annually)
Education	Increase in regularity, attendance and improved academic performance of children in school	Willingness to pay for schooling and education	28356
	Reduced expenditure on education	Average cost saving of the beneficiaries on education related expenditures	1041
Health and Sanitation	Improved access to health infrastructure	Willingness to pay	255
	Reduced incidence of diseases due to improved sanitation and disinfection	Improved savings	1800
	Reduced expenditure on health	Average cost saving of the beneficiaries on medical expenditures	3247
	Increased income due to engagement in economic activities during the time saved (because of reduced illness)	Average increase in income	149
Water	Improved access to safe water	Willingness to pay	750
	Change (decrease) in cost of availing water	Amounts change in cost of availing water	3100
	Reduced expenditure on health due to lesser incidence of water borne diseases	Average cost saving on medical expenditure	209
	Increased income due to engagement in economic activities in the time saved	Average increase in income	1169
	Additional income from time saved in fetching water	Average increase in income	751

Skill Development	Improved self-confidence of youth trained	Cost of training on personality development and soft skill	3793
	Increased income level of trained beneficiaries due to skills acquired	Average increase in remuneration earned per candidate post completion of training	9000
Community Infrastructure	Improved access to community infrastructure	Willingness to pay	450
	Improved connectivity due to construction of roads	Additional income	591
	Enhanced sense of security due to reduced chances of accident, (due to construction of roads)	Willingness to pay	442
	Increase in income (due to improved commercial activity) due to installation of solar streetlights	Amount of revenue generated due to increased commercial activity after the dark	60000
	Amount saved as social events could now be organized in community halls instead of private halls	Amount saved	5867
Sports and culture	Improved health due to physical activity	Average Gym Fee	6600
	Improved access to cultural events	Willingness to pay	732
	Reduced expenditure in organizing events	Amount reduction	13281

Source: KPMG Primary Data Analysis

7.4 Establishing impact

Establishing impact provides a way of estimating how much of the outcome would have happened anyway and what proportion of the outcome can be attributed to the activities that occur during the program or program. Establishing impact is crucial, as it reduces the risk of over counting and makes the assessment more credible. Therefore, in order to provide credibility to the analysis and prevent over-claiming, the four adjustments that are calculated during this stage are deadweight, displacement, attribution, and drop-off, on the basis of which the impact is measured.

7.4.1 Deadweight

Deadweight is an estimation of the social and financial benefits that would have been created without the intervention. The table below presents the estimated deadweight percentage for the projects under various sector and the rationale underlying the same.

Table 16: Estimated deadweight percentage for the R&R-CD activities under each sector

Sectors	Dead weight (%)	Rationale
Education	65	According to the ASER 2018 report, the attendance based on visit on random day for the age group of 6-14 years has been about 65% in Jharkhand. Therefore, the percentage of children that would have attended the schools even in the absence of R&R-CD projects of NTPC, a deadweight of 65% has been estimated.
Health	76	During our interaction with the health-related stakeholders, it was indicated that on an average 76% of the beneficiaries surveyed availed medical facilities from government or private hospitals in the absence of NTPC R&R-CD intervention. Therefore, a deadweight of 76% has been estimated.
Water	10	The findings from the data analysis suggest that about 10% of the beneficiaries used government supply for their source of water before the implementation of the R&R-CD projects. Considering that these sources are relatively safe, it is estimated that these 10% beneficiaries would continue to have access to safe water in the absence of the R&R-CD activities of NTPC.
Skill Development	53	Basis secondary report ⁴² , total percentage of beneficiaries trained in Jharkhand through various government schemes is about 53%. Considering that these 53% of youth would have anyways been trained, even in the absence of R&R-CD programs of NTPC, the deadweight is estimated to be 53%
Community Infrastructure	50	Considering that 50% of the intervention would have happened through government support, even in the absence of R&R-CD intervention by NTPC, the deadweight is estimated to be 50%
Sports and Culture	85	Since 85% of the beneficiaries reported that activities related to sports and culture were organised either by schools or Govt., in the

⁴² <http://jsdm.jharkhand.gov.in/jsdm/cms/en/>

		absence of R&R- CD support from NTPC, the deadweight has been estimated to be 85%.
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Source: KPMG Primary Data Analysis

7.4.2 Attribution

Attribution is an assessment of how much of the outcome was caused by the contribution of other organisations or people. During the field visit, the beneficiaries and stakeholders surveyed shared that NTPC staff provided support through their initiatives, However, they also mentioned that the support from community, panchayat, other government schemes, etc. have been instrumental in achievement of the program's objectives. Therefore, based on our interactions with the beneficiaries and relevant stakeholders, an attribution percentage has been provided to NTPC for the outcome created. The table below presents the percentage attributed to NTPC across the various sectors.

Table 17: Percentage attribution to NTPC by beneficiaries and stakeholders

Sectors	Education	Health	Water	Skill Development	Community Infrastructure	Sports and culture
Attribution (%)	11	16	24	33	27	16

Source: KPMG Primary Data Analysis

7.4.3 Drop-off

Drop-off is the process of considering any deterioration of program outcomes over time. It refers to that portion of outcomes that are not sustained. The table below provides the duration of change and drop off percentage for the projects under each sector and rationale for the same.

Table 18: Drop off percentage for the R&R-CD activities in each of the sectors

Sector	Duration of outcome	Drop off (in %)	Drop-off Rationale
Education	5	8	Interaction with the education-related stakeholder indicated that the average drop-out rate of children in primary school is 8%. Therefore, considering that about 8% children drop out of school every year, we have estimated the drop off rate to be 8%
Health	5	5	Since the health-related infrastructure provided will depreciate over time and will require repair and maintenance service, a drop-off of 5% has been considered for the SROI analysis.

Water	5	5	Since the water related infrastructure provided will depreciate over time and will require repair and maintenance service, a drop-off of 5% has been considered for the SROI analysis.
Skill Development	5	5	The drop- off rate has been considered to be 5% as it is assumed to believe that the skill sets provided / learned during the training program will become redundant over a period of five year / would drop-off 5% annually. Thus, the drop-off is considered to be at 5%.
Community Infrastructure	5	5	Since the infrastructure provided will depreciate over time and will require repair and maintenance service, a drop-off of 5% has been considered for the SROI analysis.
Sports & Culture	1	0	The outcome lasts as long as the activity or a maximum period of one year- No drop-off is considered for projects with one-year duration of change

Source: KPMG Primary Data Analysis

7.4.5 Displacement

Displacement is an assessment of how much of the outcomes displaced other outcomes. The programs intended to improve access to education, health services and community infrastructure, and skills for employability. No significant displacement was observed or reported for the projects.

7.5 Calculating impact

The impact of the program has been arrived at based on the following calculations:

Quantity of change multiplied by financial proxy (FP) minus deadweight, displacement, and attribution.

Impact for year one = Quantity of change x FP value x (1 – deadweight) x (1 – displacement) x (1 – attribution)

Impact for subsequent years = Quantity of change x FP value x (1 – deadweight) x (1 – displacement) x (1 – attribution) + [impact value of previous year] x (1 – drop-off)]

Tables below gives details of applied Deadweight, Displacement, Attribution and Drop-off to arrive at the impact for each of the sectors.

Table 19: Cumulative impact for the R&R-CD Initiatives under each sector


Outcomes	Quantity of Change (in %)	Financial Proxy	Value (INR)	Deadweight (in%)	Displacement	Attribution	Dropoff	Cumulative Impact
Improved attendance, regularity, and improved academic performance of children in schools	34	Willingness to pay for schooling and education	28356	65	Nil	11	8	17465915
Reduced expenditure on education	51	Average cost saving of the beneficiaries on education related expenditures	1041	65	Nil	11	8	967918
Cumulative impact for R&R CD activities in the education sector⁴³								18433833
Improved access to health infrastructure	41	Willingness to pay	255	76	Nil	16	5	1503382
Reduction of disease due to improved sanitation and disinfection	5	Amount savings	1800	76	Nil	16	5	234226

⁴³ Sample calculation is provided for education sector below Table 19

Reduced expenditure on health	68	Average cost saving of the beneficiaries on medical expenditures	3247	76	Nil	16	5	31863740
Increased income due to engagement in economic activities in the time saved (due to improved health)	4	Amounts increase in income	149	76	Nil	26	5	86407
Cumulative Impact for R&R-CD activities in the health sector								33687755
Improved access to water	63	Willingness to pay	750	10	Nil	24	5	38082101
Reduced expenditure on health due to lesser incidence of water borne diseases	16	Average cost saving on medical expenditure	209	10	Nil	24	5	2762833
Increased income due to engagement in economic activities in the time saved (due to lesser incidence of	15	Amounts increase in income	1169	10	Nil	24	5	14200651

water borne diseases)								
Change in cost of availing water	16	Amounts change in cost of availing water	3100	10	Nil	24	5	41078088
Increased income due to engagement in economic activities in the time saved in fetching water	4	Amounts increase in income	751	10	Nil	28	5	2488832
Cumulative impact for R&R-CD activities in water related project								98612505
Improved self-confidence	52	Cost of training on personality development and soft skill	9000	53	Nil	37	5	1939737
Increased income due to skills acquired	37	Amount Increase in income	13500	53	Nil	37	5	4073448
Improved Social Standing	56	Willingness to pay	1163	53	Nil	37	5	350909
Cumulative Impact for R&R-CD activities on Skill Development								6364094

Improved access to community infrastructure	38	Willingness to pay	450	50	Nil	27	5	7534066
Increase in income due to improved lighting after dark	1	Average increase in income	60000	50	Nil	27	5	35854969
Savings due to provision of facility for holding religious/ cultural/ events	8	Rent of hiring similar infrastructure / marriage hall in that area	5867	50	Nil	27	5	21034915
Improved income due to better connectivity due to construction of roads	26	Amount of revenue generated due to increased commercial activity after the dark	591	50	Nil	27	5	6710258
Improved income due to time saved in commuting	31	Amounts increase in income	4130	50	Nil	27	5	56770368
Enhanced sense of security due to reduced chances of accident	64	Willingness to pay	442	50	Nil	27	5	12418740



Improved sanitation due to construction of drains	19	Reduction in health expenditure	1664	50	Nil	27	5	13923680
Cumulative impact for R&R-CD activities on community infrastructure								154246996
Improved health due to enhanced physical activity	92	Willingness to pay	6600	88	Nil	23	0	12274662
Improved access to cultural events	23	Willingness to pay	732	88	Nil	23	0	340144
Reduced expenditure in organising events	39	Average amount reduction	13281	88	Nil	23	0	10521496
Cumulative impact for R&R-CD activities on Sports and culture								23136302

