EC COMPLIANCE STG II
(Jan-June'20)

Monitoring the Implementation of Environmental Safeguards

Ministry of Environment & Forests

Western Region, Regional Office Bhopal

MONITORING REPORT PART-I

DATA SHEET

S. N.	Description	Details
1.	Project Type: River-valley/ Mining/ Industry/ Thermal/ Nuclear/ Other	Thermal
2.	Name of the project	Vindhyachal Super Thermal Power Project, **Stage-II (2x500 MW**)
3.	Clearance letter(s)/ OM No. and date	MoEF vide letter No. J-13007/32S7-IA.II dated 26.06.1993
4.	Location:	
	a) District(s)	Singrauli
	b) State(s)	Madhya Pradesh
	c) Location Latitude/ Longitude	Latitudes of 24^0 04'58" - 24^0 06'19" N Longitudes 82^0 38'34" - 82^0 41'29" E
5.	Address for correspondence:	Executive Director, Vindhyachal Super Thermal Power Project, Vindhyanagar, Dist Singrauli, (M.P.) Pin 486885
	a) Address of the Concerned Project Chief Engineer (with Pin Code and Telephone/ Telex/ Fax numbers)	Executive Director, Vindhyachal Super Thermal Power Project, Vindhyanagar, Dist Singrauli, (M.P.) Pin 486885. Ph. 07805-247710, Fax 07805-247711
	b) Address of the Executive/Project Engineer/ Manager (With Pin Code & Telephone/ Telex/ Fax numbers)	Same as above

6.	Salient features:	
	a) Of the project	i) Coal based Thermal Power Plant with sub-critical boiler and enhanced steam parameters ii) Cooling Water source is outfall channel of NTPC ShaktiNagar which in-turn draws water from Rihand Reservoir. iii) Main Coal source is Nigahi coal mines of NCL. All coal transportation is by means of Rail only with majority of transportation being done through NTPC-owned racks through MGR (Merry-Go-Round system). A Copy of Feasibility Report is already submitted.
	b) Of the Environmental Management Plans	i) Tall stack (275 m) for wider dispersion of flue gases. ii) High Efficiency ESP. iii) Stack installed with CEMS (Continuous Emission Monitoring System) for monitoring PM, SOx, NOx. iv) Effluent Treatment Plant (ETP), Sewage Treatment Plant (STP) and Ash Water Recirculation Systems are in place to ensure 100 % process water recirculation. A Copy of EIA/ EMP Report is already submitted.
7.	Break-up of the project area:	Total area of all stages of Vindhyachal project is 5999 acres.
	a) Submergence area: forest & non-forest	951 acres (for all stages of VSTPS)
	b) Others	5048 acres (for all stages of VSTPS)

8.	Breakup of the project affected population with enumeration of those losing houses/ dwelling units only agricultural land only. Both dwelling units and agricultural land and landless laborers/ artisans:	3456 (STG I & II; STG II Main Plant came up on the same land that was acquired for Stg I)
	SC, ST/ Adivasi	SC – 1040, ST - 365
	Others	2051
9.	Financial details:	
	a) Project cost as originally planned and subsequent revised estimates and the year of price reference.	
	b) Allocation made for environmental management plans with item wise and year wise break-up	~ Rs.2000 Crore (Total for all stages of VSTPS since many facilities are common)
	c) Benefit cost ratio/ internal rate of Return and the year of assessment	
	d) Whether it includes the cost of environmental management as shown in the above	Yes
	e) Actual expenditure incurred on the project so far	Project Cost for Stg II as on 31/03/2020 is Rs.2670.77 crores.
	f) Actual expenditure incurred on the environmental management plans so far	Actual expenditure on Environment Management at NTPC Vindhyachal is ~ Rs.2390 Crore upto 31.03.2020.
10.	Forest land requirement:	No forestland involved.
11.	The status of clear felling in non-forest area (such as submergence area or reservoir, approach roads), if any with quantitative information required.	---
12.	Status of Construction (actual and/or planned)	
	a) Date of commencement (actual and/or planned)	Date of Main Plant Award 13.06.1995
	b) Date of completion (Actual and/or planned)	October 2000

<table>
<tr><th>S.No</th><th>EC Conditions</th><th>Action Taken/Compliance Status</th></tr>
<tr><td>(i)</td><td>Electrostatic Precipators having an operational efficiency not less than 99.70 % should be installed so as to ensure particulate emissions are not exceeding 150mg/Nm3.</td><td>Electrostatic Precipitators (ESPs) are in operation having the efficiency of 99.96 %. ESP R&M is done to bring down the stack emission below 75mg/Nm3 (height of existing field increased and one field added in each of the four pass).
Six Monthly Emission Quality Data of CEMS of Stage-2
<table>
<tr><td>Parameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>SPM (Mg/Nm3)</td><td>73</td><td>77</td><td>74</td></tr>
</table></td></tr>
<tr><td>(ii)</td><td>A twin flue stack of 275 meters height should be provided</td><td>A twin flue stack of 275 m height have been provided for wider dispersal of the particulate & gaseous emissions. Continuous Emission Monitoring System for SOx, NOx and SPM is installed and connected to CPCB/MPPCB servers.</td></tr>
<tr><td>(iii)</td><td>Space for flue gas desulphurization (FGD) plant. The same will be installed if required from environmental. The need and requirement of FGD system will be decided by ministry based on the report of the technical committee constituted by this ministry.</td><td>Provision is kept as per condition stated. Contract for installation of FGD awarded. Work is in progress. Scheduled completion for Unit 7 is July’21 and for Unit 8 is Dec’21.</td></tr>
<tr><td>(iv)</td><td>Cooling tower of adequate capacity and size will be installed so that there is no discharge of cooling towers.</td><td>Closed cycle Cooling system of 100% capacity have been installed for each unit. No blow down is done in cooling towers and hence no effluents are generated
  </td></tr>
</table>

(v)	The bleed from the boiler house and cooling towers, effluents from DM plant will be fully treated so that the treated effluent confirms to the standards prescribed by SPCB, Central Government, whichever are there.	NTPC Vindhyachal is having the effluent treatment plant for treatment of plant effluent and treated effluents are being recycled in the plant premises. Treated water parameters are within Limit.  Treated Effluent quality reports are regularly submitted to MPPCB **ETP quality data for the period Jan-June'20:**-:

Prameter	Minimum Value	Maximum Value	Average Value
BOD (mg/lit)	14.60	17.50	16.02
COD (mg/lit)	69.50	77.00	71.92
Suspended solid	26.59	29.00	27.68
Oil & Grease	3.33	5.20	4.20
Temperature 0 C	20.76	29.54	26.53
pH	7.37	7.46	7.42

<table>
<tr>
<td>(vi)</td>
<td>Effluent from the ash ponds from Stage-I & II shall be totally recirculated within the plant.</td>
<td>NTPC Vindhyachal has installed a dedicated ash water recirculation system for 100% recirculation of ash water.
AWRS quality data for the period Jan-June’20:-
<table>
<tr><th>Prameter</th><th>Minimum Value</th><th>Maximum Value</th><th>Average Value</th></tr>
<tr><td>BOD (mg/lit)</td><td>13.40</td><td>16.50</td><td>14.64</td></tr>
<tr><td>COD (mg/lit)</td><td>67.25</td><td>71.00</td><td>69.24</td></tr>
<tr><td>Suspended solid</td><td>69.85</td><td>78.79</td><td>74.28</td></tr>
<tr><td>Oil & Grease</td><td>1.10</td><td>1.30</td><td>1.20</td></tr>
<tr><td>Temperature 0 C</td><td>20.37</td><td>31.07</td><td>26.92</td></tr>
<tr><td>pH</td><td>7.32</td><td>7.40</td><td>7.38</td></tr>
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<td></td>
<td>Adequate mechanism of air and water quality including ground water monitoring system will be setup at different locations in and around the plant. The location of these monitoring stations should be installed in consultation with SPCB/ Indian Metrological department. The monitored data of air and water quality should be furnished to the ministry and SPCB once in three months.</td>
<td>Four Ambient Air quality monitoring station and Four Effluent quality monitoring station have been set up to monitor air and effluent water quality and have been connected to CPCB/MPPCB servers. Ground water monitoring in the areas between Plant and Reservoir is also being done through off- line testing (sample report attached as Annexure II-2).
AMBIENT AIR QUALITY SYSTEM station
  </td>
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</table>

<table>
<tr><td></td><td></td><td>Ambient Air quality data for the period Jan-June’20:
<table>
<tr><td>Parameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>PM10</td><td>75.20</td><td>91.29</td><td>84.16</td></tr>
<tr><td>PM2.5</td><td>40.57</td><td>52.42</td><td>45.54</td></tr>
<tr><td>SOX</td><td>20.10</td><td>25.20</td><td>22.83</td></tr>
<tr><td>NOX</td><td>20.10</td><td>24.11</td><td>21.67</td></tr>
</table></td></tr>
<tr><td>(vii)</td><td>The stack will be provided with automatic monitoring equipments for measuring and recording of sulphur di-oxides and oxides of nitrogen.</td><td>CEMS has been installed for on line monitoring of SPM/SOx/NOx and connected to CPCB and MPPCB
Six Monthly Emission Quality Data of CEMS of Stage-2
<table>
<tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>SPM (Mg/Nm3)</td><td>73</td><td>77</td><td>74.92</td></tr>
<tr><td>SOX (Mg/Nm3)</td><td>929.50</td><td>1019.90</td><td>955.99</td></tr>
<tr><td>NOX (Mg/Nm3)</td><td>408.00</td><td>718.53</td><td>580.85</td></tr>
</table></td></tr>
<tr><td>(viii)</td><td>The request of the project authorities for their ash pond near the Govind Ballabh Pant lake is not considered due to result in pollution problem, due to leachates from the ash ponds. In view of this project authorities are requested to suggest alternate locations for ash disposal purpose. The suggestion will be examined separately and decision taken later on.</td><td>Separate clearance has been obtained.</td></tr>
<tr><td>(ix)</td><td>Adequate measure for control of noise due to operations within different plant units should be taken. The noise level should confirm to the standards prescribed by the Ministry under the Environment Protection Act.</td><td>Acoustic enclosures have been provided to control the noise level below regulatory norms & personal protective equipment have been provided wherever it is not possible to control the noise level. Regular monitoring of all the environmental parameters is being carried out & Noise level is also being complied as per norms.
The Noise monitored data at Turbine Floor for the period Jan-June’20:
<table>
<tr><td>Location</td><td>Parameter</td><td>Min</td><td>Max</td><td>Avg</td></tr>
<tr><td>Turbine floor</td><td>Noise (dB(A)</td><td>69</td><td>73</td><td>71</td></tr>
</table>
Sample Monitoring Report for June’20 is attached as Annexure-II-1.</td></tr>
<tr><td>(x)</td><td>Precautionary measure for control of fire and explosion hazards arising due to transportation, use of storage of</td><td>Comprehensive fire detection & protection system is installed for the complete power station including coal and oil storage areas. NTPC Vindhyachal has a disaster</td></tr>
</table>

	coal and oil should be taken.	management plan, approved by the nation safety council, to deal with any kind of emergency/accident. Measures dealing with oil and coal storage accidents are elaborated in **Annexure II-3.**
(xi)	A greenbelt development plan covering the entire area of the Super Thermal Power Station should be prepared and submitted to this ministry within six months time. The plants species selected should be based on the local area and should give maximum green cover. The species so selected should be less sensitive as well as resistant variations of emission of Sulphur di-oxides.	Every year, NTPC Vindhyachal is planting more than 20,000 nos. of tree in and around the plant area. Additionally, 50000 trees are also planted every year through MPRVVN for which an MOU has been signed with them for next ten years (from 2016-17). In financial year 2019-20, more than 72000 saplings have been planted by NTPC-Vindhyachal. NTPC-Vindhyachal has developed the green belt around the plant as well as in the ash dyke area. Till June'20, about 23.7 lac trees have been planted over an area of about 3000 acres out of which about 2200 acres area is in and around NTPC Vindhyachal premises The plantation is being done through MPRVVN so the species selection suitability for local area is automatically done. 

		 
(xii)	They should carry out regular monitoring of flora and fauna, fisheries and bottom sediments of the lake to monitor the impact of the ash pond effluents of other units of National Thermal Power Corporation.	Flora & Fauna study done in 2008 and 2010. Inventorization study for the industries operating around the Rihand Reservoir periphery to ascertain the effluent getting discharged directly in the water body and also carry out air emission inventory within 15 km radius of Rihand Reservoir has been carried out by M/S Vimta Lab Limited, Hyderabad. It also included Study of Rihand Reservoir sediments. The study was completed in 2019.
(xiii)	The detailed Rehabilitation plan should be prepared with regard to those displaced persons due to the location of the Vindhyachal power station and its full implementation within one year.	Provision was kept as per condition stated.
(xiv)	An environmental cell should be setup with laboratory facilities to look in to the implementation of various conditions mentioned above. Adequate financial setup should be made for implementation of these stipulations.	An Environmental cell has been created at the project site with HOD at the level of Addl General Manager that is looking after compliance of conditions stipulated. A suitably equipped Environment lab has also been created.
(xv)	The Project authorities will submit the detailed Environmental Impact Assessment report for this Singrauli region by January 1991. Any other provision stipulated by this ministry after examination of this region	Environmental Impact Assessment report submitted as per your directions.
(xvi)	The conditions stipulated above may be varies or new ones imposed. The clearance may revoke in the event	Agreed

	of non-implementation of the conditions above.	
(xvii)	The stipulation will be enforced amongst others under Water Act 1974 and Air act 1981 and the environment protection act 1986 or other subsequent amendments.	Agreed

EC COMPLIANCE STG III
(Jan-June'20)

Monitoring the Implementation of Environmental Safeguards

Ministry of Environment & Forests

Western Region, Regional Office Bhopal

MONITORING REPORT PART-I

DATA SHEET

S. N.	Description	
1.	Project Type: River-valley/ Mining/ Industry/ Thermal/ Nuclear/ Other (specify)	Thermal
2.	Name of the project	Vindhyachal Super Thermal Power Project, **Stage-III (2x500 MW)**
3.	Clearance letter(s)/ OM No. and date	MoEF vide letter No. J-13011/07/2001/IS.II (T) dated 19.0.2002
4.	Location:	
	a) District(s)	Singrauli
	b) State(s)	Madhya Pradesh
	c) Location Latitude/ Longitude	Latitudes of 24^0 04'58" - 24^0 06'19" N and Longitudes 82^0 38'34" - 82^0 41'29" E
5.	Address for correspondence:	Executive Director, Vindhyachal Super Thermal Power Project, Vindhyanagar, Dist Singrauli, (M.P.) Pin 486885
	a) Address of the Concerned Project Chief Engineer (with Pin Code and Telephone/ Telex/ Fax numbers)	Executive Director,, Vindhyachal Super Thermal Power Project, Vindhyanagar, Dist Singrauli, (M.P.) Pin 486885. Ph. 07805-247710, Fax 07805-247711
	b) Address of the Executive/Project Engineer/ Manager (With Pin Code & Telephone/ Telex/ Fax numbers)	Same as above

6.	Salient features:	
	c) Of the project	iv) Coal based Thermal Power Plant with sub-critical boiler and enhanced steam parameters v) Cooling Water source is outfall channel of NTPC ShaktiNagar which in-turn draws water from Rihand Reservoir. vi) Main Coal source is Nigahi coal mines of NCL. All coal transportation is by means of Rail only with majority of transportation being done through NTPC-owned racks through MGR (Merry-Go-Round system). A Copy of Feasibility Report is already submitted.
	d) Of the Environmental Management Plans	v) Tall stack (275 m) for wider dispersion of flue gases. vi) High Efficiency ESP. vii) Stack installed with CEMS (Continuous Emission Monitoring System) for monitoring PM, SOx, NOx. viii) Effluent Treatment Plant (ETP), Sewage Treatment Plant (STP) and Ash Water Recirculation Systems are in place to ensure 100 % process water recirculation. A Copy of EIA/ EMP Report is already submitted.
7.	Break-up of the project area:	Total area of all stages of Vindhyachal project is 5999 acres.
	a) Submergence area: forest & non-forest	No submergence area and forest land involved for Stg III
	b) Others	Existing land of VSTPP
8.	Breakup of the project affected population	No additional land was acquired for main plant & township. Hence no PAPs involved.

9.	Financial details:	
	a) Project cost as originally planned and subsequent revised estimates and the year of price reference.	
	b) Allocation made for environmental management plans with item wise and year wise break-up	~ Rs.2000 Crore (Total for all stages of VSTPS since many facilities are common)
	c) Benefit cost ratio/ internal rate of Return and the year of assessment	
	d) Whether © includes the cost of environmental management as shown in the above	Yes
	e) Actual expenditure incurred on the project so far	Project Cost for Stg III as on 31/03/2020 is Rs.4040.45 crores.
	f) Actual expenditure incurred on the environmental management plans so far	Actual expenditure on Environment Management at NTPC Vindhyachal is ~ Rs.2390 Crore up to 31.03.2020.
10.	Forest land requirement:	No forest land involved in Stg III construction.
	a) The status of approval for diversion of forest land for non forestry use	
	b) The status of clearing felling	
	c) The status of compensatory afforestation, if any	
	d) Comments on the viability & suitability of compensatory afforestation programme in the light of actual field experience so far.	
11.	The status of clear felling in non-forest area (such as submergence area or reservoir, approach roads), if any with quantitative information required.	---
12.	Status of Construction (actual and/or planned)	
	a) Date of commencement (actual and/or planned)	Date of Main Plant Award 03.05.2003
	b) Date of completion (Actual and/or planned)	July'07
13.	Reason for the delay in the project is yet to start.	---

S.N	Conditions	Status/Action taken
(i)	All the conditions stipulated by MPPCB vide their letter no. 7937/TS/MPPCB/2001 dated1st June 2001 should be strictly implemented including the stipulation that industry shall not discharge any treated effluent into the river or any surface water body.	All the treated effluents from Plant are treated in ETP/STP/AWRS and are being recycled & reused for various purposes in the plant. Parameters are within the prescribed limit.
(ii)	The Expansion unit should be constructed within the premises of Vindhyachal station. No additional land should be acquired for any project related activity.	A total area of 5800 acres of land was acquired for the project in Stage –I. The plant facilities & township for this expansion stage has been accommodated within the land acquired during Stage-I of the project.
(iii)	A twin flue stack of 275 meters height should be provided with continuous on line monitoring equipments and data collected should be analyzed and submitted regularly. Exit velocity of 22m/s should be maintained as the predictions for incremental ground level concentrations are based on this value.	A twin flue stack of 275 m height have been provided for wider dispersal of the particulate & gaseous emissions. Continuous Emission Monitoring System for SOx, NOx, SPM is installed and connected to CPCB/MPPCB servers. Exit flue gas velocity for Jan - Jun'20 period is 21.8 – 22.5 m/s (third party sampling report for **May'20** is attached for reference as **Annexure III-1)**. The variation in velocity is mainly attributable to combustion parameter variations, part-load operation and increase in air ingress in Induced draft fan suction (the air ingress points are attended during Unit shutdowns/overhauls). Data is being regularly submitted to MPPCB.
(iv)	Consumptive water requirement to the tune of 104520 m3/day should be drawn from discharge channel of Singrauli Super thermal Power Station of NTPC. The consumption of the station should not exceed 80 cu sec as permitted by the irrigation department, Government of Madhya Pradesh. Closed circuit cooling towers should be incorporated in the design of the project , as stipulated by MPPCB, no treated water should be discharged outside the plant premises or surface water bodies.	As per present water agreement with irrigation department, NTPC Vindhyachal is allowed to draw 167 cusecs of water and the same is complied with. Closed cycle Cooling system of 100% capacity have been installed for each unit.

<table>
<tr>
<td>(v)</td>
<td>Water Quality should be monitored in different streams and in the Central Monitoring Basin before its use for afforestation, dust separation.</td>
<td>Third party monitoring is being done at different locations. Treated water quality of ETP, AWRS and STP is regularly monitored and submitted to MPPCB.
Effluent quality data of ETP of Stage-3 for the period Jan-June’20:
<table>
<tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>BOD (mg/lit)</td><td>14.60</td><td>17.50</td><td>16.02</td></tr>
<tr><td>COD (mg/lit)</td><td>69.50</td><td>77.00</td><td>71.92</td></tr>
<tr><td>Suspended solid</td><td>26.59</td><td>29.00</td><td>27.68</td></tr>
<tr><td>Oil & Grease</td><td>3.33</td><td>5.20</td><td>4.20</td></tr>
<tr><td>Temperature 0 C</td><td>20.76</td><td>29.54</td><td>26.53</td></tr>
<tr><td>pH</td><td>7.37</td><td>7.46</td><td>7.42</td></tr>
</table>
AWRS quality data of Stage-3 for the period of jan-June20:
<table>
<tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>BOD (mg/lit)</td><td>13.50</td><td>15.75</td><td>14.71</td></tr>
<tr><td>COD (mg/lit)</td><td>68.50</td><td>71.25</td><td>69.71</td></tr>
<tr><td>Suspended solid</td><td>72.38</td><td>77.24</td><td>73.74</td></tr>
<tr><td>Oil & Grease</td><td>1.05</td><td>1.28</td><td>1.18</td></tr>
<tr><td>Temperature 0 C</td><td>20.73</td><td>31.04</td><td>27.13</td></tr>
<tr><td>pH</td><td>7.35</td><td>7.44</td><td>7.40</td></tr>
</table>
STP quality data for the period of Jan-June’20:
<table>
<tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>BOD (mg/lit)</td><td>21.60</td><td>23.50</td><td>23.09</td></tr>
<tr><td>COD (mg/lit)</td><td>77.00</td><td>81.75</td><td>80.23</td></tr>
<tr><td>Suspended solid</td><td>64.93</td><td>73.68</td><td>69.99</td></tr>
<tr><td>Oil & Grease</td><td>3.95</td><td>5.64</td><td>4.96</td></tr>
<tr><td>Temperature 0 C</td><td>20.95</td><td>32.28</td><td>26.99</td></tr>
<tr><td>pH</td><td>7.53</td><td>7.60</td><td>7.56</td></tr>
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<tr>
<td>(vi)</td>
<td>Coal should be used @ 4.7 MP per annum with a maximum ash content of 45% and sulphide content not exceeding 0.3%. fuel for the project should be transported from Nighai Coal Mines only through MGR system.</td>
<td>Average ash content in coal is 34.97% & Sulphur content is 0.36 % in coal.
100 % Fuel transportation is through MGR. Main coal source is Nigahi although some supplement coal is also taken from the nearby NCL mines of Jayant and Dudhichua.</td>
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(vii)	Fly ash generated to the tune of 5813.48 TPD should be used in accordance with the provision of fly ash Utilization Notification of September 1997. Ash generated from Stage-III to the tune 15MM3 should be utilized in various activities such as brick making, construction of roads, back filling of mines etc.	Total 1,51,800 MT ash utilized in ash brick manufacturing , Cement & Asbestos industries for F.Y. 2019-20.
(viii)	Presently an area of 904 acres has been approved for ash disposal from existing units of 2260 MW capacity. For accommodating the fly ash from existing and proposed expansion units, an additional area of 576 acres in V3 lagoon should be utilized. No earth should be removed from the existing and proposed ash lagoons for construction of starter dyke or in its raising to maintain impervious soil layer for avoiding contamination of ground water. NTPC should ensure that fly ash is disposed of only in designated areas and not in low lying areas in and around project premises as has been done in case of existing operating units. Violations of this type should be totally stopped.	Complied.
(ix)	Continuous monitoring of ground water quality around the ash disposal area should be undertaken to ascertain change in water quality due to leaching from ash pond area. Proper care should be taken to ensure that the natural drainage of the area is not affected and that there are no stagnant water bodies outside the ash dyke.	Regular monitoring of ground water around the ash pond area, including heavy metals (As, Hg,Cr, Pb), is being done through an approved Laboratory from Ministry of Environment, Forest and Climate Change. Third party monitored data for May'20 is attached as **Annexure III-2.**
(x)	As per risk analysis report, efforts should be made to have minimum inventory of secondary fuel and other chemicals required for operations of the plant. A programme of mock drills should be prepared and regularly conducted to train the employees to handle effectively eventuality. Safety alarm devices should be installed at strategic points including main gate, assembly points, first aid center etc.,	Inventory of secondary fuel and other chemicals required for Plant operation is minimized to the extent possible taking care the plant operation is not compromised. The plant has been provided with adequate automated fire alarm and protection system. Alarms have also been provided for Hydrogen leak and Chlorine leak. Fully equipped CISF manned central fire control station is in place. NTPC Vindhyachal has the onsite & off site emergency plan for mitigation of control of fire and explosion hazards arising due to transportation, use of storage of coal and oil. Mock drills are conducted regularly to plug the gaps, if any, in the emergency planning and response system. Sample report attached as **Annexure III-5**.