Source: KPMG Primary Data Analysis

Sample calculation for Education sector:

Outcomes/ Year	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Cumulative Impact	NPV as on 2016
Improved attendance, regularity, and improved academic performance of children in schools	1415292	3480342	3232698	3448289	3172426	1985839	391312	339719	17465915	13244871
Reduced expenditure on education	78432	192872	179148	191096	175808	110050	21686	18826	967918	733998
Total	1493723	3673214	3411846	3639384	3348234	2095889	412998	358545	18433833	14179906
Inputs	2016-17	2017-18	2018-19	2019-20	Total					NPV as on 2018-19
	7938726	1231709	313966	2521509	12005910					10,591,537

$$\text{SROI for Education sector} = (14179906) / (10591537) = 1.34$$

7.5.1 Calculating the SROI

The SROI value is expressed as a ratio of return and is derived from dividing the value of the impact by the value of the investment.

$$\text{SROI} = \frac{\text{Total impact value}}{\text{Total input value}}$$

However, before the calculation is made, the impact value is adjusted to reflect the NPV of projected outcome values. This is to reflect the present value of benefits projected in future.

$$\text{SROI} = \frac{\text{Total present value of impact}}{\text{Total present value of inputs}}$$

Further, discounting is applied to those values that have been projected for longer than one year. Here, we have assumed that the duration of impact for projects on education, vocational training and community infrastructure is 5 years and health, water and sports is 1 year. The interest rate used to discount the value of future benefits in this case is 7.5%

7.5.2 Program input

As part of this SROI analysis, inputs from NTPC are considered. The table below presents the cost incurred (in INR) by the NTPC Karanpura in each of the sectors.

Table 20: Program inputs

Year	Education	Health	Water	Community Infrastructure	Skill Development	Sports and Culture
2016-17	7938726	8883338	14875963	43319240.15	4197599	11066925.2
2017-18	1231709	5810544	16070232	35256651.13	277200	1847697
2018-19	313966	5662707	14416500	24375543.7	482130	3051566
2019-20	2521509	6281241	26301848	21322309	72599	3426901
Total (INR)	12005910	26637830	71664543	124273744	5029528	19393089.2

Source: Data provided by NTPC Karanpura

7.5.3 Net present value (NPV)

The impact value is adjusted to reflect the net present value (NPV) of the outcome values. The idea is to reflect the present-day value of benefits. A discount rate of 7.5% has been used for the NPV calculations.

The NPV of the benefits can be calculated by using the following calculations:

$$\text{NPV} = \text{Value of benefits} / ((1 + \text{discount rate}) \times \text{time})$$

Table 21: Estimated SROI for the R&R-CD activities under each sector

Sectors	NPV of Social Impact created (INR)	NPV of Investment incurred (INR)	SROI
Education	14179906	10591537	1.34
Health	24749835	19,737,987	1.25
Water	72357726	59,043,753	1.23
Skill Development	19165605	16,916,142	1.05
Community Infrastructure	114836391	106,393,205	1.08
Sports and Culture	19656279	16,916,142	1.16

Source: KPMG calculations based on primary data collected during the survey

Need Assessment

Chapter 8: Need Assessment

Need assessment is a systematic set of procedures for determining “needs”, examining their nature and causes and prioritizing them for future action. “A need, in the simplest sense, is a measurable gap between two conditions: what currently is, and what should be. This requires ascertaining what the circumstances are at a point in time, what is desired in the future, and a comparison of the two.”⁴⁴ Thus, discrepancy between the current condition and wanted condition must be measured to appropriately identify the need. It is important to approach needs assessment using a participatory lens in order to understand and align how the community views its ‘needs’ and envisions its “wants”, with the programmatic goals.

NTPC Karanpura conducted a socio-economic impact assessment survey in 2005 to understand the situational context and provide an overview of the beneficiaries in the project affected villages. Several needs of the community were also identified during this assessment which were then incorporated into the programmatic activities over the years. In 2020, NTPC Karanpura empaneled KPMG for conducting the need assessment survey for understanding the future needs and expectations of the community.

8.1 Objectives of the Need Assessment Survey

- To explore and gather data about the current conditions across various focus areas- education, health and sanitation, livelihood, etc.
- To understand the difference or “gap” between the current condition and desired condition.
- To prioritize identified needs and gaps
- To learn more about what group or community needs are, as perceived by the various community stakeholders.
- To document needs, as is required in many applications for funding, and as is almost always helpful in advocating or lobbying for the cause.
- To guide formulation and alignment of programmatic activities as per the needs and issues as identified and prioritized by the community. Also, to promote more community participation and ownership in the program activities.

KPMG adopted a ‘mixed method’ approach-qualitative and quantitative-to conduct the need assessment survey. Review of documents, including the socio-economic impact assessment (2005), and data provided by the program team was undertaken to understand the objective and coverage of the program. Field visits were carried out in the 6 project affected villages for data collection from the beneficiaries and other relevant stakeholders. Discussions were held with Gram Pradhans and other salient stakeholders through in-depth interviews as well as focused group discussions to understand the needs and aspirations of the community. A statistical approach was adopted to decide on the sample size. In total, 394 beneficiaries were surveyed as part of this project. This sample had a proportionate representation of beneficiaries from all age groups and across genders and caste (Scheduled caste, scheduled tribe, and other backward class).

⁴⁴ Needs Assessment: Trends and a View Toward the Future,” New Directions in Evaluation, No. 144, Winter, 2014 James W. Altschuld and Ryan Watkins (eds.)

8.2 Key Findings

The key findings from the need assessment survey are presented in the table below:


Table 22: Key findings of the NAS⁴⁵

Sector	Needs of the beneficiaries surveyed
Education	Support in infrastructure
	Improving the quality of education
	Support in meeting education-related expenditure
	Capacity building of schoolteachers
	Provision of safe and regular drinking water supply and sanitation facilities
Health and Sanitation	Support in healthcare infrastructure
	Improving the quality of service
	Provision of regular supply of medicines
	Building and maintaining community toilets
Water	Increasing the number of tankers and pipelines
	Improved maintenance of the facilities created
Skill Development	Provision for on-the-job training
	Support in employment
Community Infrastructure	Provision of adequate quantity of assets (community halls, drains, schools etc.)
	Regular upkeep of the infrastructure provided
Sports & Culture	Improve accessibility for sports programs and cultural events
	Improve sports infrastructure and increase frequency of sports events

8.2.1 Education

Among the beneficiaries surveyed, 62% shared that their children face various challenges in accessing quality school education. 93% of the beneficiaries surveyed stated that they were facing challenges in meeting the school expenses due to financial constraints. Stakeholder interactions highlighted that unemployment and poverty lead to children being engaged in earning

⁴⁵ Source: KPMG Primary Data Analysis



a livelihood or household chores to assist the family members, which further acted as a deterrent in accessing school education. 71% of the respondents shared their concerns around capacity of teachers and the quality of education provided in schools. About 89% of the respondents suggested that adequate number of qualified teachers should be onboarded for ensuring access to quality education. Further, to improve the learning experience of their children, 90% of the respondents suggested that NTPC Karanpura should provide trainings to the schoolteachers on subject matter as well as teaching methods. This will improve the quality of education and further enhance the impact created through the education-related intervention by NTPC team. Also, 89% respondents noted that interventions promoting digital learning, sports, and co-curricular activities, etc., should also be taken up to enhance education quality and provide a holistic learning environment for the children.

For 67% of the respondents, there was a need to improve the infrastructure in schools as poor infrastructure posed various challenges in accessing school education. Around 90% of the respondents noted that there is a need to build better education facilities with all amenities- classrooms, toilets, boundary walls, playgrounds, etc. According to the beneficiaries surveyed, there was a need to build computer labs, libraries, as well as furnishing the classrooms with adequate desk and benches. During our interactions with the stakeholders, it was indicated that the schools needed computers for their laboratories to improve access to computer literacy amongst students. 66% of the beneficiaries noted that there is a need to supply stationary items and books for the children. The stakeholders also highlighted the need for provision of safe and regular supply of drinking water as well as maintenance of toilets in schools. Also, improving access to solar energy was noted as a possible intervention that could help provide continuous electricity for the school and the village too. Around 86% of the beneficiaries surveyed shared the need for establishing a higher education institution in the locality. Among the beneficiaries surveyed, 84% highlighted the need to improve access to education particularly for girl children. During the field study, the stakeholders also raised concerns about the issue of early marriages for girls and the need for awareness programs to tackle this issue and promote education for girls. Around 89% of the beneficiaries surveyed recommended organizing and planning activities around girl education.

8.2.2 Health & Sanitation

Among the beneficiaries surveyed, 57% shared that the health infrastructure in the villages need further improvement. Around 78% shared that there is an issue of poor quality of service provided in the PHCs which can be addressed through improving the infrastructure and deploying experienced staff for providing health care services. About 89% of the beneficiaries were not satisfied with the support received for health and sanitation. It was noted that though there have been efforts to increase access to healthcare through MMU, there is scope for improvement. The MMU facility is available once a week and only covers common ailments. It is not equipped to address serious diseases and only has a limited stock of basic medicines. The villagers have to pay for healthcare facilities at a private clinic or travel to the PHC at Tandwa.

During the focused group discussions, beneficiaries suggested that there is a need to improve accessibility to healthcare services for the community members through constructing hospitals or permanent health centers. Furthermore, the beneficiaries surveyed voiced out their needs for

equipping mobile health care units with better facilities such as X-ray, blood testing, and regular supply of medicines. The beneficiaries surveyed also suggested that facilities to provide treatment for critical illness needs to be set up for improving the health care services in the community. The beneficiaries highlighted the need to eradicate open defecation through conducting awareness campaigns amongst the community members. Also, there is a need to construct toilets at both household and community levels to work towards making the villages open defecation free.

8.2.3 Water

NTPC in its targeted villages has addressed issues around access to safe water through installment of hand pumps, solar pumps, provision of water tankers, extension of existing pipelines and construction of borewells. Around 52% of the surveyed beneficiaries reported an improved access to safe drinking water due to NTPC's intervention, which contributed towards reduction in water borne diseases in the project villages. When asked about the challenges, about 47% beneficiaries surveyed shared that they have to travel long distances and 53% shared that they have to stand in long queues to avail water from the community pumps. 78% of the respondents shared that the water infrastructures installed needs regular maintenance. Typhoid, dysentery, and giardia were the most common water borne diseases in the project villages, as reported by the surveyed beneficiaries during the need assessment.