<table>
<tr><td></td><td></td><td> 
NTPC Vindhyachal Fully equipped CISF manned central fire control station</td></tr>
<tr><td>(xi)</td><td>Noise level should be limited to 75 dBA and regular maintenance of equipment is undertaken. For people working in the area of generator halls and other high noise areas, earplug should be provided.</td><td>Acoustic enclosures have been provided to control the noise level below regulatory norms & personal protective equipment have been provided wherever it is not possible to control the noise level. Regular monitoring all the environmental parameters is being carried out & Noise level is also being complied as per norms.
The Noise monitored data at Turbine floor for the period jan-June’20
<table>
<tr><td>Location</td><td>Parameter</td><td>Min</td><td>Max</td><td>Avg</td></tr>
<tr><td>Turbine floor</td><td>Noise (dB(A)</td><td>66</td><td>72</td><td>69</td></tr>
</table>
Sample Monitoring Report for June’20 is attached as Annexure III-3.</td></tr>
<tr><td>(xii)</td><td>For controlling the fugitive dust, regular sprinkling of water in vulnerable areas of the plant should be ensured.</td><td>Complied. All the interlinking road, inside plant premises, township and dyke areas have been made pucca. Water sprinkling on roads is also done. Water sprinkling arrangement has also been done in ash dykes. Water cover is maintained on top surface of the dyke to prevent fugitive emissions. In Coal Handling Plant, Conflow system has been installed on Conveyor belts and Rotating Sprinklers are installed in coal yard to prevent fugitive emission.</td></tr>
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<tr>
<td>(xiii)</td>
<td>A greenbelt of at least 50m width should be created around the expansion unit and particularly in areas like coal handling plant, coal crushed/uncrushed sock yard, which are prone to fugitive dust. At least 1/3rd area of the project should be brought under greenbelt with tree density of 1500-2000 trees per ha. In addition a greenbelt of 20-30 m should be created around the ash disposal V3 lagoon. Plantation should be immediately undertaken over the areas where fly ash has been dumped outside the designated areas particularly in the periphery of the reservoirs and along cooling water outfall channel of Singrauli STPP. A programme to this effect should be submitted to the ministry within two months</td>
<td>Every year, NTPC Vindhyachal is planting more than 20,000 nos of tree in and around the plant area, including CHP and ash dyke areas. Additionally, 50000 trees are also planted every year through MPRVVN for which an MOU has been signed with them for next ten years (from 2016-17). In the financial year 2019-20, 72000 saplings have been planted by NTPC-Vindhyachal. NTPC-Vindhyachal has developed the green belt around the plant as well as in the ash dyke area. Plantation has been done in all available areas in ash dykes and along the outfall channel of SSTPS.
Till June'20, about 23.7 lac trees have been planted over an area of about 3000 acres out of which about 2200 acres area is in and around NTPC Vindhyachal premises with plantation of about 22 lac trees (density works out to be ~ 1000 trees/acre or ~ 2500 trees/hectare).</td>
</tr>
<tr>
<td>(xiv)</td>
<td>The pollution control equipments and online monitoring system should be immediately made operational for the operating units and the analysis report should be submitted to the ministry within three months. A confirmation on the functioning of online monitoring system for all the operating units should be immediately submitted.</td>
<td>ESPs and other pollution control measures have been in place since the Units were commissioned. Online monitoring of AAQMS has been operational since year 2009 and connected to MPPCB/CPCB servers for online monitoring. CEMS (Continuous Emission Monitoring Systems) for stacks for monitoring of SPM, SOx, NOx have been installed and system has been connected to MPPCB/CPCB servers.
Emission Quality Data of CEMS of Stage-3 for the period Jan-June'20:
<table>
<tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>SPM (Mg/Nm3)</td><td>42.50</td><td>46.50</td><td>45.23</td></tr>
<tr><td>SOX (Mg/Nm3)</td><td>926.64</td><td>999.90</td><td>963.83</td></tr>
<tr><td>NOX (Mg/Nm3)</td><td>242.50</td><td>517.60</td><td>390.05</td></tr>
</table>
EQMS (Effluent quality monitoring system) has been installed and system has been connected to MPPCB/CPCB servers.
Effluent quality data of ETP 2 & 3 for the period jan-June'20:
<table>
<tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>BOD (mg/lit)</td><td>14.60</td><td>17.50</td><td>16.02</td></tr>
<tr><td>COD (mg/lit)</td><td>69.50</td><td>77.00</td><td>71.92</td></tr>
<tr><td>Suspended solid</td><td>26.59</td><td>29.00</td><td>27.68</td></tr>
<tr><td>Oil & Grease</td><td>3.33</td><td>5.20</td><td>4.20</td></tr>
<tr><td>Temperature 0 C</td><td>20.76</td><td>29.54</td><td>26.53</td></tr>
<tr><td>pH</td><td>7.37</td><td>7.46</td><td>7.42</td></tr>
</table>
</td>
</tr>
</table>

<table>
<tr><td>(xv)</td><td>NTPC should initiate a coordinated project for preparation of an inventory of industries operating around the Rihand reservoirs periphery to ascertain the effluents getting discharged directly or indirectly in to the water body. The exercise should be extended emission inventory of pollution resources in the region which could be serve as baseline for future projects in the area. In this exercise NTPC may like to involve NGOs like Banvasi Sewa Ashram working in the area on environmental aspects.</td><td>Inventorization study for the industries operating around the Rihand Reservoir periphery to ascertain the effluent getting discharged directly in the water body and also carry out air emission inventory within 15 km radius of Rihand Reservoir has been carried out by M/S Vimta Lab Limited, Hyderabad. Study completed in 2019.</td></tr>
<tr><td>(xvi)</td><td>Regular monitoring of SPM, SO2 and NOx around the power plant should be carried out and records maintained. Monitoring station should be established in consultation with the SPCB, Since maximum concentration is expected south -west direction, a monitoring station should be installed in this in this segment.</td><td>Provision is as per condition stated.
NTPC Vindhyachal has installed 4 nos. of AAQMS in all four directions in consultation with MPPCB, System has been connected to MPPCB/CPCB servers for online monitoring.

Ambient Air quality data for the period Jan-July’20:
<table>
<tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>PM10</td><td>75.20</td><td>91.29</td><td>84.16</td></tr>
<tr><td>PM2.5</td><td>40.57</td><td>52.42</td><td>45.54</td></tr>
<tr><td>SOX</td><td>20.10</td><td>25.20</td><td>22.83</td></tr>
<tr><td>NOX</td><td>20.10</td><td>24.11</td><td>21.67</td></tr>
</table>

Third party monitoring report for outside plant area for March’20 is attached as Annexure III-4.</td></tr>
<tr><td>(xvii)</td><td>The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned within seven days from the date of this clearance letter, informing that the project has been accorded Environmental Clarence and copies of the clearance are available with the state pollution control board/committee and may also be seen at website of Ministry of Environment and Forests at HTTP://environmental.</td><td>Complied.</td></tr>
<tr><td>(xviii)</td><td>A monitoring committee should be constituted for reviewing compliance of various safeguard measures by</td><td>Environment Monitoring cell continuously monitors the Environmental compliance conditions of the station. Functioning of pollution control devices is under real time</td></tr>
</table>

	involving recognized local NGOs, Pollution Control Board, Institutions Experts, etc.,	continuous monitoring. Ambient Air quality, stack emission parameters and effluent parameters already made available to MPPCB/CPCB for real time monitoring.
(xix)	The project authorities should inform the Regional office as well as the ministry regarding the date of financial closure and final approval of the project by the concerned authorities and the dates of start of land development work.	Complied.
(xx)	Full cooperation shall be extended to the Scientists/Officers from the Ministry/Regional Office of the Ministry at Bhopal/the CPCB/ the SPCB who would be monitoring the compliance of Environmental status. A complete set of revised impact assessment report and management plan incorporating the changes made during appraisal of the project and commitments made from time to time should be forwarded to MOEF and to the Regional Office within two months for their use during monitoring.	Noted for compliance.

	ENVIRONMENT LAB (CHEMISTRY DEPARTMENT)	*VINDHYACHAL*
	NOISE LEVEL MONITORING REPORT	

MONTH - JUNE -2020

A. Stage:-1

Sr. No.	Location	Date of Monitoring/ Noise Level [dB(A)]				
		01/06/2020	08/06/2020	15/06/2020	22/06/2020	22/06/2020 6:00 pm
1.	Mill Area -1	65	72	68	70	66
2	Boiler -1	69	68	67	66	65
3.	T.G.Floor-1	70	72	70	72	67
4.	U.P.H. -1	66	70	68	70	65
5.	Compressor House- 1	68	69	70	68	66
6.	Crusher House - 1	70	67	69	70	68

B. Stage:-II

Sr. No.	Location	Date of Monitoring/ Noise Level [dB(A)]				
		02/06/2020	09/06/2020	16/06/2020	23/06/2020	23/06/2020 6:00 pm
1.	Mill Area -2	67	66	70	72	65
2.	Boiler -2	69	70	69	70	64
3.	T.G.Floor-2	71	72	71	72	67
4.	U.P.H. -2	68	69	70	68	66
5.	Compressor House- 2	70	67	69	67	65
6.	Crusher House - 2	69	65	70	69	67

C. Stage:-III

Sr. No.	Location	Date of Monitoring/ Noise Level [dB(A)]				
		03/06/2020	10/06/2020	17/06/2020	24/06/2020	24/06/2020 6:00 pm
1.	Mill Area -3	70	69	67	69	64
2.	Boiler -3	69	70	68	70	65
3.	T.G.Floor-3	72	72	71	72	66
4.	U.P.H. -3	65	70	67	68	64
5.	Compressor House- 3	68	67	70	69	67
6.	Crusher House - 3	66	70	69	71	66

Annexure II-2

EKO PRO ENGINEERS PVT. LTD.
Environmental Consultants and Analytical Laboratory
(An ISO 9001:2015 Certified Company)
TC-5063
Contact : +91 - 9810243870
Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
Contact No. : 9711159210, 9711159427, SMS/Whatsapp No. : 9711163422; E-mail : email@ekopro.in, ekoproengineers@gmail.com, website : www.ekopro.in

TEST REPORT

Water Sample Analysis

Test Report No : EKO/132/250520 **Issue Date : 30/05/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
: Vindhya Nagar
Distt. - Singrauli
Madhya Pradesh

Sample Description	:	Drinking Water
Sample Drawn on	:	22/05/2020
Sample Drawn by	:	EPEPL (Mr. Pramod Mishra)
Sample Received on	:	25/05/2020
Sampling Location	:	Hand Pump of Iswar atta chakki Ghailgarh (Near Ash Dyke)
Sampling Plan & Procedure	:	SOP-W/66
Sample Quantity	:	1.0 Litre
Environmental Conditions	:	Normal
Analysis Duration	:	25/05/2020 To 29/05/2020
Remark (if any)	:	NA

RESULTS

S. No.	Parameters	Test Methods	Results	Units	Range of Testing / LOD	Limits as per IS: 10500-2012 (Amd.No.2 Sep-2018)	
						Acceptable	Permissible
1	Colour	IS: 3025 (P-4)	ND	Hazen	1 - 500	5.0	15.0
2	Odour	IS: 3025 (P-5)	Agreeable	–	–	Agreeable	Agreeable
3	Turbidity	IS: 3025 (P-10)	4.8	NTU	1 - 500	1.0	5.0
4	Conductivity	IS : 3025 (P-14)	402.5	µS/cm	1 - 100000	-	-
5	pH	IS: 3025 (P-11)	7.24	–	1 - 13	6.5-8.5	No relaxation
6	Total Hardness (as $CaCO_3$)	IS: 3025 (P-21)	198.0	mg/L	1 - 10000	200.0	600.0
7	Calcium Hardness (as $CaCO_3$)	IS: 3025 (P-40)	120.0	mg/L	1 - 10000	--	--
8	Calcium (as Ca)	IS: 3025 (P-40)	48.1	mg/L	0.5 - 5000	75.0	200.0
9	Chloride (as Cl)	IS: 3025 (P-32)	32.5	mg/L	2.5 - 5000	250.0	1000.0
10	Fluoride (as F)	IS: 3025 (P-60)	ND	mg/L	0.1 - 50	1.0	1.5
11	Total Dissolved Solids	IS: 3025 (P-16)	240.0	mg/L	5 - 20000	500.0	2000.0
12	Total Suspended Solids	IS: 3025 (P-17)	ND	mg/L	5 - 2000	-	-
13	Magnesium (as Mg)	IS: 3025 (P-46)	18.9	mg/L	0.5 - 2500	30.0	100.0
14	Sulphate (as SO_4)	IS: 3025 (P-24)	53.6	mg/L	1 - 5000	200.0	400.0
15	Nitrate (as NO_3)	IS: 3025 (P-34)	3.14	mg/L	0.1 - 100	45.0	No relaxation
16	Total Alkalinity (as $CaCO_3$)	IS: 3025 (P-23)	208.0	mg/L	1 - 5000	200.0	600.0

Remark - ND- Not Detected, LOD- Limit of Detection.

EKO PRO ENGINEERS PVT. LTD. GHAZIABAD SAVE THE ENVIRONMENT

Contact : +91 - 9810243870

EKO PRO ENGINEERS PVT. LTD.

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(An ISO 9001:2015 Certified Company)

TC-5063

Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
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Test Report No : EKO/132/250520 **Issue Date : 30/05/2020**

Notes:

1. The results given above are related to the tested sample, as received & mentioned parameters. The customer asked for the above tests only.
2. This test report will not be generated again, either wholly or in part, without prior written permission of the Laboratory.
3. The test report will not be used for any publicity/legal purpose.
4. The test samples will be disposed off after 15 days from the date of reporting of result, unless until specified by the customer. Sample received for biological tests will be destroyed after 7 days from the date of issue of test report.
5. Responsibility of the Laboratory is limited to the invoiced amount only.

****End of Report****

For EKO PRO ENGINEERS PVT. LTD.

PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

DISASTER MANAGEMENT PLAN

OF VINDHYACHAL SUPER THERMAL POWER STATION

REVIEWED ON: 26.05.2018, REVISION NO: 05 (2018)

NTPC Limited

VINDHYACHAL SUPER THERMAL POWER STATION
VINDHYANAGAR, SINGRAULI – 486885 (M.P.)

ESP: There is a possibility of fire in ESPs installed in VSTPS. The main reason may be the presence of high-unburned carbon in the flue gas. Regular checks for unburned carbon in the fly ash/bottom ash are carried out.

Cable galleries: Cable galleries have been provided with smoke detector/emulsifier system and at cable entry intersections, intermittent places, cable trays and cable raisers are provided with fire resistant barriers. Medium velocity and high velocity water spray system has been installed in cable spreader rooms.

Fuel Oil storage tank farm area: Though HFO/LDO does not represent a major fire hazard because of its high flash point (>66OC), fuel oil tank farm area at VSTPS is protected against fire. It is well equipped with fire hydrant and foam pourer systems.

The tank farm area has dykes with sufficient dimensions to reduce the evaporation from the spill and hence reducing the impact of release.

6.2 Mitigation Measures against fire & explosion.

6.2.1 Mitigation measures associated with coal.

a. **Raw Coal stockpile:** The raw coal is typically stored on an outside stockpile near track hopper at VSTPS. From there, coal is moved around by front-end loaders. The fire and explosion hazards associated with this stockpile are usually limited to spontaneous combustion. The meteorological data shows that temperature may go up to 47deg C at Vindhyanagar during summer months. It is recommended that these hot spots be removed from coal stockpile spread until cooled. Hot material must never be loaded into the pulverized-fuel system.

b. **Raw Coal in Track hopper:** In Stage I Linear Heat Sensing cable and Quartz Bulb arrangement for water spraying in case of fire along with alarm at control room and fire station is available.

   In Stage II, III, IV & V Linear Heat Sensing cable integrated with a medium velocity water spray system is installed for operating deluge valve in case of fire along with alarm and initiating spray in previous and subsequent belt section.

c. **Coal pulveriser:** The main explosion hazard associated with a pulveriser is related to start up and shut down procedures. Coal mil out let temperature is strictly controlled and monitored in stage I, III, IV & V. When a system goes down under load, all the coal falls out of suspension.

In stage –II, mill are of Tube and mill type are in pressurized conditions, to prevent any fire or explosion steam inserting is carried out with every start and stop of the mill. All coal pipe temperature is monitored to prevent any localized fire / explosion in coal fires.

d. **Coal bunkers:** Coal bunkers store large quantity of coal and are potential fire hazard. Early detection of a bunker fire is essential to extinguishing it quickly and minimizing its damage. For this in Stage-I, Linear Heat Sensing cable and sprinklers initiated by Quartz Bulb arrangement for water spraying in case of fire along with alarm at control room and fire station is available.

In all stages Linear Heat Sensing cable integrated with a medium velocity water spray system is installed for operating deluge valve in case of fire along with alarm and initiating spray in previous and subsequent belt section.

e. **Conveyor:** The occurrence of fire in coal conveyors can cause potential loss since fire can move from one conveyor to another due to moving coal conveyors. To tackle fire in coal conveyor, first step is to make the moving fire stationary. To prevent propagated fire in a running fire Infra Red Detecting system is installed all along the length of conveyor. In case of fire it will trip the system & LHSC will be operated.

6.2.2 Mitigation against release of chlorine and fire/explosion.

a. Although licensed quantity of chlorine is 25 tonners, actual inventory is limited to 15 tonners thereby reducing risk level.

b. Location of chemical storages is quite away from the plant

c. Active scrubbers with proper maintenance of neutralizing agent have been installed near chlorination plant & chemical house, and are in interlock with detecting sensors.

d. Installation and maintenance of windsocks at some selected places other than Chemical house/chlorination plant.

e. A leak detecting system calibrated at TLV has been installed at all location in sufficient number & interlocked with auto scribing system and water certain system.

f. To reduce the occurrence of any major release arising out of severe mechanical failure of tonner, failure of a flange leak, corrosion of tonner, scheduled inspection and maintenance are being carried out.

g. Chlorine tonners are stored under shed and in isolated areas.

h. Response times calculated from dose relationship show that nobody should remain more than three minutes at the leakage point of chlorine to escape LC50 concentration.

i. Automatic sprinkler system is to be provided throughout the cable galleries to extinguish the fires.

j. Usages of non-sparking tools are ensured in hydrogen storage area.

k. Proper auditing and implementation of recommendations: VSTPS maintains regular auditing programmes to support the continuous improvement of safety procedures at hazardous installations.

6.2.3 Other Mitigation Measures.

Sl. No.	Area	Location	Hazards	Mitigation measures
1	CHP			1. Use of dust mask is ensured. 2. Fire hydrant system provided. 3. Automatic sprinkler system is envisaged for fire extinguishing. 4. Coal conditioning by water spray to reduce coal-dust and fire hazard. 5. Linear heat sensing cable system
Sl. No.	Area	Location	Hazards	Mitigation measures

		Track hopper	Dust, Fire, any injury during coal unloading.	(heat sensor) is installed for alarm and automatic sprinkling.
	CHP	Conveyor	Dust, Fire, any injury during coal cleaning.	1. Fire-Hydrant and sprinkle system is installed near conveyor belts. 2. Conditioning of coal and installation of Dust Extraction System maintains a dust free surrounding. 3. Pull-cords provided for stopping in emergency situations. 4. Liner heat sensing cable system (heat) sensor) is provided all along the conveyors. 5. Zero speed limit switches (EPB) provided for emergency stopping.
		Coal stock yard	Coal-dust, fire	1. Coal conditioning by water spray to reduce coal- dust and fire hazard. 2. Fire hydrant landing valves are provided and maintained. 3. Compacting during stacking to reduce fire hazard by releasing trapped air.
		Transformers in CHP area	Fire	1. Sprinkle system provided 2. Fire extinguishers provided 3. Regular cleaning of dust.
2	Boiler Area	Boiler	Explosion of Coal Dust, Fire, Ash Dust, working at height risks	1. The spring loaded safety valves and ERVs are installed to release steam/ water to protect bole from excessive pressure rise. The safety valves healthiness is ensured periodically. 2. Furnace explosions/ implosions are avoided by various interlocks and protections incorporated in

				Furnace Safeguard and Supervisory System (FSSS) like conditions of furnace pressure High/Low, Flame Failure, Loss of Fuel and drum level High/Low etc. 3. Negative draft is maintained inside the furnace to avoid leakage of ash and flue gas from boiler. 4. Fly ash from flue gas is trapped in Electro Static Precipitators (ESP) working at 99.99% collection efficiency. The collected as is store in silos and used by cement industry/brick fields. The remaining ash is mixed with water and disposed off as slurry. 5. Proper scaffolding is made while working on high elevations. Use of safety belt and helmets are ensured through special PTWs for working at heights through ERP system.
3	Turbo generator	Turbine & Generator	Explosion injury from rotating machines. Heat, Noise, Fire	1. Generator is designed to withstand explosion. 2. Hydrogen gas purity is continuously monitored and maintained always. 3. All the hydrogen cylinders are checked for very high level of purity before filling. 4. Seal oil system is provided for the generator to prevent the leakage of hydrogen gas and system healthiness is ensured by operation department by continuously monitoring.

				5. Trained operators are deployed. 6. In case the leakage is heavy, the generator is immediately shut down and purged out with CO2. 7. It is ensured that cutting and welding works near generator are not allowed with hydrogen in casing. 8. Mostly all piping and equipments have been made thermally insulated to reduce heat loss. 9. Rotary equipments are well guarded. 10. Acoustic enclosures have been installed around turbines to reduce noise levels. 11. Ear-plugs are provided and its use is ensured. 12. Fire extinguishers of different types are ensured in sufficient numbers at different places for emergency handling. 13. Comprehensive network of fire hydrant system with fire hoses and nozzles in place.
4	Fuel oil handling Area	HFO & HSD	Fire	1. Fire Hydrants provided. 2. Foam spray system provided. 3. Foam type fire extinguishers provided for emergency. 4. Sprinkler system is installed.
5	Chlorination building	PT Plant- I, II, III & CW-I, II, III.	Exposure to Chlorine	1. To control such leakage emergency sealing kits have been provided. 2. Staffs have been trained to seal any leakage with the help of emergency kit consisting of Breathing apparatus, apron etc. 3. Neutralization pit to neutralize the leakage if any.

				4. Chlorine leak detectors and alarm systems are available. In case of any chlorine leak, alarm will automatically blow off. 5. Scrubber and water curtains are provided to absorb the minor leakages. 6. Periodic mock drills are carried out to ensure preparedness and enhance awareness.
6	Hydrogen Plant	Hydrogen Plant	Fire and Explosion	1. To prevent such possibility Hydrogen is purged with neutral gas like nitrogen. 2. Fire spray system provided. 3. Hydrant provided. 4. Fire extinguishers provided. 5. Flam proof fittings provided. 6. Use of anti-spark tools is ensured. 7. Hydrogen leak detectors with alarm facility are provided for early detection of leakage and prompt remedial action.
7	Cable Galleries	Cable Trays	Fire, Smoke	1. Smoke detectors/ Linear Heat Sensing Cables (LHSC) have been provided. 2. Cleanliness of cable rays and cable galleries are ensured. 3. Automatic sprinkler system is provided. 4. Fire extinguishers provided.

SECTION 7: RESPONSE ACTIONS DURING EMERGENCY

7.1: Actions during emergencies:

7.1.1 In case of leakage of chlorine:

a. Action by the operator

- Report the incident immediately to the Shift charge Engineer/HOD (Chemistry).
- Use self-breathing apparatus set, reach the leakage spot and try to arrest the leakage.
- Ensure that chlorine absorption system comes into service automatically as soon as chlorine leakage is substantial. In case the system is not coming into service automatically, start it manually.

b. Action by the Shift charge Engineer/HOD(Chemistry)

- Confirm the leakage by talking to the operator.
- Arrange staff of operation support/mechanical maintenance department to go to the spot of leak and take necessary action to contain the leak.
- Arrange for extra breathing apparatus from control room and other areas and shift them to the leaking areas.
- Arrange to inform the following personnel immediately:
  - AGM/DGM/Sr.Supdt/Shift In-charge (Site Controller) depending on seriousness
  - CISF team (Fire & Rescue)
  - Mgr (Safety) / Safety Officer
- Continuously asses the wind direction and alert personnel to be affected by chlorine leak in the downwind direction.
- Engineering team will let out chlorine in the neutralizing pit through proper means.

c. Action to be taken by the AGM/DGM/Sr.Supdt/ Shift In-charge (Site Controller).

He will coordinate all the activities during the leak. If the leakage of chlorine is uncontrollable and leads to an emergency, he will arrange to inform all key persons and take necessary actions as laid down in Table 5.1.

In case of a major emergency, as per the instructions from CIC and WIC, Site Controller along with other key personnel shall coordinate for emergency management functions as per duties assigned in Table 5.1. Ambulance, Hospital and surrounding off-site community which are coming within the vulnerable zones of IDLH will also be informed accordingly.

Head of Safety will reach the spot, assess the situation and provide necessary advice accordingly.

d. Action to be taken after the end of chlorine emergency
After neutralization and end of emergency, water shall be disposed to ETP along with main plant effluent for further treatment.

The chlorination plant shall be restarted only after attending leakages as per the operating instructions.
All low-lying areas especially along downwind direction are to be tested and be confirmed of absence of chlorine, as the leakage of chlorine can settle in low-lying areas.

7.1.2 In case of leakage of HFO/LDO:

a. Action to be taken by the operator
- Report the incident immediately to the Shift Charge Engineer.
- Reach the leakage spot and cooperate with maintenance team in arresting/containing the leakage.
- Ensure that dyke outlet is closed and no oil is coming out from the dyke to avoid mixing with water in storm water drain.
- Monitor the area to protect any kind of ignition sources.

Engineering team will let out chlorine in the neutralizing pit through proper means.

b. Action to be taken by the Shift Charge Engineer In case of leakage of oil in FOPH area, he will
  - Confirm the leakage in discussion with the operator.
  - Arrange staff of mechanical maintenance to go to the spot of leak and take necessary action to contain the release.
  - Arrange to inform the following personnel immediately:
    - AGM/DGM/Sr.Supdt/ Shift In-charge (Site Controller) depending on seriousness
    - CISF team (Fire & Rescue)
- HOD(Safety) / Safety Officer

c. Action to be taken by the DGM/Chief Manager/ Shift In-charge (Site Controller)

He will coordinate all the activities during the release. He will ensure Fire safety precautions to prevent any fire hazard leading to an emergency. In case of emergency, he will arrange to inform all key persons and take necessary actions as laid down in Table 5.1.

In case of fire, water hydrant system as well as foam pourer systems will be on operation and only mechanical foam, which is biodegradable, will be used.

In case of a major emergency, as per the instructions from CIC and WIC, Site Controller along with other key personnel shall coordinate for emergency management functions as per duties assigned in Table 5.1.

Head of Safety will reach the spot and ensure that all necessary fire safety precautions are taken to prevent any fire hazard and provide necessary advice.

d. Action to be taken after the end of HFO/LDO release emergency

- Water used in fire fighting will be dispersed to industrial waste water drain.
- Transfer the oil (HFO/LDO) from leaking tank to other tank as follows:
- Keep the suction of the leaking tank open to the pump.
- Close the suction of the other tank.
- Open the re-circulation to the other tank and close the re-circulation of the leaking tank.

- Spilled oil from the tank in the dyke shall be removed by pumping the same and collect in the separate tank.

7.2 Declaration of Emergency and Evacuation procedures:

Public address system has been provided in the plants. Telephone, inter communication facilities and walki-talkies etc. are also available at desks and with officials. The emergency alarm will be a wailing sound for 45 seconds irrespective of type of emergency.

Shift In charge/Shift engineer from ECC will operate the siren on approval by the WIC.

Contact : +91 - 9810243870

EKO PRO ENGINEERS PVT. LTD.

Environmental Consultants and Analytical Laboratory

(An ISO 9001:2015 Certified Company)

Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
Contact No. : 9711159210, 9711159427, SMS/Whatsapp No. : 9711163422; E-mail : email@ekopro.in, ekoproengineers@gmail.com, website : www.ekopro.in

TEST REPORT

Stack Emission Analysis

Test Report No. : EKO/167/020320 **Issue Date : 11/03/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
Vindhya Nagar,
District - Singrauli
Madhya Pradesh

Sample Description	:	Stack (Boiler Emission)
Sample Drawn on	:	12/02/2020
Sample Drawn by	:	EPEPL Representative
Sampling Location	:	Unit - IX
Sampling Plan & Procedure	:	SOP-SE/09
Source of Emission	:	Stack Attached To ESP
Capacity	:	500 MW
Type of Stack	:	MS
Remark (if any)	:	Stack Monitoring Kit

RESULTS

S. No.	Parameters	Test Methods	Results	Units
1	Particulate Matter (as PM)	IS: 11255 (P-1)	44.0	mg/Nm^3
2	Sulphur Dioxide (as SO_2)	IS: 11255 (P-2)	948.0	mg/Nm^3
3	Oxide of Nitrogen (as NOx)	IS: 11255 (P-7)	453.0	mg/Nm^3
4	Oxygen (O_2)	IS: 13270	6.5	% V/V
5	Carbon Dioxide (as CO_2)	IS: 13270	12.5	% V/V
6	Stack Gas Temp.	IS: 11255 (P-3)	134.0	°C
7	Exit Velocity of Gas	IS: 11255 (P-3)	22.51	m/sec
8	Moisture in flue gas	IS: 11255 (P-3)	9.6	%
9	Mercury	EKO/CHEM/SOP/FL-083	0.013	mg/Nm^3

Remark- ND- Not Detected, LOD- Limit of Detection.