Around 96% of the beneficiaries suggested that access to water should be increased with 85% highlighting the need to increase amount of water supply as well. The need to increase access to water in the villages was also highlighted by the participants during the focused group discussions. Around 55% of the beneficiaries noted facing issues with the quality of water, primarily because the existing tanks have not been cleaned since after installation and requires maintenance. The beneficiaries expressed the need for regular maintenance and provision of support in setting up of tap water connection in each household to further enhance the impact created and increase the reach of the project. Around 78% of the beneficiaries suggested that water-related interventions can be scaled up and installation of ROs, solar plants and water pipes can be carried out to provide regular access to safe water. The need for maintenance of new and existing assets was reiterated while highlighting the need for increasing outreach through tankers and pipelines to ensure water supply to all households in the villages.

8.2.4 Skill Development

NTPC Karanpura has provided vocational trainings for the youth and women of the communities through various trainings such as computer, tailoring and stitching, mushroom cultivation, etc., to bridge the skill gap. These trainings were organized by NTPC to help the recipients become employable and enhance their livelihood, leading to an increase in income and enhanced socio-economic status. 78% of the respondents indicated that the R&R-CD projects undertaken by NTPC were aligned and relevant to the needs of the community and 30% of them stated that the skill development intervention was able to address some of the requirements of the villages.

During the focused group discussion, employment opportunities and wages were the main areas of concerns for the surveyed beneficiaries. Lack of employment opportunities and low wages were the key issues that needed to be addressed by NTPC through focusing on improving livelihood opportunities. Around 96% of the beneficiaries expressed that there was a severe lack of employment opportunity while all of them noted that the wages were significantly low. About 81% of the beneficiaries requested for assistance with on-the-job training, support in market-oriented employment skill training and assistance in job placement.

8.2.5 Community Infrastructure

Beneficiaries surveyed shared that they were facing challenges in terms of limited accessibility and lack of maintenance of community assets/ infrastructure created by NTPC in their respective villages under their R&R community development project. 80% of the beneficiaries surveyed shared that a greater number of infrastructural input (toilets, drains, halls, roads, streetlights, etc.) needs to be provided. Around 78% of beneficiaries surveyed indicated that the infrastructure provided needs to be regularly repaired and maintained for continued usage by the beneficiaries. Around 91% of the beneficiaries surveyed noted the need for maintaining existing roads and streetlights as well as constructing new ones to improve connectivity and road safety for everyone.

Furthermore, 88% beneficiaries surveyed shared the need for constructing community halls in their respective villages and 86% highlighted the maintenance needs of existing halls. During the focused group discussions, the beneficiaries shared that they face power shortages and have access to less than 2-3 hours of electricity per day (Garilong village). It was suggested that the project interventions such as solar panels could help in improving access to affordable and regular supply of electricity for the villages.

8.2.6 Sports & Culture

Prior to NTPC's intervention, all the villages had very limited facilities and the quality of community infrastructure for sports and cultural events was not adequate. The project activities contributed towards fulfilling these needs by creating various provisions such as constructing a community building so that the villagers are able to organize functions comfortably. Around 89% of the beneficiaries surveyed shared that there is a need to improve access to sports. About 97% of the respondents highlighted that sports activities must be made inclusive and more accessible for a wider range of beneficiaries especially the vulnerable sections of the community.

About 95% of the beneficiaries suggested that frequency of training should also be increased with special focus on the upgradation and maintenance of the sports infrastructure. Among the beneficiaries surveyed, 85% remarked that the sports infrastructure in the villages needed improvement. Around 95% beneficiaries noted that provision of one-time support-sports training kits, equipment, sports field, etc., for the beneficiaries is another area that should receive attention. During the focused group discussion, it was suggested that sports must be actively promoted in schools through ensuring availability of sports teacher, good playground in schools, regular sporting events, sports coaching programs, etc. Also, beneficiaries suggested that access to participation in cultural events should be improved upon to make it inclusive for a larger demographic of beneficiaries. The respondents felt that the process for selecting beneficiaries for financial assistance lacked a proper system and thus the focus of future program should be on the strengthening of these programs.

8.2.7 Gender

The issue of gender equality and women empowerment is also significant in the region as the study noted concerns around instances of early marriages for girls. The stakeholders expressed the need for targeted awareness and sensitization programs that would promote education amongst girls enabling them to pursue higher studies. Around 84% of the respondents highlighted the need to improve access to education particularly for girl children. Improving WASH facilities in schools would further help curb the drop-out rates amongst girl students. About 89% of the beneficiaries surveyed recommended organizing and planning activities around girl education. Also, strengthening skill development initiatives and promoting women's economic empowerment

would further promote girl education and delay the average age of marriage for girls in the area. Around 70% of the respondents for skill development program were women, which shows that NTPC has actively promoted inclusion of women for the trainings. Project activities can be designed to engage women through SHGs and micro-enterprises in order to promote additional income for the women.

Gender equality can be furthered promoted throughout the various interventions by actively ensuring participation of women beneficiaries. For instance, interventions in healthcare can be made inclusive through provision of female doctors. Also, project activities addressing infant mortality rate and maternal mortality rate can improve access to quality ante and post-natal healthcare for women. Similarly, improving access to safe water helps in saving time and effort for women of the household. Around 69% of the women beneficiaries surveyed reported improved water supply system in villages post intervention. However, the need to further improve access to safe and reliable water was expressed by around 96% of the beneficiaries overall. Also, solar streetlights improve sense of security and road safety for all, especially for women and children. Ensuring maintenance of solar streetlights that have been installed would also improve safety for girls and women.

8.3 Road Map: Suggestive Five-Year Plan

Table below presents a suggestive 5-year plan for NTPC Karanpura. This plan has been formulated basis interaction with the beneficiaries surveyed in the 6 villages.

Table 23: Suggestive 5-year plan⁴⁶

Sectors	Activities	Justification
Economic	Provision of scholarship support to students	93% of the beneficiaries surveyed shared that they were facing challenges in meeting the education-related expenditures and hence suggested that provision of scholarship to their children will be helpful.
	Planning activities to address infrastructural gaps in schools	67% beneficiaries surveyed requested for infrastructural support in schools
	Organizing training for the schoolteachers	71% beneficiaries surveyed expressed concerns around quality of education and suggested that quality of teaching needs to be improved through provision of comprehensive training to teachers on subject matter as well as on soft skills.

⁴⁶ Source: KPMG Primary Data Analysis

Education	Planning activities around improving access to digital education	During our interactions with the beneficiaries and stakeholders, it was indicated that the schools needed more computers for their laboratories to improve access to computer literacy amongst students.
	Key villages: Dundua, Raham	
Health and Sanitation	Construction of community health centers in every village	97% beneficiaries surveyed expressed the need to improve accessibility to healthcare for the community members through building better health facilities such as constructing of a permanent health center in the villages.
	Increasing number of household and community toilets.	During the focused group discussions, beneficiaries suggested that there is a need to construct toilets at both household and community levels for combatting diseases and open defecation.
	Upgrading existing PHCs	77% beneficiaries surveyed shared that there is a need for improving accessibility to healthcare services for the community members through strengthening existing systems and infrastructure
	Key villages: Tandwa, Dundua	
Quality of Life	Setting up of water pipeline connections in households	81% beneficiaries shared that there is a need to further improve water infrastructure. 47% surveyed shared that they had to travel long distances and 53% noted that they have to stand in long ques to avail water from the community pumps.
	Improve access to electricity through Solar Panels	Respondents shared that frequent fluctuation of power supply was an important issue affecting various interventions
	Capacity building for better community management of infrastructural interventions	78% of beneficiaries surveyed observed that the infrastructure provided need to be regularly repaired and maintained. This can be efficiently done through better participation and accountability from community stakeholders.
	Key villages: Tandwa, Naiparam, Raham	

Occupation and Employment	Skill Development Training	It was suggested by 81% respondents that NTPC should provide on the job trainings for the village youth. Around 96% of the beneficiaries expressed the lack of employment opportunities and the need for provision of employment support.
	Skill training and support to promote small scale entrepreneurs	Specialized training program to promote self-employment through small business and initial investment support could be designed to promote entrepreneurship.
	Key villages: Garilong, Naiparam	

Conclusion and Recommendation

Chapter 9: Conclusion and Recommendation

This study presents the need assessment survey and social impact evaluation of the R&R-CD projects of NTPC Karanpura. NTPC Karanpura has implemented various R&R-CD programs/activities to support the development of communities in 6 villages around its plant. Major activities included provision of infrastructural support (construction of community buildings, classrooms, toilet blocks, boundary walls, etc.), supply of books and school shoes and socks to students, installation of RO water plants in villages for improved access to safe drinking water, organizing health camps, Mobile health care unit, support to PHCs to improve access to affordable health facilities, conducting training for the youth to improve their employability, among several others. Through these R&R-CD interventions, NTPC Karanpura has created positive impact on several indicators across sectors including attendance, regularity, and enrolment levels of the children, access to affordable health care services and reduced incidence of diseases, access to safe and reliable water, additional income due to reduced illness, improved skills and confidence level through skill development trainings, improved connectivity to rural infrastructure, improved sense of safety after dark and so forth. Overall NTPC Karanpura has contributed towards community development through implementation of its R&R-CD initiatives in the targeted villages. However, during the interactions, the beneficiaries surveyed shared that there is a need to enhance the involvement of the larger community in all the phases of implementing the projects. Across all thematic areas, the beneficiaries stated that they had limited involvement, particularly on aspects related to program planning, designing, monitoring, selection and feedback mechanism.


Furthermore, the R&R-CD programs of NTPC could be further strengthened through provision of end-to-end support to the beneficiaries across all the sectors. For example, in the education sector, support should be provided for capacity building of teachers, provision of basic supplies to children on a continuous basis, infrastructure construction, regular maintenance of the infrastructure provided, constructing playgrounds for the children, etc., all of which together will contribute towards building an enabling environment for the children in schools. This can be done through onboarding individuals from the development sphere along with collaborating with NGO partners who are specialized in the education sector and with their expertise can play crucial role in implementing NTPC's program in a holistic manner.

Similarly, in the health sector, support should comprise both preventive and curative health care. It should include activities - conducting diagnostics for detecting diseases, supply of medicines, continuous monitoring on whether the beneficiaries are receiving follow up treatment, training the village youths and pharmacies on conducting basic testing and common medicines. All these will lead to an improved sustainability quotient of their models.

In water-related interventions, NTPC should enable end to end support, starting from installation of infrastructure to regular maintenance of the same with the required support from village heads and the agencies installing these infrastructures. Village heads should ensure that everyone in the community is able to access community assets installed/ constructed by NTPC.

In the skill development sector, beneficiaries should be provided with a judicious mix of business/ entrepreneurship trainings, on-site technical assistance and counselling, provision of income generating assets for enterprise development, and linkage with government schemes.

In activities pertaining to provision of community infrastructure, support should include the following- proper assessment of beneficiaries, provision of the assets in adequate numbers, and



ensuring the quality of infrastructure (streetlights) / physical assets provided. It is crucial for the agencies installing these infrastructures to undertake regular maintenance activities for ensuring continued usage by the project beneficiaries. Here, NTPC Karanpura can play the role of an enabler and ensure long term sustenance through provision of governance, monitoring, operational and financial support.

Recommendations

In summary, NTPC team has put in a dedicated effort towards enhancing the welfare of the community. However, to further improve the effectiveness and sustainability quotient of the impact created through these interventions, NTPC may consider adopting the following approaches:

I. Strengthening stakeholder governance

NTPC can enhance the sustainability of impact created, through strengthening its participatory approach and establishing mechanisms for continued active participation of the community stakeholders. Local community leaders and government representatives can be engaged in a more focused manner throughout project implementation to promote accountability, especially in designing and monitoring of the intervention. Feedback from Gram Pradhan(s) and other local leaders can be sought to build a governance structure for project with clear roles and responsibilities for various stakeholders.

II. Capacity building

NTPC can strengthen the project management systems through reviewing and building capacities of different stakeholders. Through imparting training and providing handholding support, NTPC can draw in various salient stakeholders and boost their involvement across project activities. Community stakeholders can then be efficiently involved in planning and implementation of project activities, while ensuring representation and inclusion of all stakeholders. Capacity building efforts further add to participatory decision-making at a community level which leads to increased ownership and support for project implementation.

III. Linkages and collaboration

NTPC can augment the impact created and ensure its sustainability through exploring opportunities for convergence and partnerships. The current project model is based on complete funding support from NTPC. Through encouraging convergence from other government or non-government sources, NTPC can work towards ensuring long-term support for project activities and creation of sustained impact. Also, collaborating with the NGOs with expertise in similar thematic and geographical regions could bolster both implementation as well as monitoring and evaluation processes.

IV. Holistically designed projects

NTPC can significantly contribute towards community development through ensuring that the project activities cover all crucial aspects of the community's requirement. The projects should be designed and implemented in partnership with the community and must include both short-term and long-term outcomes. Through designing projects that offer end to end support to the beneficiaries across all the sectors, NTPC will be able to create and sustain significant impact.

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

REV-02, Dated:18.05.2023

NORTH KARANPURA SUPER THERMAL POWER PROJECT (3X660 MW)

Post – North Karanpura, District- Chatra

Jharkhand- 825415

Foreword

As the name suggests, On-site emergency plan is a documented meticulous planning to tackle and mitigate any catastrophic or hazardous situation creating emergency like situation in a plant or factory. In addition to ensuring safety to the extent possible, the document also takes care of the provisions and requirements of following acts / rules

1. The Factories Act – 1948
2. Jharkhand Factories Rules – 2015 (Amendment)
3. Factories Act (Amendment) – 1987
4. Hazardous wastes (Management and Handling) Rules – 1989
5. Environment (Protection) Act – 1986

We appreciate the support extended by the Plant Management of NORTH KARANPURA SUPER THERMAL POWER PROJECT and his team in the preparation of this document.

We strongly feel that this document shall go a long way to improve the preparedness for any emergency in the plant.

K. K. Engineering

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1. PREAMBLE

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.

2. 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.

M/s NORTH KARANPURA SUPER THERMAL POWER PROJECT is located at Tandwa in the district of Chatra of Jharkhand State. District head quarter is about 50Km from the site of the plant.

Name & address of the factory is as following:

M/s NORTH KARANPURA SUPER THERMAL POWER PROJECT
VILL+ POST : TANDWA, DISTT.-CHATRA, JHARKHAND,

The plant was incorporated in 2014. The principal activity of the factory is to Power Generation

- Some of the key information regarding production and operation of the plant is as follows :
- Main Product : Electricity
: Rated Capacity 3*660 MW (Total – 1960MW)
 - By Product : Ash

It operates throughout the year 24*7. Sundays are used for maintenance of the plant.

- Present manpower position can be categorized as following :

- Managerial Personnel : 208
- Supervisory Personnel : 00
- Workers :
 - Skilled : 28
 - Un-Skilled :
 - Contractual basis : 4000 (approx)
 - Others :
 - Security Personnel : 310 (approx)

Total : 4546 (Approx)

➤ Transport facilities available with the plant

- Jeep - 28
- Tractor - 1
- Ambulance - 3

Disaster Management Teams of the plant is enclosed in annexure – 2. The employees other than contractual workers are regular employees of North Karanpura Super Thermal Power Project.

➤ The area in which the plant is situated is quite populated. The population within 1 Km radius is about 15000 (approx) and within 2.5 Km radius is about 25000 (approx).

➤ Government bodies with whom liaising may be required are listed below :

- Police station : Tandwa Police Station (Tel- 9431706324)
- D.C.'s office : Chatra (Tel -06553-261555)
- S.D.O.'s office : Simariya (Tel - 098351 64695)
- Factory Inspector's office : Hazaribagh

➤ The nearby industries who's help can be sought or services may be utilized under mutual-aid-scheme are listed below :

- Parki Barwadih Coal Mining Project (NTPC).
- Piparwar Coal Mining (CCL)
- Amrapali Coal Mining (CCL)
- Magadh Coal Mining (CCL)

➤ Medical facilities are available near the plant who's services can be utilized as per requirements: Nearby hospitals are

- NTPC Hospital
- PHC Tandwa
- Distt Hospital Chatra

➤ There is a canteen operating near the plant boundary where tea, snacks and lunch is available on payment basis. Drinking water is available within the plant boundary.

➤ The climatic condition of the area in which the plant is situated is no different from that of Plateau of Chotanagpur belt of Jharkhand. Summers are hot and winters are cold. Except for rainy season, which normally lasts from June to September, the weather is generally dry. Wind proves to be the greatest influence in the dispersion fire, if any. Meteorological features of the Chotanagpur Plateau can broadly be summarised as follows:

* Temperature

- Mean monthly during summer : 32-42 deg. C
- Mean monthly during winter : 14-24 deg. C

- Absolute maximum : 46 deg. C
 - Absolute minimum : 2 deg. C
- * Rainfall
- Mean annual : 1020 mm
 - Mean monthly (rainy season) : 230 mm
- * Humidity
- Maximum relative humidity : 85% (July-September)
 - Minimum relative humidity : 10 % (March-April)
- * Wind
- Mean velocity : 3-9 Kmph
 - Maximum velocity : 140 Kmph
 - Predominant wind direction :
North westerly direction between
November to May
South Easterly direction between
July to October.

3. OBJECTIVES OF ON-SITE EMERGENCY PLAN

The objectives of the On-site emergency 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.

4. 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 57,494 MW (including JVs) with 25 coal based, 7 gas based stations, 2 Hydro based stations and 1 Wind based station. 8 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 m ³ /hr) and will be arranged through barrage /weir across river Garhi.
Name & Address of Occupier & Chief Incident Controller (CIC)	Sh Tajinder Gupta, GGM (NK). Plant Head Mobile No : 9650994662
Name & Address of Factory Manager & Works Incident Controller (WIC)	Sh. Ajay Kumar Shukla, GM (O&M) Mobile No : 9471001071
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.

5. 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.

6. 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 condition significant to Dispersion of personnel at the scene.....	Any other relevant information?

7. 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 Draft 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.

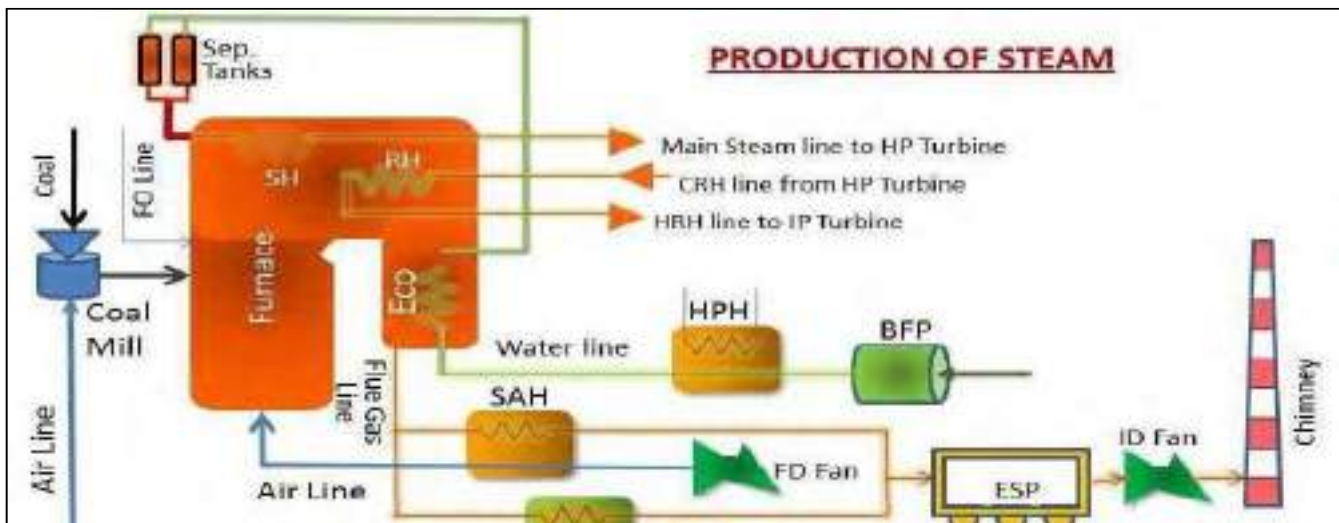
Intake Water Pump House near Tandwa village pumps raw water to the Reservoir at the plant having 1,60,000 M³ storage capacity. The approximate fresh water requirement is 2200 cubic metre per hour. Water used in the boiler is demineralized at DM Plant with anion / cation exchange process.

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.