Notes :

1. The results given above are related to the tested sample, for various parameters, as observed at the time of Sampling. The customer asked for the above tests only.
2. This test report will not be generated again, either wholly or in part, without prior written permission of the Laboratory.
3. The test report will not be used for any publicity/legal purpose.
4. The test samples will be disposed off after 15 days from the date of issue of test report, unless until specified by the customer.
5. Responsibility of the Laboratory is limited to the invoiced amount only.

**** End of Report ****

For EKO PRO ENGINEERS PVT. LTD.
PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

Annexure III-2

EKO PRO

Contact : +91 - 9810243870

TC-5063

EKO PRO ENGINEERS PVT. LTD.

Environmental Consultants and Analytical Laboratory

(An ISO 9001:2015 Certified Company)

Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
Contact No. : 9711159210, 9711159427, SMS/Whatsapp No. : 9711163422; E-mail : email@ekopro.in, ekoproengineers@gmail.com, website : www.ekopro.in

TEST REPORT

Water Sample Analysis

Test Report No : EKO/132/250520 **Issue Date : 30/05/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
: Vindhya Nagar
Distt. - Singrauli
Madhya Pradesh

Sample Description	:	Drinking Water
Sample Drawn on	:	22/05/2020
Sample Drawn by	:	EPEPL (Mr. Pramod Mishra)
Sample Received on	:	25/05/2020
Sampling Location	:	Hand Pump of Iswar atta chakki Ghailgarh (Near Ash Dyke)
Sampling Plan & Procedure	:	SOP-W/66
Sample Quantity	:	1.0 Litre
Environmental Conditions	:	Normal
Analysis Duration	:	25/05/2020 To 29/05/2020
Remark (if any)	:	NA

RESULTS

S. No.	Parameters	Test Methods	Results	Units	Range of Testing / LOD	Limits as per IS: 10500-2012 (Amd.No.2 Sep-2018)	
						Acceptable	Permissible
1	Colour	IS: 3025 (P-4)	ND	Hazen	1 - 500	5.0	15.0
2	Odour	IS: 3025 (P-5)	Agreeable	–	–	Agreeable	Agreeable
3	Turbidity	IS: 3025 (P-10)	4.8	NTU	1 - 500	1.0	5.0
4	Conductivity	IS : 3025 (P-14)	402.5	µS/cm	1 - 100000	-	-
5	pH	IS: 3025 (P-11)	7.24	–	1 - 13	6.5-8.5	No relaxation
6	Total Hardness (as $CaCO_3$)	IS: 3025 (P-21)	198.0	mg/L	1 - 10000	200.0	600.0
7	Calcium Hardness (as $CaCO_3$)	IS: 3025 (P-40)	120.0	mg/L	1 - 10000	--	--
8	Calcium (as Ca)	IS: 3025 (P-40)	48.1	mg/L	0.5 - 5000	75.0	200.0
9	Chloride (as Cl)	IS: 3025 (P-32)	32.5	mg/L	2.5 - 5000	250.0	1000.0
10	Fluoride (as F)	IS: 3025 (P-60)	ND	mg/L	0.1 - 50	1.0	1.5
11	Total Dissolved Solids	IS: 3025 (P-16)	240.0	mg/L	5 - 20000	500.0	2000.0
12	Total Suspended Solids	IS: 3025 (P-17)	ND	mg/L	5 - 2000	-	-
13	Magnesium (as Mg)	IS: 3025 (P-46)	18.9	mg/L	0.5 - 2500	30.0	100.0
14	Sulphate (as SO_4)	IS: 3025 (P-24)	53.6	mg/L	1 - 5000	200.0	400.0
15	Nitrate (as NO_3)	IS: 3025 (P-34)	3.14	mg/L	0.1 - 100	45.0	No relaxation
16	Total Alkalinity (as $CaCO_3$)	IS: 3025 (P-23)	208.0	mg/L	1 - 5000	200.0	600.0

Remark - ND- Not Detected, LOD- Limit of Detection.

EKO PRO ENGINEERS PVT. LTD. GHAZIABAD SAVE THE ENVIRONMENT

Contact : +91 - 9810243870

EKO PRO ENGINEERS PVT. LTD.

Environmental Consultants and Analytical Laboratory
(An ISO 9001:2015 Certified Company)

TC-5063

Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
Contact No. : 9711159210, 9711159427, SMS/Whatsapp No. : 9711163422; E-mail : email@ekopro.in, ekoproengineers@gmail.com, website : www.ekopro.in

Test Report No : EKO/132/250520 **Issue Date : 30/05/2020**

Notes:

1. The results given above are related to the tested sample, as received & mentioned parameters. The customer asked for the above tests only.
2. This test report will not be generated again, either wholly or in part, without prior written permission of the Laboratory.
3. The test report will not be used for any publicity/legal purpose.
4. The test samples will be disposed off after 15 days from the date of reporting of result, unless until specified by the customer. Sample received for biological tests will be destroyed after 7 days from the date of issue of test report.
5. Responsibility of the Laboratory is limited to the invoiced amount only.

****End of Report****

For EKO PRO ENGINEERS PVT. LTD.

PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

	ENVIRONMENT LAB (CHEMISTRY DEPARTMENT)	*VINDHYACHAL*
	NOISE LEVEL MONITORING REPORT	

MONTH - JUNE -2020

A. Stage:-1

Sr. No.	Location	Date of Monitoring/ Noise Level [dB(A)]				
		01/06/2020	08/06/2020	15/06/2020	22/06/2020	22/06/2020 6:00 pm
1.	Mill Area -1	65	72	68	70	66
2	Boiler -1	69	68	67	66	65
3.	T.G.Floor-1	70	72	70	72	67
4.	U.P.H. -1	66	70	68	70	65
5.	Compressor House- 1	68	69	70	68	66
6.	Crusher House - 1	70	67	69	70	68

B. Stage:-II

Sr. No.	Location	Date of Monitoring/ Noise Level [dB(A)]				
		02/06/2020	09/06/2020	16/06/2020	23/06/2020	23/06/2020 6:00 pm
1.	Mill Area -2	67	66	70	72	65
2.	Boiler -2	69	70	69	70	64
3.	T.G.Floor-2	71	72	71	72	67
4.	U.P.H. -2	68	69	70	68	66
5.	Compressor House- 2	70	67	69	67	65
6.	Crusher House - 2	69	65	70	69	67

C. Stage:-III

Sr. No.	Location	Date of Monitoring/ Noise Level [dB(A)]				
		03/06/2020	10/06/2020	17/06/2020	24/06/2020	24/06/2020 6:00 pm
1.	Mill Area -3	70	69	67	69	64
2.	Boiler -3	69	70	68	70	65
3.	T.G.Floor-3	72	72	71	72	66
4.	U.P.H. -3	65	70	67	68	64
5.	Compressor House- 3	68	67	70	69	67
6.	Crusher House - 3	66	70	69	71	66

Contact : +91 - 9810243870

EKO PRO ENGINEERS PVT. LTD.

Environmental Consultants and Analytical Laboratory

(An ISO 9001:2015 Certified Company)

Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
Contact No. : 9711159210, 9711159427, SMS/Whatsapp No. : 9711163422; E-mail : email@ekopro.in, ekoproengineers@gmail.com, website : www.ekopro.in

TEST REPORT

Ambient Air Quality Monitoring

Test Report No. : EKO/194/190320 **Issue Date : 19/03/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
Vindhya Nagar,
District - Singrauli
Madhya Pradesh

Sample Description : Ambient Air
Sample Drawn by : EPEPL Representative
Sampling Location : L5 = Stage V (Coal Mill Area), L6 = CHP, L7 = Near Jwala Mukhi Mandir, L8 = Rose Garden Jayant
Sampling Time : 24.0 Hrs.
Sampling Plan & Procedure : SOP-AAQ/15
Remark (if any) : Instrument Use RDS & FPS

RESULTS

S. No.	Parameters	Test Methods	Sampling Date/Results				Units	Limits as per CPCB Notification, 18th Nov 2009
			L5-13.03.20	L6-16.03.20	L7-12.03.20	L8-14.03.20		
1	Particulate Matter (PM10)	IS: 5182 (P-23)	91.52	87.25	76.25	78.78	$\mu g/m^3$	100.0
2	Particulate Matter (PM2.5)	EK0/CHEM/SOP/AAQ/01	48.52	47.64	38.78	39.12	$\mu g/m^3$	60.0
3	Sulphur Dioxide (as SO_2)	IS: 5182 (P-2)	25.65	23.29	24.36	21.98	$\mu g/m^3$	80.0
4	Nitrogen Dioxide (as NO_2)	IS: 5182 (P-6)	24.32	22.14	23.23	20.42	$\mu g/m^3$	80.0
5	Carbon Monoxide (as CO)	IS: 5182 (P-10)	ND	ND	ND	ND	mg/m^3	4.0
6	Mercury (as Hg)	EKO/CHEM/SOP/FL-082	ND	ND	ND	ND	$\mu g/m^3$	-

Remark- ND- Not Detected, LOD- Limit of Detection. (Detection Limits for CO- 0.5 mg/m3, & Mercury- 0.1 µg/m3).

Notes :

1. The results given above are related to the tested sample, for various parameters, as observed at the time of Sampling. The customer asked for the above tests only.
2. This test report will not be generated again, either wholly or in part, without prior written permission of the Laboratory.
3. The test report will not be used for any publicity/legal purpose.
4. The test samples will be disposed off after 15 days from the date of issue of test report, unless until specified by the customer.
5. Responsibility of the Laboratory is limited to the invoiced amount only.

**** End of Report ****

For EKO PRO ENGINEERS PVT. LTD.
PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

IV-7

एनटीपीसी NTPC

एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)

VINDHYACHAL

Fire mock drill at Stage-4 LDO tank as per DMP dated_29-05-2020

1. Summary of Fire/Rescue Exercise

i) Conducted on : 29-05-2020 Time: 16:38

ii) Location of exercise scenario : Stage-4 LDO tank.

iii) Exercise Conducted By: Mr Prashant Diwedi - (Dy. Commandant CISF)

iv) Brief description of the scenario : A fire was observed in LDO tank stage IV by a operator working there.

2. Planning		**Yes/No**	**Remarks**
i)	Whether pre-planning carried out?	Yes	
ii)	Was a specific scenario drilled?	Yes	MCLS as per DMP

iii) Details of planning carried out

Objectives:-

a) To assess the awareness & preparedness of rescue plan.

b) To check preparedness of first-aider and ambulance.

c) To assess the alertness and timely involved response of officials and supporting staff.

d) To educate the officials and supporting staff to act in an orderly of an accident and how to mitigate the fire.

iv) Name and designation of observers:-

Mr CS Reddy - (AGM Safety)

Sh. NP Agarwal - (Chief Shift Incharge NTPC)

Sh. SV Reddy - (AC- Fire CISF)

3. Category of Exercise:		**Yes/No**	**Remarks**
i)	Pre informed exercise	No	
ii)	Secret / Surprise exercise	Yes	

4. a) Persons informed to the scene :		**Yes/No**	**Remarks**
i)	Rescue team	No	
ii)	First aid staff of NTPC	No	
iii)	Ambulance driver of NTPC	No	

b) Persons responded to the scene:	**Yes/No**	**Remarks**
i) Rescue team	Yes	
ii) First aid staff of NTPC	Yes	
iii)Ambulance driver of NTPC	Yes	

5. Demonstration during exercise: **Yes/No**

a) Simulation of emergency situations

i) Portable stretcher used. NA

b) Simulation rescue conditions NA

i) Human being rescued

ii) Artificial/dummies used for rescue

6. Chronological order of Events: **Time (hrs.)**

i)	Accident noticed	16:38
ii)	Rescue team informed at	16:38
iii)	NTPC first-aid staff informed	16:39
iv)	Arrival of concern to area (Sh. Abhay Raj Singh Engr Opn)	16:42
v)	Rescue team/ fire tender arrived	16:42
vi)	Evacuation mitigation started of victim and fire respectively	16:43
vii)	Arrival of work incident controller (Sh. NP Agarwal CSE)	16:45
viii)	Arrival of NTPC Ambulance at location	16:42
ix)	Termination of rescue exercise	17:15
x)	Briefing of Fire mock drill exercise at assembly point	17:20

7. Deficiencies in exercise:

Sl. No.	**Observations**	**Recommendations**
i)	Crossover path over piping not available	- To be provided for easy access near tank bund wall.
ii)	Approach for backside not available	- Permanent path required to access fire hydrant on backside of tank. Wild vegetation also need to be removed.
iii)	Wind sock not available direction.	- To be installed for approaching fire in upwind
iv)	First responders were not able to start the foam pourer system manually	- Refresher training is required to be imparted for manual operation of Foam pourer system.

8. **Additional information (If any)**
   i) Fire fighting was carried out by identified fire & rescue team.