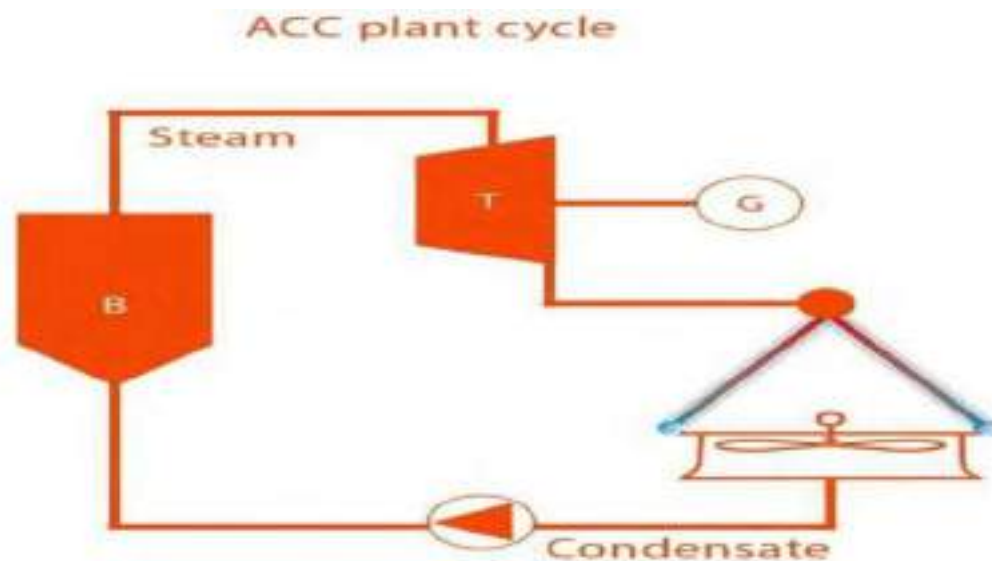
The steam leaving the high pressure cylinder (i.e. CRH) goes back to the boiler for reheating and returns (i.e. HRH) by a further pipe to the intermediate pressure cylinder. Here it passes through another series of stationary and moving blades.

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.

8. 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-11)

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

9. 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.

10. 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

11. 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 H₂ 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.

12. 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

13. 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 'Unit#1 Control room' 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

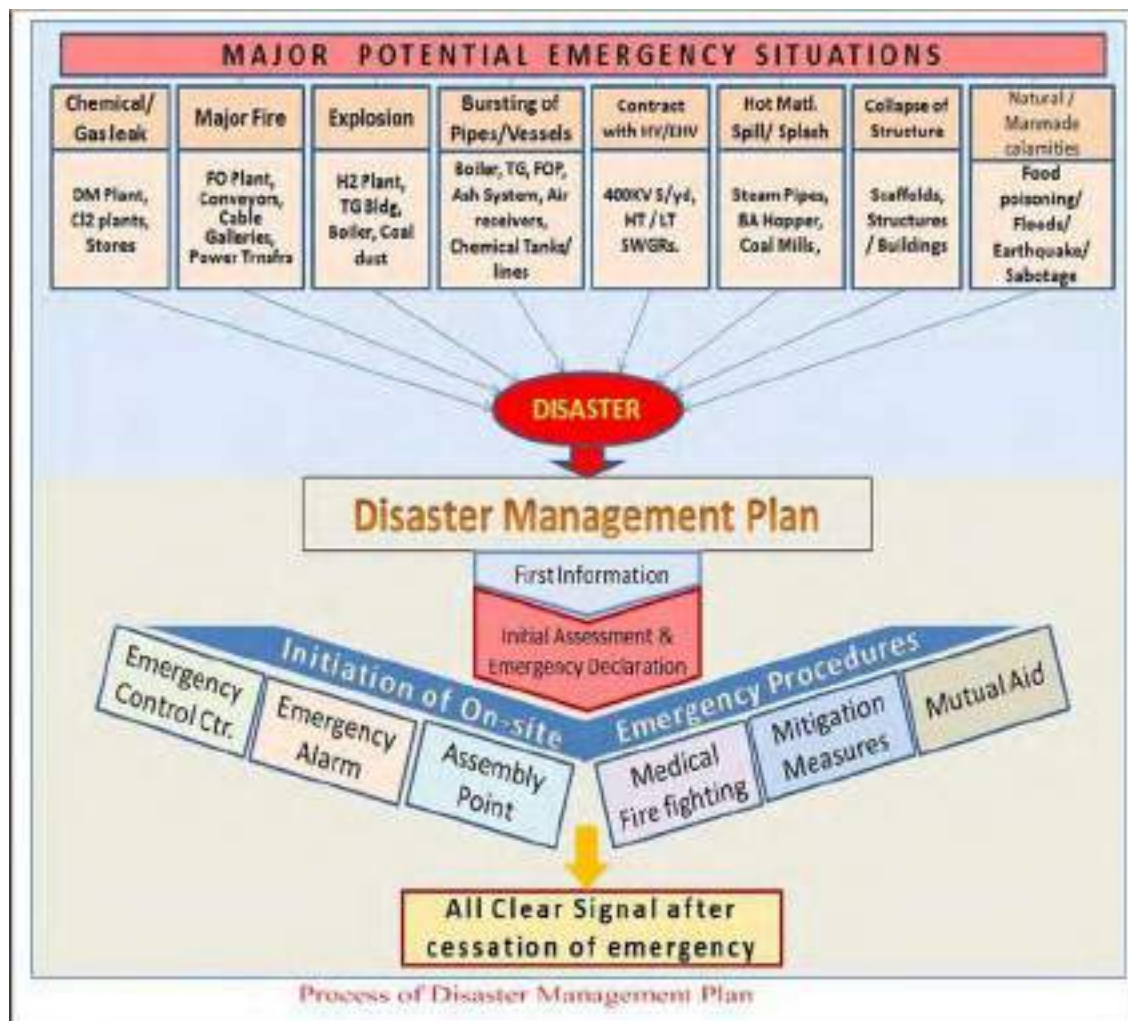
Manning of Emergency Control Centre:-

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., BUH (NK) or his Alternate
2. Members of Support team to CIC
3. Sr. Officers of outside services called in for assistance.

14. 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.



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.

15. 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.

16. 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.

17. 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 inquiries.

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.

18. 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.

19. 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.

20. OUTSIDE ORGANISATIONS TO ASSIST DURING EMERGENCY AND PROTOCOL 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

21. 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 of emergency.
- 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.

22. 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)
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23. 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.

24. 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 where ever required.
- 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 proof 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 wherever required.
- 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 CO₂ 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.

25. 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 proof in the entire plant.

- vi. Hydrogen holder / lines are purged with N₂ 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:

H₂ 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 H₂ gas. And also the H₂ gas purity is continuously monitored and maintained always above 99%. All the H₂ 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.

26. 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.

27. 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.

28. 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.

29. 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.

30. ASSEMBLY POINTS, EVACUATION 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.

3.1. 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:

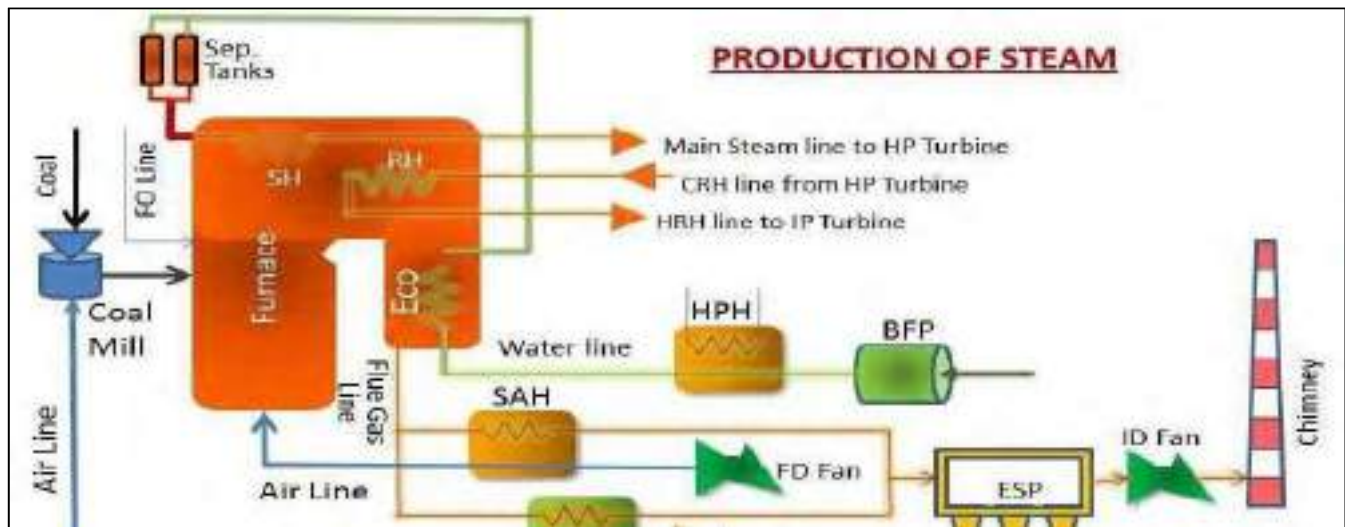
Fire Extinguishers are deployed in all the buildings of entire plant as per the requirements and in accordance with the guide lines of IS: 2190-1992.

FIRE STATION:

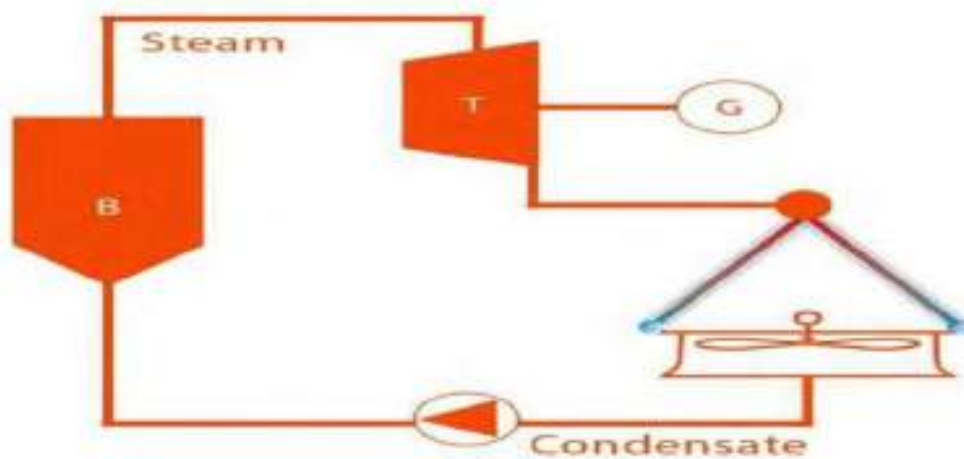
A full pledged Fire Station is available in the Plant which is managed by CISF-Fire Wing. The Fire Station has been equipped with all the required equipments for efficient operation of fire squad. The equipments include the following items mainly.

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

Annexure-1 Process Flow Diagram



ACC plant cycle



ANNEXURE-2 DISASTER MANAGEMENT TEAMS

SUPPORT TEAM TO CIC

Ajay Kumar	Shukla	GM (O&M)	O & M	9471001071
Subhasis	Bose	GM(PROJ CONST)	PROJ CONST	9650996897
Brij Raj	Prasoon	AGM(TS)	TS	9650990017
Swarup	Khan	SR. MANAGER (CHEMISTRY)	CHEMISTRY	9650997461
Rajeev	Tripathi	AGM(ELECT ERECT)	ELECT ERECT	7522002825
A.K	Agarwal	AGM(Safety)	SAFETY	7054757778

TECHNICAL RESPONSE TEAM

Ajay Kumar	Shukla	GM (O&M)	O & M	9471001071
Rajeev	Tripathi	AGM(ELECT ERECT)	ELECT ERECT	7522002825
Jayesh S	Chaudhari	DGM (FQA)	FQA	9925503881
Dipak Kumar	Dalei	AGM(C & I ERECT)	C & I ERECT	9437964101
N.D	Pandey	AGM(CIVIL CONST)	CIVIL CONST	7349608575

FIRE FIGHTING TEAM

		AC (CISF)		9264443340
		FIRE INSPECTOR, CISF		9264443351
U.K	Mukherjee	SR. MANAGER (MAINT. PLNG.)	MAINT. PLNG.	9434047525
Uday	Kumar	AGM (MECH ERECT)	MECH ERECT	9471001324
Prashant	Soni	SR.MANAGER(P & S)	P & S	9425219116

MEDICAL TEAM

Shankar Sheo	Prasad	CHIEF MEDICAL OFFICER	MEDICAL	9434084523
Baby	Sarkar	SMO (MEDICAL)	MEDICAL	8004948305
Ade	Ashok	AMO (MEDICAL)	MEDICAL	9491172122
V.L.N	Saikiran	AMO (MEDICAL)	MEDICAL	9844745343
Gaurav	Sharma	AMO (MEDICAL)	MEDICAL	7300874471
Anil	Kumar	ASST. OFFICER (MEDICAL)	MEDICAL	8004948065

MAINTENANCE TEAM

Mukul	Rai	AGM (MECH MAINT.)	MAINT.	7458012805
Rajeev	Verma	AGM (IT)	IT	9650995009
Anil Kumar	Chawla	AGM(HR)	HR	9650701354
Sachin	Kumar	DGM (ELECT ERECT)	ELECT ERECT	9471003376
Lal Babu	Sharma	DGM (Maint)	Off. Site Maint	9473196778

ADMINISTRATIVE TEAM

Rajeev	Verma	AGM (IT)	IT	9650995009
Uday	Kumar	AGM (MECH ERECT)	MECH ERECT	9471001324
Anil Kumar	Chawla	AGM(HR)	HR	9650701354
Dharmendra	Singh	AGM (OPERATION.)	OPERATION.	9650998599
N.D	Pandey	AGM(CIVIL CONST)	CIVIL CONST	7349608575

SAFETY TEAM

Ajay Kumar	Agarwal	AGM(Safety)	SAFETY	7054757778
Prince	Kumar	DY. MANAGER(SAFETY	SAFETY	9065519283
Prashant	Soni	SR.MANAGER(P & S)	P & S	9425219116

COMMUNICATION TEAM

Rajeev	Verma	AGM (IT)	IT	9650995009
Ajay	Chadha	DGM (IT)	IT	9650990882
Rahul	Prakash	SR.MANAGER(IT)	IT	9406712435
Sunny	Seth	SR.MANAGER(HR)	HR	9425570890

TRANSPORTATION TEAM

Neeraj	Bharati	DGM(MECH ERECT)	MECH ERECT	7389942202
Anil Binit	Lakra	DGM(MECH ERECT)	MECH ERECT	9425178269
Anil Kumar	Chawla	AGM(HR)	R & R	9650701354
Ananjan	Bhunja	MANAGER(HR)	HR	9434075924

SECURITY & TRAFFIC CONTROL TEAM

		AC, CISF		9264443340
		INSPECTOR,CISF		9264443341
		CISF CR		9264443342
Abhishek	Anand	SR.MANAGER(HR)	HR	9425281005
Sita Ram	Munda	ASST. MANAGER(SAFETY)	Safety	9473196353
Dheeraj	Gupta	DGM (HR)	HR	9650995877

Annexure-3

Preventive Maintenance Record

Sl. No.	Name of Equipment	Place of Installation	Date of Examination	Components Checked	Components Changed	Next Due Date of Examination	Remarks

Annexure-4

Check of Earthing Pit

Sl. No.	Date of Examination	Agency / Person	Measured Resistance	Allowable Resistance	Steps Taken	Next Due Date of Examination	Remarks

Annexure-5

Examination of Lifting Machines and Lifting Tackles

[illegible]

Annexure-6

First Aid Fire Fighting Equipment

[illegible]

Annexure-7

Record of Mock Drills

Sl. No.	Unit Where performed	Nature of Shadow Accident	Persons Involved	Steps Performed	Area of Weakness

Annexure-8

Safety and personnel protective appliances

1. Portable Generator
2. Flood Light / search light
3. Light extension ladder
4. Ropes (manila) / Safety belts
5. Spanner set
6. Rope ladder
7. Bolt cutter
8. Insulated fire axe
9. Fire hose
10. Helmets
11. Emergency torches
12. Fire suit
13. Public address system
14. First aid kit
15. Stretches

Annexure-9
Emergency Check-list

1. Assess the situation.
2. Operate the emergency alarm signal, if found necessary.
3. Inform the security.
4. Inform the unit-incharge of the units surrounding the affected area.
5. Inform the district administration / state authorities about the emergency and the proposed line of action.
6. Call the fire fighting and rescue team.
7. Inform the nearby industries to safeguard their units and extend help under mutual aid scheme.
8. Sound nearest hospitals and dispensary to remain prepared.
9. Coordinate the efforts to be made and actions to be taken to combat the emergency situation effectively.
10. Coordinate the rescue team.
11. Mark the affected area and safe roads of transport in the plant layout drawing displayed in the plant control room.
12. Any other precautions.

Annexure-10

Record of Accidents

[illegible]

MATERIAL SAFETY DATA SHEET FOR TOXIC & CORROSIVE CHEMICALS

ANNEXURE-11

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.

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

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

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: 50ppm

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.

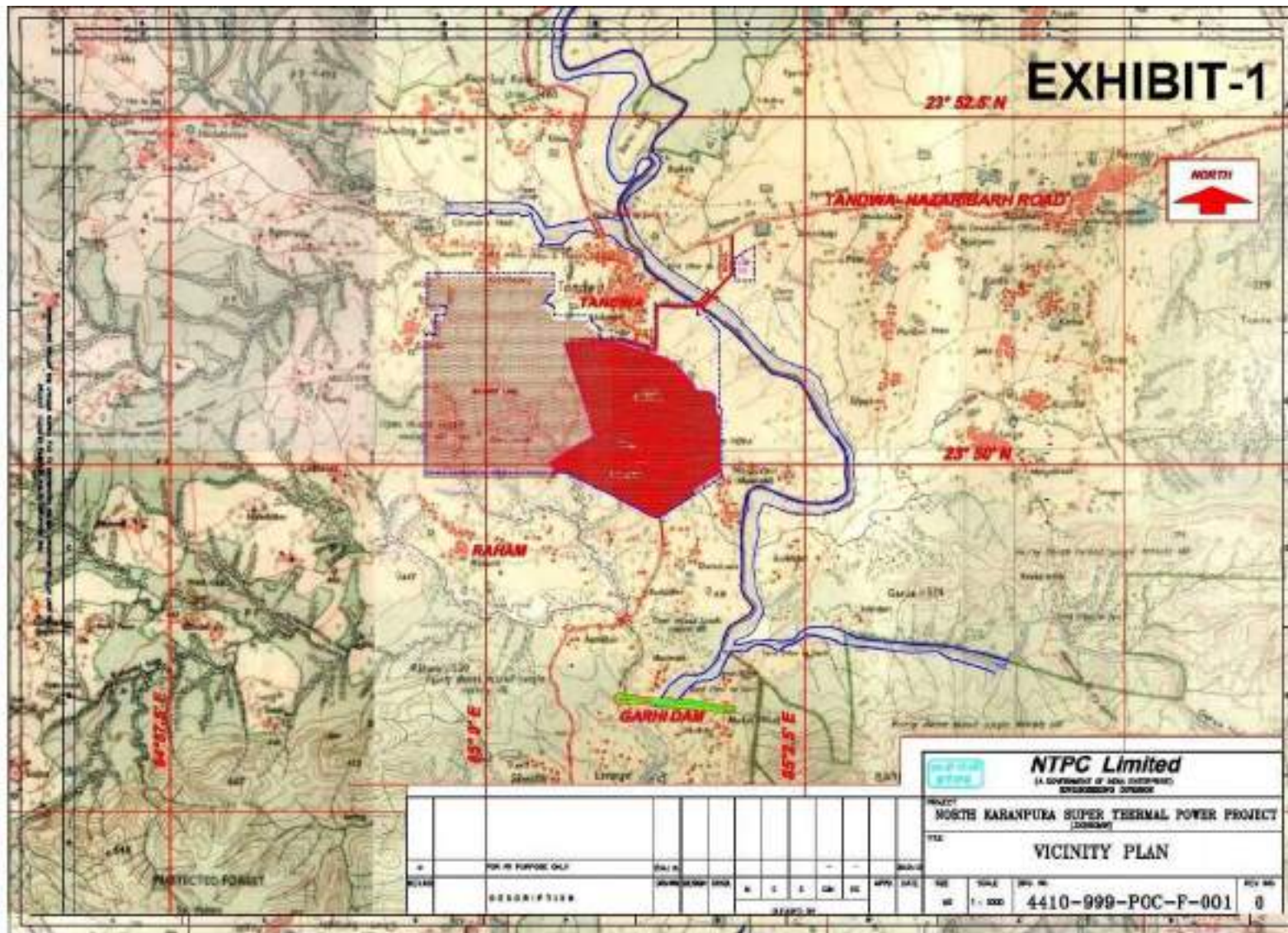
Methods for Cleaning Up: Absorb spill with an inert material (e.g. vermiculite, dry sand, earth, cloth, fleece), and place in a suitable non-combustible container for reclamation or disposal. Neutralize spill area and washings with acetic acid. Never return spills in original containers for re-use. Clean 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-12 VICINITY PLAN