Prepared by	**Reviewed by**
Amber Dixit (Engineer Safety)	CS Reddy (AGM Safety)

Distribution:-

To,
ES to ED (V)
Es. to CGM (O&M)
GM (Maint.,OPN, EMD, C&I,CHP,FT,FM,HR)
AC Fire-CISF

Enclosure attached: -

Snaps of Fire/Rescue/ Evacuation Mock Drill

Annexure III-5

एनटीपीसी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)

VINDHYACHAL

Snaps of Fire Mock Drill

EC COMPLIANCE STG IV

Monitoring the Implementation of Environmental Safeguards

Ministry of Environment & Forests

Western Region, Regional Office Bhopal

MONITORING REPORT PART-I

DATA SHEET

S. N.	Description	
1.	Project Type: River-valley/ Mining/ Industry/ Thermal/ Nuclear/ Other (specify)	Thermal
2.	Name of the project	Vindhyachal Super Thermal Power Project, **Stage-IV (2x500 MW)**
3.	Clearance letter(s)/ OM No. and date	MoEF vide letter No. J-13011/56/2008/-IA.II (T) dated 05.02.2009
4.	Location:	
	a) District(s)	Singrauli
	b) State(s)	Madhya Pradesh
	c) Location Latitude/ Longitude	Latitudes of 24^0 02'45" - 24^0 03'00" N and Longitudes 82^0 38'00" - 82^{039}'25" E
5.	Address for correspondence:	Executive Director, Vindhyachal Super Thermal Power Project, Vindhyanagar, Dist Singrauli, (M.P.) Pin 486885
	a) Address of the Concerned Project Chief Engineer (with Pin Code and Telephone/ Telex/ Fax numbers)	Executive Director,, Vindhyachal Super Thermal Power Project, Vindhyanagar, Dist Singrauli, (M.P.) Pin 486885. Ph. 07805-247710, Fax 07805-247711
	b) Address of the Executive/Project Engineer/ Manager (With Pin Code & Telephone/ Telex/ Fax numbers)	Same as above

6.	Salient features:	
	a) Of the project	i) Coal based Thermal Power Plant with sub-critical boiler and enhanced steam parameters ii) Cooling Water source is outfall channel of NTPC ShaktiNagar which in-turn draws water from Rihand Reservoir. iii) Main Coal source is Nigahi coal mines of NCL. All coal transportation is by means of Rail only with majority of transportation being done through NTPC-owned racks through MGR (Merry-Go-Round system). A Copy of Feasibility Report is already submitted.
	b) Of the Environmental Management Plans	i) Tall stack (275 m) for wider dispersion of flue gases. ii) High Efficiency ESP. iii) Stack installed with CEMS (Continuous Emission Monitoring System) for monitoring PM, SOx, NOx. iv) Effluent Treatment Plant (ETP), Sewage Treatment Plant (STP) and Ash Water Recirculation Systems are in place to ensure 100 % process water recirculation. A Copy of EIA/ EMP Report is already submitted.

7.	Break-up of the project area:	Total area of all stages of Vindhyachal project is 5999 acres.
	a) Submergence area: forest & non-forest	30 acres (for Stage IV)
	b) Others	5048 acres [for all stages (I to V)]
8.	Breakup of the project affected population with enumeration of those losing houses/ dwelling units, only agricultural land, both dwelling units and agricultural land and landless labourers/ artisans:	817
	a) SC, ST/ Adivasi	SC – 59 ST - 407
	b) Others	351
9.	Financial details:	
	a) Project cost as originally planned and subsequent revised estimates and the year of price reference:	
	b) Allocation made for environmental management plans with item wise and year wise break-up	~ Rs.2000 Crore (Total for all stages of VSTPS since many facilities are common)
	c) Benefit cost ratio/ internal rate of Return and the year of assessment	
	d) Whether © includes the cost of environmental management as shown in the above	
	e) Actual expenditure incurred on the project so far	Project Cost as on 31/03/2020 for Stg IV is Rs.6557.20 crores.
	f) Actual expenditure incurred on the environmental management plans so far	Actual expenditure on Environment Management at NTPC Vindhyachal is ~ Rs.2390 Crore upto 31.03.2020.
10.	Forest land requirement:	45 acres
	a) The status of approval for diversion of forest land for non forestry use	Approval granted on 28/07/2014
	b) The status of clearing felling	No trees were felled (Revenue forest land)

	c) The status of compensatory afforestation, if any	Rs. 3.04 crores deposited with MoEF for afforestation in 2013.
	d) Comments on the viability & sustability of compensatory afforestation programme in the light of actual field experience so far.	
11.	The status of clear felling in non-forest area (such as submergence area or reservoir, approach roads), if any with quantitative information required.	---
12.	Status of Construction (actual and/or planned)	
	e) Date of commencement (actual and/or planned)	Date of Main Plant Award is 01.7.2009
	f) Date of completion (Actual and/or planned)	01/03/2014
13.	Reason for the delay in the project is yet to start.	-

<table>
<tr><th>S.No</th><th>EC Conditions</th><th>Compliance Status</th></tr>
<tr><td>(i)</td><td>Total land requirement for all the activities of the project shall not be exceed 600 acres.</td><td>Till now total 572 Acres land acquired.</td></tr>
<tr><td>(ii)</td><td>Prior forestry clearance shall be obtained for the forest land involved in the project, if any.</td><td>Application for diversion of 18.127 hec forest clearance obtained.</td></tr>
<tr><td>(iii)</td><td>Ash pond shall be at least 500 m away from FRL of Govind Ballabh pant Sagar (Rihand reservoir) . The land shall be free from arshy/waterlogged area.</td><td>Complied. Ash pond is more than 500 mts away from FRL of Rihand reservoir.</td></tr>
<tr><td>(iv)</td><td>Sulphur and ash content in the coal to be used in the project shall not be exceed 0.4% and 35 % respectively at any given time.</td><td>For the period Jan-June’20, average ash content in coal is 34.97 % & Sulphur content is 0.36% in coal. Coal is taken from the dedicated NCL mines of Nigahi, Jayant and Dudhichua.</td></tr>
<tr><td>(v)</td><td>A bi-flue stack of 275 m height shall be provided with continuous online, monitoring equipments for Sox, NOx, Hg, and Particulate. Exit velocity of flue gas shall not be less than 22 m/s</td><td>A twin flue stack of 275 m height have been provided for wider dispersal of the particulate & gaseous emissions. Continuous Emission Monitoring System for SOx, NOx, SPM is installed and connected to CPCB/MPPCB servers. Online Monitoring equipment for Hg is also installed.
Exit flue gas velocity for Jan - Jun’20 period is 21.8 – 22.4 m/s (third party sampling report for May’20 is attached for reference as Annexure IV-1. The variation in velocity is mainly attributable to combustion parameter variations, part-load operation and increase in air ingress in Induced draft fan suction (the air ingress points are attended during Unit shutdowns/overhauls).</td></tr>
<tr><td>(vi)</td><td>The High efficient Electrostatic Precipitators (ESP) shall be installed to ensure that particulate emission does not exceed 50mg/Nm3</td><td>ESP Design efficiency is 99.9 %. Particulate emission is maintained below 50 mg/Nm3.
Data for Jan-Jun’20 is as below:
<table><tr><td>Parameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr><tr><td>SPM (Mg/Nm3)</td><td>44</td><td>46</td><td>45</td></tr></table></td></tr>
</table>

<table>
<tr>
<td>vii)</td>
<td>The Particulate emission from existing units of stage-I,II and III shall be brought down to 75 mg/Nm3 and this modification should be completed before commissioning of stage-IV</td>
<td>ESP R & M of stage-I is in progress. Emission level reduced to below 100 mg/Nm3. R&M completion expected by Feb'21.

Data for Jan-Jun'20 is as below:

<table>
<tr><td>Parameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>SPM (Mg/Nm3)</td><td>92</td><td>95</td><td>94</td></tr>
</table>

ESP R & M of stage-II is completed and emission level brought down to the level of 75 mg/Nm3.

Data for Jan-Jun'20 is as below:

<table>
<tr><td>Parameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>SPM (Mg/Nm3)</td><td>73</td><td>77</td><td>74</td></tr>
</table>

Emission level of Stage-III are below 75 mg/Nm3.

Data for Jan-Jun'20 is as below:

<table>
<tr><td>Parameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>SPM (Mg/Nm3)</td><td>42</td><td>46</td><td>45</td></tr>
</table>

(third party sampling report for May'20 is attached for reference as Annexure IV-1)</td>
</tr>
<tr>
<td>(viii)</td>
<td>Space Provision shall be kept for retrofitting of FGD, if required at a later date.</td>
<td>Provision is kept as per condition stated. Contract for installation of FGD awarded. Work is in progress. Scheduled completion for Unit 11 is Dec'21 and for Unit 12 is June'21.</td>
</tr>
</table>

<table>
<tr><td></td><td></td><td> 
Civil work at FGD Unit :11
 
Civil work at FGD Unit :12</td></tr>
<tr><td>(ix)</td><td>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.</td><td>Provision is as per condition stated. Rotating Water Sprinklers have been installed in coal yard to suppress the dust. Dust Extraction system is installed in Crusher House and Ventillation supply and Exhaust system is installed in track hopper. DFDS is installed at all transfer points of conveyor belts.
 
Water Sprinklers at Coal Yard
 
DFDS at Conveyors Belts

CHP area fugitive dust concentration for the period Jan-June’20:
<table><tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr><tr><td>RPM (ug/M3)</td><td>85</td><td>94</td><td>89</td></tr><tr><td>SPM (ug/M3)</td><td>488</td><td>496</td><td>492</td></tr></table>Sampling report of June’20 attached as Annexure IV-2.</td></tr>
</table>

		Water sprinkling system is installed at ash dyke.
(x)	Fly Ash shall be collected in dry form and storage facilities (silos) shall be provided. The provisions stipulated in the fly ash notifications of September 1999 and its amendment in august, 2003 in regard to fly ash utilization shall be adhered to. Unutilized fly ash and bottom ash shall be disposed off in the ash pond duly lined to avoid any ground water contamination.	Provision is as per condition stated. Dry Ash Extraction System installation was part of the originally awarded Plant package but could not be completed on time due to default by contractual agency. Work in progress. Completion now expected by Mar'21. Ash pond lining with clay-bentonite impervious layer done before start of discharge.
(xi)	Closed cycled cooling system with cooling towers shall be provided. COC of at least 4 shall be adopted and the effluents shall be treated as per the prescribed norms.	Closed cycled cooling system with cooling towers installed. COC of 3.4 is achieved. Improvement plan is under implementation. However, since the Plant has a number of common facilities for the five stages, diversion of water from one stage to other has to be done depending upon the system availability. Overall specific water consumption for the station for Jan-Jun period is 3.04 m3/Mwh against the allowed limit of 3.5.  **COOLING TOWER STAGE-IV** No blow down is done in cooling towers and hence no effluents are generated. COC is maintained by using the Cooling water for other Plant purposes.

<table>
<tr>
<td>(xii)</td>
<td>The treated effluents confirming to the prescribed standards shall be re-circulated and reused within the plant. Arrangement shall be made that effluents and storm water do not get mixed.</td>
<td>Treated effluents from ETP/STP/AWRS confirm to the prescribed standards and are being fully re-circulated/ reused within the plant.

ETP quality data for the period Jan-June’20:-
<table>
<tr><td>Parameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>BOD (mg/lit)</td><td>15.00</td><td>17.40</td><td>16.10</td></tr>
<tr><td>COD (mg/lit)</td><td>70.75</td><td>74.50</td><td>73.12</td></tr>
<tr><td>Suspended solid</td><td>27.20</td><td>32.18</td><td>28.33</td></tr>
<tr><td>Oil & Grease</td><td>2.93</td><td>4.90</td><td>4.22</td></tr>
<tr><td>Temperature 0 C</td><td>20.73</td><td>31.14</td><td>27.84</td></tr>
<tr><td>pH</td><td>7.42</td><td>7.46</td><td>7.44</td></tr>
</table>
AWRS quality data for the period Jan-June’20:-
<table>
<tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>BOD (mg/lit)</td><td>14.00</td><td>16.25</td><td>15.08</td></tr>
<tr><td>COD (mg/lit)</td><td>67.80</td><td>70.50</td><td>69.49</td></tr>
<tr><td>Suspended solid</td><td>70.33</td><td>75.54</td><td>72.86</td></tr>
<tr><td>Oil & Grease</td><td>1.10</td><td>1.28</td><td>1.19</td></tr>
<tr><td>Temperature 0 C</td><td>20.75</td><td>31.14</td><td>26.94</td></tr>
<tr><td>pH</td><td>7.38</td><td>7.44</td><td>7.41</td></tr>
</table>
Storm water drain separation scheme finalised. Completion of work expected by Oct’21.</td>
</tr>
<tr>
<td>(xiii)</td>
<td>A sewage treated plant shall be provided and the treated sewage shall be reused for raising greenbelt/plantation.</td>
<td>Provision is as per condition stated.
NTPC Vindhyachal has one no. of STP of 6MLD capacity; the treated effluent of STP is being recycled for the horticulture purposes.
STP quality data for the period Jan-June’20:-
<table>
<tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>BOD (mg/lit)</td><td>21.60</td><td>23.50</td><td>23.09</td></tr>
<tr><td>COD (mg/lit)</td><td>77.00</td><td>81.75</td><td>80.23</td></tr>
<tr><td>Suspended solid</td><td>64.93</td><td>73.68</td><td>69.99</td></tr>
<tr><td>Oil & Grease</td><td>3.95</td><td>5.64</td><td>4.96</td></tr>
<tr><td>Temperature 0 C</td><td>20.95</td><td>32.28</td><td>26.99</td></tr>
<tr><td>pH</td><td>7.53</td><td>7.60</td><td>7.56</td></tr>
</table></td>
</tr>
</table>

		 **Sewage Treatment Plant**
(xiv)	Rainwater harvesting should be adopted. Central ground water authority /Board shall be consulted for finalization of appropriate rainwater harvesting technology within a period of three months from the date of clearance and details shall be furnished.	Installation of Rain Water Harvesting in Township Public Buildings is in progress; expected completion by Mar'21. Feasibility study for installing rain water harvesting system in Plant area is in progress. Report expected by Sep'20. However, station is constructing three large number of reservoirs inside the Plant premises which will serve the purpose of rain water conservation. This work is likely to be completed by Oct'21. Earlier in 2015, Feasibility study has been carried out by M/s Rajmi Exploration & Engg Ltd, Indore in consultation with Central ground water authority Bhopal in 2015. As per that study, groundwater recharging through rain water harvesting was not feasible because of the very high ground level in the Plant area (**Annexure IV-3**).
(xv)	Adequate safety measures shall be provided in the plant area to check/minimize spontaneous fires in coal yard, especially during summer season. Copy of the these measure with full details alongwith location plant layout shall be submitted to the ministry as well as to the regional office at Bhopal	The plant has been provided with adequate automated fire protection system. Fully equipped CISF manned central fire control station is in place. NTPC Vindhyachal has the onsite & off site emergency plan for mitigation of control of fire and explosion hazards arising due to transportation, use of storage of coal and oil. CHP fire safety measures, as documented in the Local Management Instructions, are attached as **Annexure IV-7**.
(xvi)	Storage facilities for auxiliary liquid fuel such as LDO and/HFO/LSHS shall be made in the plant area where risk is minimum to the storage facilities. Disaster management plan shall be prepared to meet any eventuality in case of an accident taking place. Mock	Provision is as per condition stated. NTPC Vindhyachal has the disaster management approved by the nation safety council for any kind of emergency plan and in case of any accident taking place. Mock drill is conducted regularly and observations, if any, are taken care of. Report of Mock Drill conducted on 29.05.20 is attached as **Annexure IV-8**.