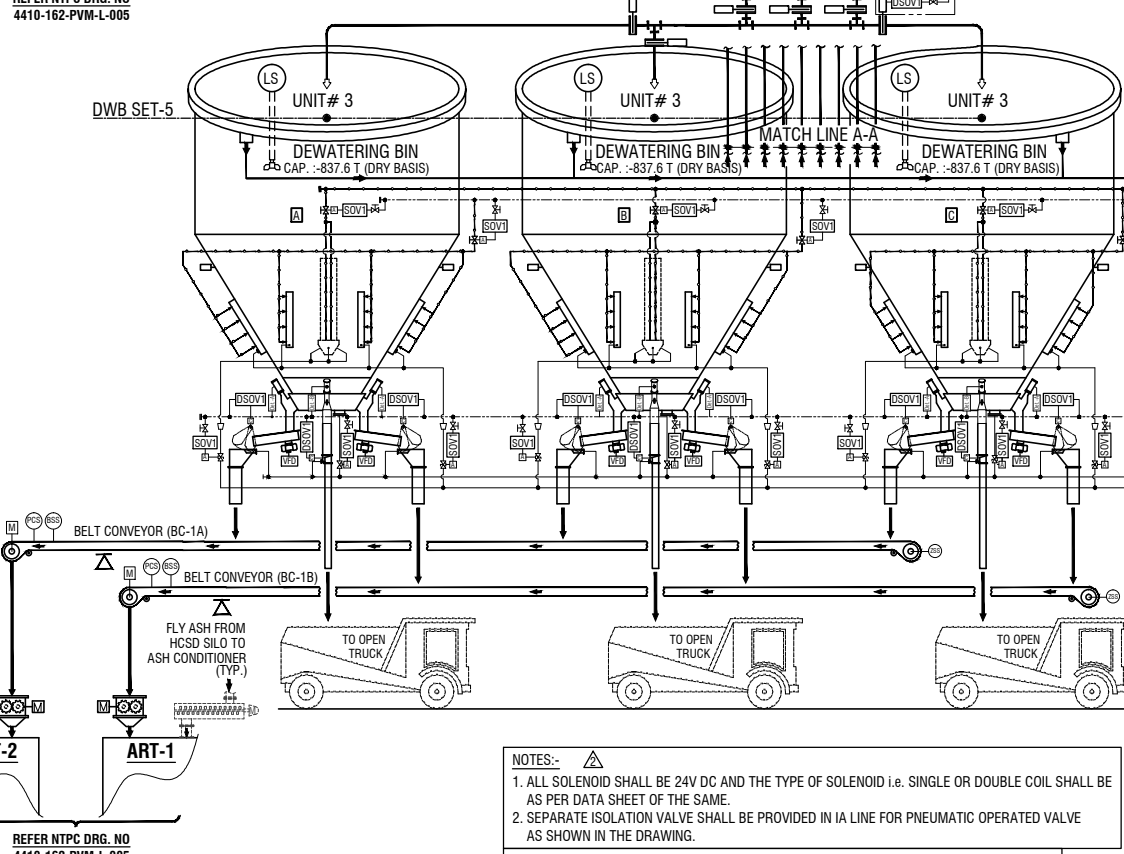
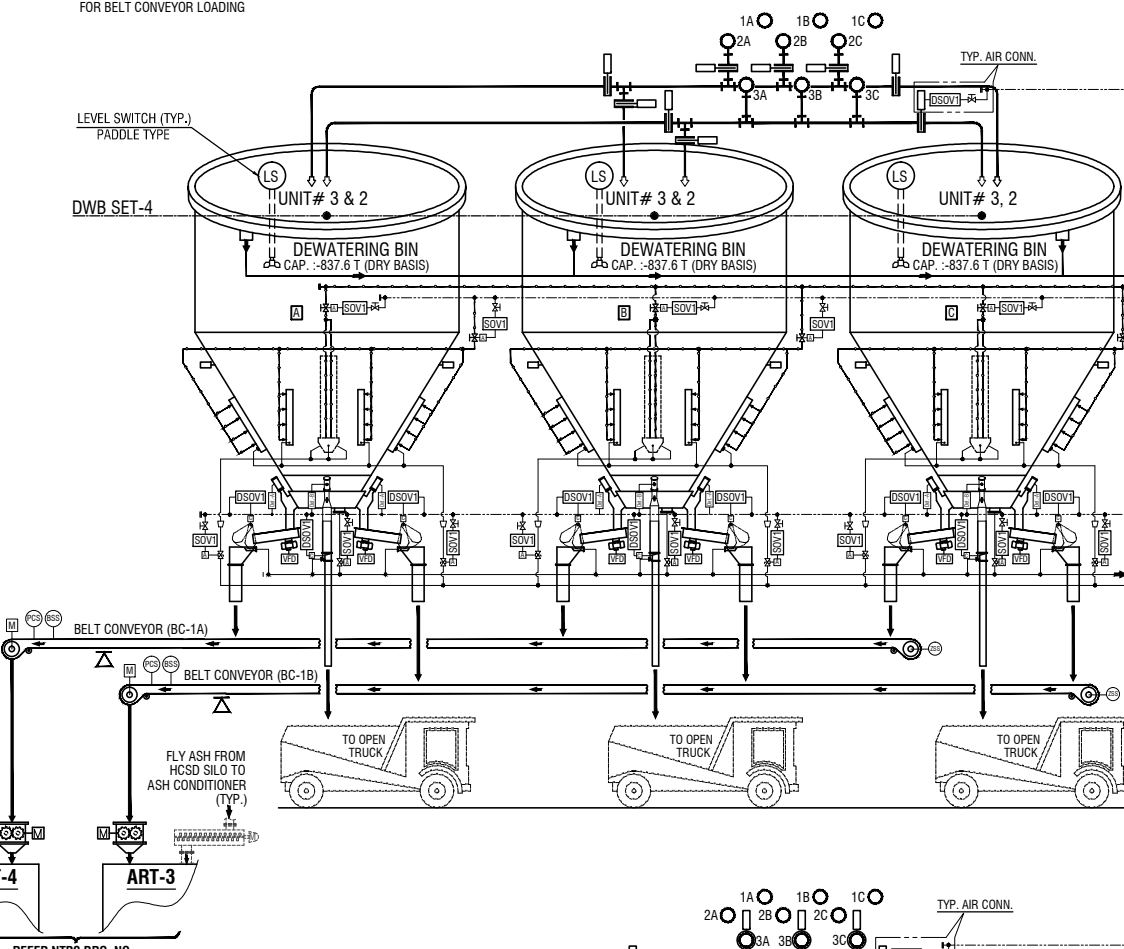
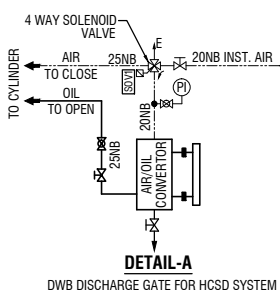
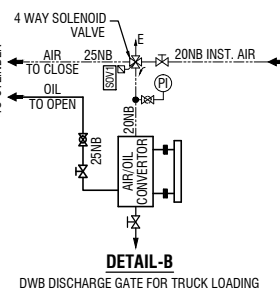
ANNEXURE-14 DETAILS OF FIRST AID TRAINED STAFF

DETAILS OF FIRST AID TRAINED STAFF

SL. NO	NAME	DESIGNATION	MOBILE	AGENCY
1	SURESH TUDU	MEDICAL ATTENDANT	9122365435	GVK EMRI
2	CHANDAN KUMAR	MEDICAL ATTENDANT	8210775985	GVK EMRI
3	SLMAN ALI	MEDICAL ATTENDANT	6205886024	GVK EMRI
4	MUDIT BAJPAI	EMT	7518088817	GVK EMRI
5	SUNIL SINGH	EMT	7054312760	GVK EMRI
6	RAVI KUMAR	EMT	9102499418	GVK EMRI
7	RAVI KUMAR	EMT	9671489938	GVK EMRI
8	OM PRAKASH	EMT	9835139483	GVK EMRI
9	VIRENDRA KUMAR	EMT	9102255848	GVK EMRI
10	ABHIRAM BANKIRA	DRESSER	7479597041	UPL
11	BHUNESHWAR KUMAR	DRESSER	6200202508	UPL
12	SAROJ KUMAR	DRESSER	7739545655	UPL

LEGEND:-

WET ASH CONVEYING PIPE	PLUG VALVE	BUTTERFLY VALVE	SOLENOID VALVE	PULL CORD SWITCH
INSTRUMENT AIR PIPE	"Y" TYPE STRAINER	REDUCER	PNEUMATIC ACTUATED OPERATED	BELT SWAY SWITCH
BA LP WATER PIPE	GLOBE VALVE	GLOBE VALVE NORMALLY CLOSED	PNEUMATIC CYLINDER OPERATED	ZERO SPEED SWITCH
BA HP WATER PIPE	NON-RETURN VALVE	BALL VALVE	PNEUMATIC PANEL	MOTOR
ECO WATER LINE	SAFETY VALVE	LEVEL TRANSMITTER	EXPANDER	OPEN LIMIT SWITCH
FLY ASH WATER PIPE	KNIFE GATE VALVE (HAND WHEEL OPTD.)	PS PRESSURE SWITCH	PRESSURE TRANSMITTER	VARIABLE FREQUENCY DRIVE
MAKE UP WATER PIPE	KNIFE GATE VALVE (CLY. OPTD.)	PI PRESSURE INDICATOR	DIAPHRAGM TYPE PRESSURE GAUGE	ORIFICE
GATE VALVE NORMALLY CLOSED	KNIFE GATE VALVE (CLY. OPTD.)	LS LEVEL SWITCH (PADDL TYPE)	DIAPHRAGM TYPE PRESSURE TRANSMITTER	
GATE VALVE NORMALLY OPEN	PNEUMATIC ACTUATOR OPTD. BUTTERFLY VALVE	LG LEVEL GAUGE	PRESSURE GAUGE	
PNEUMATIC ACTUATOR OPTD. BUTTERFLY VALVE				



- NOTES:
1. ALL SOLENOID SHALL BE 24V DC AND THE TYPE OF SOLENOID I.e. SINGLE OR DOUBLE COIL SHALL BE AS PER DATA SHEET OF THE SAME.
 2. SEPARATE ISOLATION VALVE SHALL BE PROVIDED IN IA LINE FOR PNEUMATIC OPERATED VALVE AS SHOWN IN THE DRAWING.