<table>
<tr><td></td><td>drill shall be conducted regularly and based on the same, modifications required, if any shall be incorporated in the DMP. Sulphur content in the liquid fuel shall not exceed 0.5%.</td><td>Liquid fuels with sulphur content less than o.5 % are not available.</td></tr>
<tr><td>(xvii)</td><td>Regular monitoring of ground water in and around the ash pond area including heavy metals (As, Hg, Cr, Pb) shall be carried out, records maintained and six monthly report shall be furnished to Regional office of the ministry.</td><td>Regular monitoring of ground water around the ash pond area, including heavy metals (As, Hg, Cr, Pb), is being done through an approved Laboratory from Ministry of Environment, Forest and Climate Change. Third party monitored data for the period Jan-June'20 is attached as Annexure IV-4.</td></tr>
<tr><td>(xviii)</td><td>A green belt of adequate width and density shall be developed around the plant periphery covering 1/3rd of project area preferably with local species.</td><td>Every year, NTPC Vindhyachal is planting more than 20,000 nos. of tree in and around the plant area. Additionally, 50000 trees are also planted every year through MPRVVN for which an MOU has been signed with them for next ten years (from 2016-17). In financial year 2019-20, more than 72000 saplings have been planted by NTPC-Vindhyachal. NTPC-Vindhyachal has developed the green belt around the plant as well as in the ash dyke area. Till June'20, about 23.7 lac trees have been planted over an area of about 3000 acres out of which about 2200 acres area is in and around NTPC Vindhyachal premises which have a total area o about 5800 acres.</td></tr>
<tr><td>(xix)</td><td>Adequate funds shall be allocated for undertaking CSR activities.</td><td>Provision is as per condition stated. Total spend on CSR activities by NTPC was 305 crores (~ 2.65 % of the annual profit of 11,500 crores) for the year 2019-20. NTPC Vindhyachal spent ~ 9.4 crores on the activity. A report on CSR activities of NTPC Vindhyachal is attached as Annexure IV-9.</td></tr>
<tr><td>(xx)</td><td>First aid and sanitation arrangement shall be made for the drivers and other contract workers during construction phase.</td><td>Provision is as per condition stated.</td></tr>
<tr><td>(xxi)</td><td>Noise level emanating from turbines shall be so controlled such that the noise in the work zone shall be limited to 75dBA. For people working in the high noise area, requisite personal protective equipments 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 of any hearing loss including shifting to non noisy /less nosy areas.</td><td>Acoustic enclosures have been provided to control the noise level below regulatory norms & personal protective equipment have been provided wherever it is not possible to control the noise level. Regular monitoring all the environmental parameters is being carried out & Noise level is also being complied as per norms.
The Noise monitored data at Turbine floor for the period jan-June'20

<table>
<tr><td>Location</td><td>Parameter</td><td>Min</td><td>Max</td><td>Avg</td></tr>
<tr><td>Turbine floor</td><td>Noise (dB(A)</td><td>68</td><td>72</td><td>71.0</td></tr>
</table>

Sample Monitoring Report for June'20 is attached as Annexure IV-5.

Regular health checkup of all employees is being done which includes ENT examination also.</td></tr>
</table>

<table>
<tr><td>(xxii)</td><td>Regularly monitoring of ambient air quality in the impact zone shall be carried out and records maintained. In case the air quality levels exceed the prescribed standards, necessary corrective measure shall be taken.</td><td>Regularly monitoring of ambient air quality in the impact zone is being carried out and records being maintained. Continuous Ambient air monitoring system is installed for monitoring within the plant and data is being sent regularly to MPPCB/CPCB.
Ambient Air quality data for the period Jan-June’20:
<table><tr><td>Parameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr><tr><td>PM10</td><td>75.20</td><td>91.29</td><td>84.16</td></tr><tr><td>PM2.5</td><td>40.57</td><td>52.42</td><td>45.54</td></tr><tr><td>SOX</td><td>20.10</td><td>25.20</td><td>22.83</td></tr><tr><td>NOX</td><td>20.10</td><td>24.11</td><td>21.67</td></tr></table>
Third party monitoring report for outside plant area within the Impact Zone for March’20 is attached as Annexure IV-6.</td></tr>
<tr><td>(xxiii)</td><td>Regular monitoring of ground level concentration of SO2, NOx, SPM and RSPM shall be carried out in the impact zone and records maintained. If any stage these level are found to be exceed the prescribed limits, necessary control measures shall be provided immediately. The locations of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Periodic reports shall be submitted to Regional Office of the Ministry.</td><td>Provision is as per condition stated. Regular monitoring of ambient air quality is being done. The four AAQMS stations were set up in consultation with MPPCB.

Data given in condition xxii.</td></tr>
<tr><td>(xxiv)</td><td>A detailed plan for the health monitoring in the area within the impact zone shall be prepared and implemented along with local administration. The plan should be besides others, also provides for monitoring of respiratory disorders. The plan should be submitted within three months to the Ministry and its Regional Office at Bhopal.</td><td>1. Regular medical check-up plan for the employees and contract workers is in place. Medical check-up of 922 employees and 3000 contract workers was done in 2019-20.
2. For People living in the neighbouring villages, Village health camps (approx. 10), Antenatal care camps, Family planning camp and eye camps are conducted in coordination with Distt. Administration.
3. Projected Affected People (PAPs) are given subsidised medical treatment at NTPC hospital.
4. All National Health Programs are implemented.
5. DOTS centre and Mobile Health Clinic has been established.
6. Regular Health Awareness sessions are conducted for employees and contract workers.
7. Health Impact survey already carried out and report submitted. It addition to this another Human health risk assessment study has been done by M/s FICCI.
8. Till date, no occupational health disease has been diagnosed.</td></tr>
<tr><td>(xxv)</td><td>Provision shall be made for the housing of construction labours within the site with all necessary infrastructure</td><td>Provision is as per condition stated.</td></tr>
</table>

	and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, etc., The housing may be in the form of temporary structures to be removed after the completion of the project.	
(xxvi)	The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned within seven days from the date of this clearance letter, informing that the project has been accorded Environmental Clarence and copies of the clearance are available with the state pollution control board/committee and may also be seen at website of Ministry of Environment and Forests at http://envfor.nic.in.	Already done.
(xxvii)	A separate environment management cell with qualified staff shall be setup for implementation of the stipulated environmental safeguards.	An Environmental cell has been created at the project site with HOD at the level of Addl General Manager.
(xxviii)	Half yearly report to the status of implementation of the stipulated conditions and environmental safeguards shall be submitted to the ministry/Regional Office/CPCB/SPCB.	Being sent. Reports are available on the company website at the following link: https://www.ntpc.co.in/sites/default/files/downloads/EC-Compliance-Status.pdf
(xxix)	Regional office of the ministry of Environment and Forests located at Bhopal will monitor the implementations of the stipulated conditions. A complete set of documents including Environmental Impact Assessment Report and Environment management plan along with additional Information submitted from time to time shall be forwarded to the regional office for their use during monitoring. The project proponent will upload the compliance status in their website and update the same from time to time (at least six monthly). Criteria pollutants levels (stack and Ambient levels) will be displayed at the main gate of the power plant.	Already done. A display board at the main gate of the plant is installed for displaying the Environment quality parameters. 

(xxx)	Separate fund shall be allocated for implementation of Environmental protection measure along with item-wise breakup. These cost shall be included as part of the project cost. The funds earmarked for the environmental protection measures shall not be diverted for other purposes. And year wise expenditure should be report to the Ministry.	Provision is as per condition stated. The expense statement for Vindhyachal as a station is attached as **Annexure IV-10**
(xxxi)	The project authorities shall inform the Regional office as well as the ministry regarding date of financial closure and final approval of the project by the concerned authorities and the dates of start of land development work and commissioning of plant.	Provision is as per condition stated.
(xxxii)	Full cooperation shall be extended to the Scientists/Officers from the Ministry/Regional Office of the Ministry at Bhopal/the CPCB/ the SPCB who would be monitoring the compliance of Environmental status.	Provision is as per condition stated.

Contact : +91 - 9810243870

EKO PRO ENGINEERS PVT. LTD.
Environmental Consultants and Analytical Laboratory
(An ISO 9001:2015 Certified Company)

Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
Contact No. : 9711159210, 9711159427, SMS/Whatsapp No. : 9711163422; E-mail : email@ekopro.in, ekoproengineers@gmail.com, website : www.ekopro.in

TEST REPORT

Stack Emission Analysis

Test Report No. : EKO/205/190320 **Issue Date : 21/03/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
Vindhya Nagar,
District - Singrauli
Madhya Pradesh

Sample Description	:	Stack (Boiler Emission)
Sample Drawn on	:	16/03/2020
Sample Drawn by	:	EPEPL Representative
Sampling Location	:	Unit - XI
Sampling Plan & Procedure	:	SOP-SE/09
Source of Emission	:	Stack Attached To ESP
Capacity	:	500 MW
Type of Stack	:	MS
Remark (if any)	:	Stack Monitoring Kit

RESULTS

S. No.	Parameters	Test Methods	Results	Units
1	Particulate Matter (as PM)	IS: 11255 (P-1)	44.0	mg/Nm^3
2	Sulphur Dioxide (as SO_2)	IS: 11255 (P-2)	973.0	mg/Nm^3
3	Oxide of Nitrogen (as NOx)	IS: 11255 (P-7)	462.0	mg/Nm^3
4	Oxygen (O_2)	IS: 13270	6.3	% V/V
5	Carbon Dioxide (as CO_2)	IS: 13270	12.8	% V/V
6	Stack Gas Temp.	IS: 11255 (P-3)	133.0	°C
7	Exit Velocity of Gas	IS: 11255 (P-3)	22.19	m/sec
8	Moisture in flue gas	IS: 11255 (P-3)	9.4	%
9	Mercury	EKO/CHEM/SOP/FL-083	0.010	mg/Nm^3

Remark- ND- Not Detected, LOD- Limit of Detection. (PM, SO2 & Nox at 6% O2 dry basis).

Notes :

1. The results given above are related to the tested sample, for various parameters, as observed at the time of Sampling. The customer asked for the above tests only.
2. This test report will not be generated again, either wholly or in part, without prior written permission of the Laboratory.
3. The test report will not be used for any publicity/legal purpose.
4. The test samples will be disposed off after 15 days from the date of issue of test report, unless until specified by the customer.
5. Responsibility of the Laboratory is limited to the invoiced amount only.

**** End of Report ****

For EKO PRO ENGINEERS PVT. LTD.
PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

Contact : +91 - 9810243870

EKO PRO ENGINEERS PVT. LTD.

Environmental Consultants and Analytical Laboratory

(An ISO 9001:2015 Certified Company)

Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
Contact No. : 9711159210, 9711159427, SMS/Whatsapp No. : 9711163422; E-mail : email@ekopro.in, ekoproengineers@gmail.com, website : www.ekopro.in

TEST REPORT

Stack Emission Analysis

Test Report No. : EKO/206/190320 **Issue Date : 21/03/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
Vindhya Nagar,
District - Singrauli
Madhya Pradesh

Sample Description	:	Stack (Boiler Emission)
Sample Drawn on	:	17/03/2020
Sample Drawn by	:	EPEPL Representative
Sampling Location	:	Unit - XII
Sampling Plan & Procedure	:	SOP-SE/09
Source of Emission	:	Stack Attached To ESP
Capacity	:	500 MW
Type of Stack	:	MS
Remark (if any)	:	Stack Monitoring Kit

RESULTS

S. No.	Parameters	Test Methods	Results	Units
1	Particulate Matter (as PM)	IS: 11255 (P-1)	47.0	mg/Nm^3
2	Sulphur Dioxide (as SO_2)	IS: 11255 (P-2)	968.0	mg/Nm^3
3	Oxide of Nitrogen (as NOx)	IS: 11255 (P-7)	498.0	mg/Nm^3
4	Oxygen (O_2)	IS: 13270	6.4	% V/V
5	Carbon Dioxide (as CO_2)	IS: 13270	12.6	% V/V
6	Stack Gas Temp.	IS: 11255 (P-3)	129.0	°C
7	Exit Velocity of Gas	IS: 11255 (P-3)	22.07	m/sec
8	Moisture in flue gas	IS: 11255 (P-3)	9.6	%
9	Mercury	EKO/CHEM/SOP/FL-083	0.014	mg/Nm^3

Remark- ND- Not Detected, LOD- Limit of Detection. (PM, SO2 & Nox at 6% O2 dry basis).