SOV1 - SINGLE COIL SOLENOID VALVE WITH 2 LIMIT SWITCH (OPEN & CLOSE FEEDBACK)

BSOV1 - DOUBLE COIL SOLENOID VALVE WITH 2 LIMIT SWITCH (OPEN & CLOSE FEEDBACK)

R.NO.	DATE	DESCRIPTION	BY	CHKD.	APPD.
2	03-02-2016	REVISED AS PER NTPC LETTER REFERENCE NO. CC162:3494 DATED:- 19.08.2015	RAMESH	AP	SVS
1	03-08-2015	REVISED AS PER NTPC LETTER REFERENCE NO. CC162:2754 dtd.06.07.15 & TCM-001 DTD. 08.07.15	SAINI	AP	SVS
REVISIONS					

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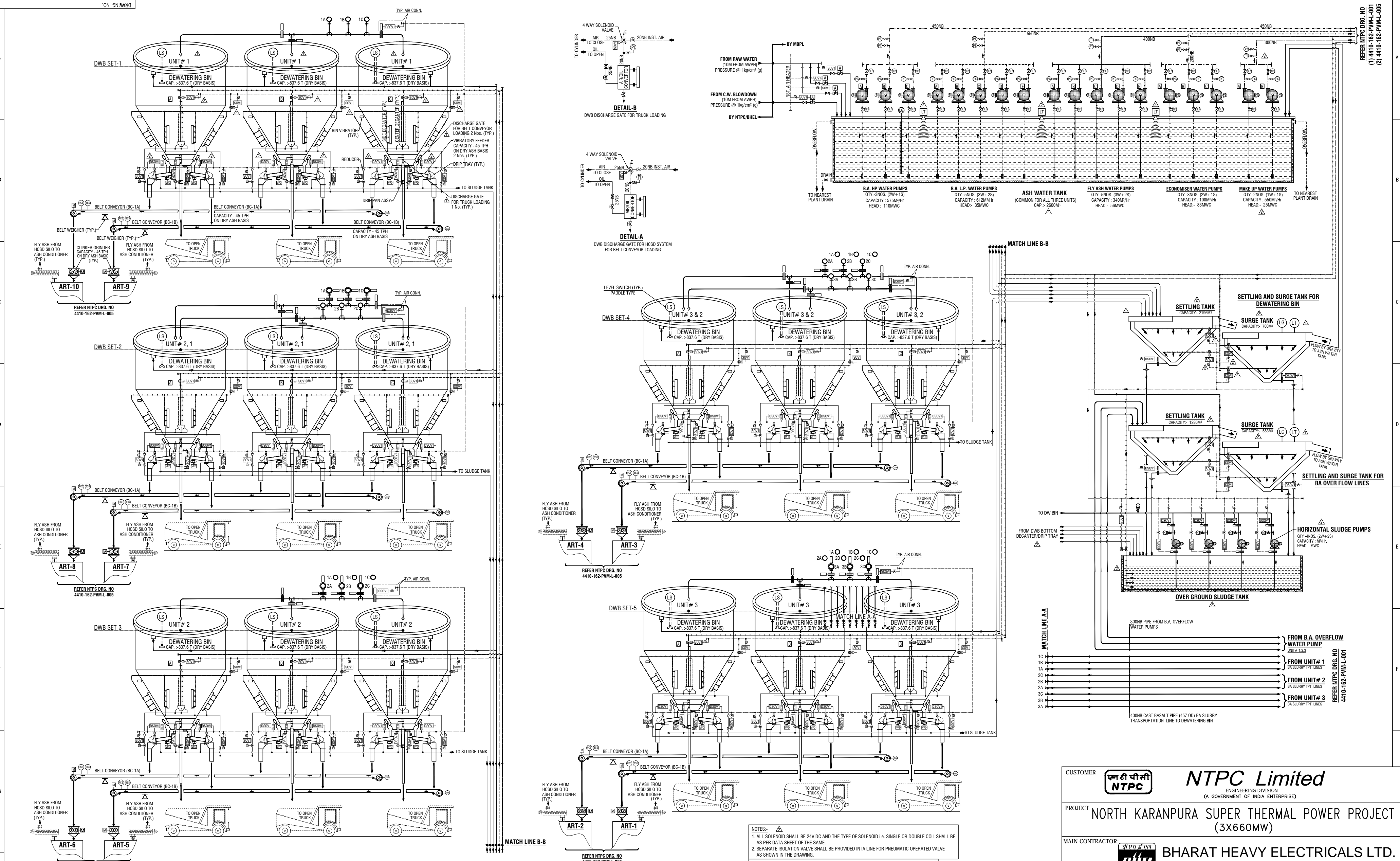
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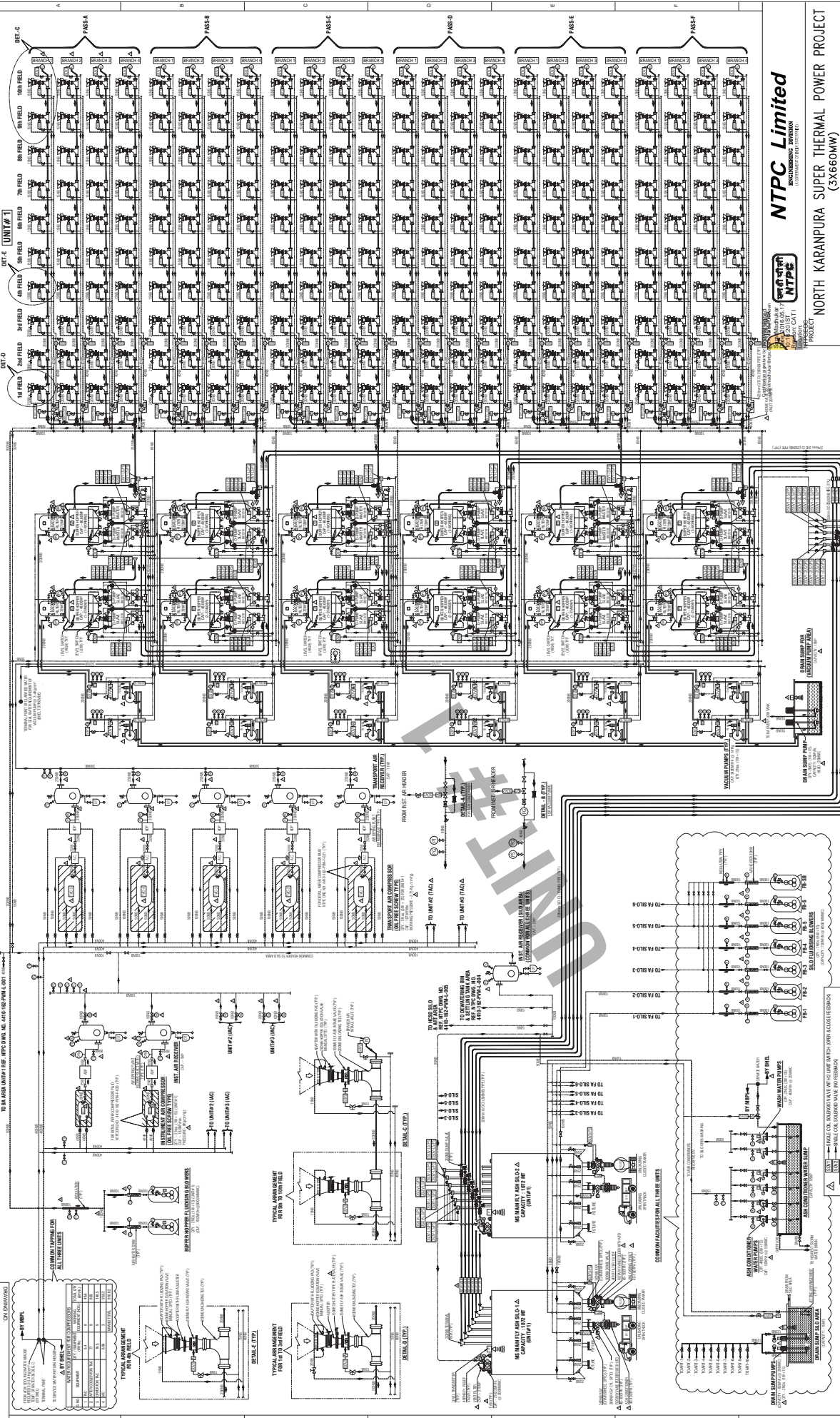
RELEASE STATUS

PURPOSE	DATE	SIGNATURE
FOR APPROVAL		
FOR TENDER ONLY		
CIVIL/STR.		
MECH.		
ELECT.		

THIS DRG. HAS BEEN APPROVED BY CONSULTANTS/PURCHASERS LETTER NO. DT.



CUSTOMER		NTPC Limited ENGINEERING DIVISION (A GOVERNMENT OF INDIA ENTERPRISE)	
PROJECT			
NORTH KARANPURA SUPER THERMAL POWER PROJECT (3X660MW)			
MAIN CONTRACTOR:		BHARAT HEAVY ELECTRICALS LTD. INDUSTRIAL SYSTEMS GROUP, BANGALORE	
BHEL's CONTRACTOR:		MACAWBER BEEKAY PRIVATE LIMITED NOIDA (U.P.)	
DIRECTORY:	SCALE	WEIGHT(Kgs.)	NTPC DRAWING NO.
FILE NO.:	NTS		4410-162-PVM-L-004
TITLE:		DRAWING NO.	
ASH WATER & ASH SLURRY DISPOSAL SYSTEM		IS-1-FL-682-302-M004	
SHEET NO.		NO. OF SHEETS.	
01		01	



REVISIONS

NO.	DATE	DESCRIPTION
1	20-07-15	REVISED AS PER P.T. LETTER REFERENCE NO. CG 102-2005-041105-15 & TO MAIN UNIT DTD. 08-07-15
2	04-05-16	REVISED AS PER P.T. LETTER REFERENCE NO. CG 102-2005-041105-15 & TO MAIN UNIT DTD. 08-07-15
3	04-05-16	REVISED AS PER P.T. LETTER REFERENCE NO. CG 102-2005-041105-15 & TO MAIN UNIT DTD. 08-07-15

RELEASE STATUS

PURPOSE	DATE	SIGNATURE
FOR APPROVAL		
FOR TENDER ONLY		
FOR CONTRACT		

PROJECT INFORMATION

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

CLIENT: BHARAT HEAVY ELECTRICALS LTD. INDUSTRIAL SYSTEMS GROUP, BANGALORE

DESIGNER: NTPC Limited

DATE: 15-07-15

SCALE: 1:1

FILE NO.:

CONTRACT INFORMATION

CONTRACT NO.:

CONTRACT VALUE:

CONTRACT TYPE:

APPROVALS

DESIGNED BY: SAURABHA DAA

CHECKED BY: SAURABHA DAA

APPROVED BY: SAURABHA DAA

REVISIONS

REVISED BY: SAURABHA DAA

REVISED DATE: 15-07-15

LEGEND

SYMBOLS AND THEIR MEANINGS:

- VALVE
- ACTUATOR
- PUMP
- CONVEYOR
- SILO
- PIPE
- WIRE
- ...

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS (MM) UNLESS OTHERWISE SPECIFIED.

2. ALL DIMENSIONS SHALL BE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.

3. ALL DIMENSIONS SHALL BE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.