Notes :

1. The results given above are related to the tested sample, for various parameters, as observed at the time of Sampling. The customer asked for the above tests only.
2. This test report will not be generated again, either wholly or in part, without prior written permission of the Laboratory.
3. The test report will not be used for any publicity/legal purpose.
4. The test samples will be disposed off after 15 days from the date of issue of test report, unless until specified by the customer.
5. Responsibility of the Laboratory is limited to the invoiced amount only.

**** End of Report ****

For EKO PRO ENGINEERS PVT. LTD.
PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

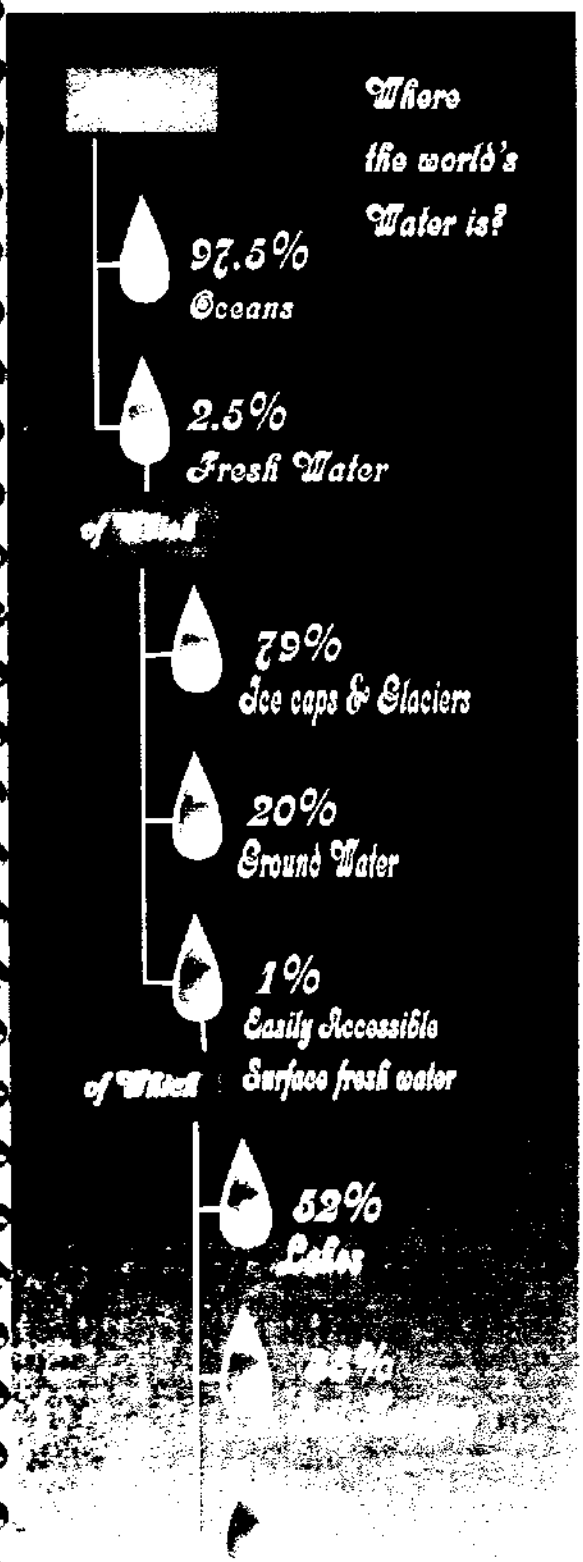
ENVIRONMENT LAB
(CHEMISTRY DEPARTMENT)

VINDHYACHAL

FUGITIVE DUST MONITORING REPORT

MONTH: MAY -2020

DATE	PARAMETERS	LOCATION					
	Limit/Unit	MILL AREA ST- I	MILL AREA ST- II	MILL AREA ST- III	MILL AREA ST- IV	MILL AREA ST- V	CHP
01/05/2020	RPM (100µg/m³)	92.7					
	SPM (500µg/m³)	488.2					
11/05/2020	RPM (100µg/m³)		89.4				
	SPM (500µg/m³)		492.0				
07/05/2020	RPM (100µg/m³)			91.6			
	SPM (500µg/m³)			490.3			
09/05/2020	RPM (100µg/m³)				88.7		
	SPM (500µg/m³)				486.7		
12/05/2020	RPM (100µg/m³)					87.9	
	SPM (500µg/m³)					489.2	
14/05/2020	RPM (100µg/m³)						93.5
	SPM (500µg/m³)						494.0



Report on

RAIN WATER HARVESTING SYSTEM IN NTPC PLANT AREA AT VILLAGE VINDHACHAL, DISTRICT-SINGRAULI(M.P.)

Client :- NTPC VINHYACHAL NAGAR

VAIDHAN M P

Submitted by

Rajmi Geoexploration & Engg. Pvt. Ltd.

101-106 M L Tower, 292- A, Project Scheme No. 91,

Opposite Malwa Mill Super Market

Indore MP Pin- 452003

Tel. +0731-2434588, 09926845588, 094525460588,

09993470161

email :- geoexplorationindore@gmail.com

JAN- 2016

9. RECOMMENDATION FOR RAINWATER HARVESTING

On the basis of the analysis of the data, generated from the systematic and comprehensive Hydro geological survey, the Geophysical Resistivity Survey & lateral Profiling, the lineament fabric studies of the area, thoroughly understanding the aquifer geometry and its disposition at depth, Hydro meteorological studies (Rain fall intensity etc.), the location and types suitable rainwater harvesting structures was to be finalized to impound as well as recharge ground water.

As per the hydrogeological investigations the water level as observed during field work during post monsoon season rises upto 0.45 t0 2.50 m. This condition is almost water logged and some wells show the SWL at a depth of 2.0 m in pre monsoon too. This is mainly due to the discharge of water from plant area and other domestic water flows throughout the year in the nala in and around project area. The presence of sandy soil from 0.0 m to 4.50 m also boosts the seepage of water to water table aquifer from surface flow.

As per the above water level data the area seems to be water logged and no rain water harvesting will be feasible in such condition.

However, The general rainwater harvesting structures for artificial recharge is as described below.

Contour Bunding

Contour Bunding, which is a watershed management practice aimed at building up soil moisture storage involve construction of small embankments or bunds across the slope of the land. They derive their names from the construction of bunds along contours of equal land elevation. Spacing between two contour bunds depends on the slope of the area; in the study area spacing is to be considered as 20 to 25 m. The schematic of a system of contour bunds is shown below in Fig: 10.2

EKO PRO ENGINEERS PVT. LTD.
Contact : +91 - 9810243870
TC-5063
EKO PRO ENGINEERS PVT. LTD.
Environmental Consultants and Analytical Laboratory
(An ISO 9001:2015 Certified Company)
Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
Contact No. : 9711159210, 9711159427, SMS/Whatsapp No. : 9711163422; E-mail : email@ekopro.in, ekoproengineers@gmail.com, website : www.ekopro.in

TEST REPORT

Water Sample Analysis

Test Report No : EKO/124/130220 **Issue Date : 18/02/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
: Vindhya Nagar
Distt. - Singrauli
Madhya Pradesh

Sample Description	:	Drinking Water
Sample Drawn on	:	12/02/2020
Sample Drawn by	:	EPEPL (Mr. Pramod Mishra)
Sample Received on	:	13/02/2020
Sampling Location	:	Hand Pump of near Ash Dyke Baliyari
Sampling Plan & Procedure	:	SOP-W/66
Sample Quantity	:	1.0 Litre
Environmental Conditions	:	Normal
Analysis Duration	:	13/02/2020 To 17/02/2020
Remark (if any)	:	NA

RESULTS

S. No.	Parameters	Test Methods	Results	Units	Range of Testing / LOD	Limits as per IS: 10500-2012 (Amd.No.2 Sep-2018)	
						Acceptable	Permissible
1	Colour	IS: 3025 (P-4)	ND	Hazen	1 - 500	5.0	15.0
2	Odour	IS: 3025 (P-5)	Agreeable	–	–	Agreeable	Agreeable
3	Turbidity	IS: 3025 (P-10)	4.2	NTU	1 - 500	1.0	5.0
4	Conductivity	IS : 3025 (P-14)	390.5	µS/cm	1 - 100000	-	-
5	pH	IS: 3025 (P-11)	7.24	–	1 - 13	6.5-8.5	No relaxation
6	Total Hardness (as $CaCO_3$)	IS: 3025 (P-21)	184.0	mg/L	1 - 10000	200.0	600.0
7	Calcium Hardness (as $CaCO_3$)	IS: 3025 (P-40)	105.0	mg/L	1 - 10000	--	--
8	Calcium (as Ca)	IS: 3025 (P-40)	44.9	mg/L	0.5 - 5000	75.0	200.0
9	Chloride (as Cl)	IS: 3025 (P-32)	42.5	mg/L	2.5 - 5000	250.0	1000.0
10	Fluoride (as F)	IS: 3025 (P-60)	ND	mg/L	0.1 - 50	1.0	1.5
11	Total Dissolved Solids	IS: 3025 (P-16)	234.0	mg/L	5 - 20000	500.0	2000.0
12	Total Suspended Solids	IS: 3025 (P-17)	ND	mg/L	5 - 2000	-	-
13	Magnesium (as Mg)	IS: 3025 (P-46)	17.5	mg/L	0.5 - 2500	30.0	100.0
14	Sulphate (as SO_4)	IS: 3025 (P-24)	43.6	mg/L	1 - 5000	200.0	400.0
15	Nitrate (as NO_3)	IS: 3025 (P-34)	1.86	mg/L	0.1 - 100	45.0	No relaxation
16	Total Alkalinity (as $CaCO_3$)	IS: 3025 (P-23)	180.0	mg/L	1 - 5000	200.0	600.0

Remark - ND- Not Detected, LOD- Limit of Detection.

EKO PRO ENGINEERS PVT. LTD. GHAZIABAD SAVE THE ENVIRONMENT

IV - 4

D. Stage:-IV

Sr. No.	Location	Date of Monitoring/ Noise Level [dB(A)]				
		04/06/2020	11/06/2020	18/06/2020	25/06/2020	25/06/2020 6:00 pm
1.	Mill Area -4	68	66	70	67	66
2.	Boiler -4	69	71	69	65	68
3.	T.G.Floor-4	71	72	72	70	65
4.	U.P.H. -4	70	68	67	69	67
5.	Compressor House- 4	68	70	67	70	66
6.	Crusher House -3	69	68	70	68	65

E. Stage:-V

Sr. No.	Location	Date of Monitoring/ Noise Level [dB(A)]				
		05/06/2020	12/06/2020	19/06/2020	26/06/2020	26/06/2020 6:00 pm
1.	Mill Area -5	66	69	70	69	64
2.	Boiler -5	69	66	71	68	65
3.	T.G.Floor-5	70	72	72	71	67
4.	U.P.H. -5	68	69	67	70	66
5.	Compressor House- 5	70	65	69	70	67

F. Outside Plant Premises

Sr. No.	Location	Date of Monitoring/ Noise Level [dB(A)]			
		06/06/2020	13/06/2020	20/06/2020	27/06/2020 6:00 pm
1.	Outside Plant (Labour Gate)	67	66	65	65
2.	Outside plant (Township Gate)	69	68	67	66
3.	Outside Plant (MGR Gate)	67	69	66	67
4.	Outside Plant (Matawai Gate)	66	65	67	64

***These parameters are analyzed weekly at Day time**
***Limits as per PCB: Industrial Area Day/ Night 75/70 dB, commercial Area Day/ Night 55/45 dB**

Contact : +91 - 9810243870

EKO PRO ENGINEERS PVT. LTD.

Environmental Consultants and Analytical Laboratory

(An ISO 9001:2015 Certified Company)

Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
Contact No. : 9711159210, 9711159427, SMS/Whatsapp No. : 9711163422; E-mail : email@ekopro.in, ekoproengineers@gmail.com, website : www.ekopro.in

TEST REPORT

Ambient Air Quality Monitoring

Test Report No. : EKO/194/190320 **Issue Date : 19/03/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
Vindhya Nagar,
District - Singrauli
Madhya Pradesh

Sample Description : Ambient Air
Sample Drawn by : EPEPL Representative
Sampling Location : L5 = Stage V (Coal Mill Area), L6 = CHP, L7 = Near Jwala Mukhi Mandir, L8 = Rose Garden Jayant
Sampling Time : 24.0 Hrs.
Sampling Plan & Procedure : SOP-AAQ/15
Remark (if any) : Instrument Use RDS & FPS

RESULTS

S. No.	Parameters	Test Methods	Sampling Date/Results				Units	Limits as per CPCB Notification, 18th Nov 2009
			L5-13.03.20	L6-16.03.20	L7-12.03.20	L8-14.03.20		
1	Particulate Matter (PM10)	IS: 5182 (P-23)	91.52	87.25	76.25	78.78	$\mu g/m^3$	100.0
2	Particulate Matter (PM2.5)	EK0/CHEM/SOP/AAQ/01	48.52	47.64	38.78	39.12	$\mu g/m^3$	60.0
3	Sulphur Dioxide (as SO_2)	IS: 5182 (P-2)	25.65	23.29	24.36	21.98	$\mu g/m^3$	80.0
4	Nitrogen Dioxide (as NO_2)	IS: 5182 (P-6)	24.32	22.14	23.23	20.42	$\mu g/m^3$	80.0
5	Carbon Monoxide (as CO)	IS: 5182 (P-10)	ND	ND	ND	ND	mg/m^3	4.0
6	Mercury (as Hg)	EKO/CHEM/SOP/FL-082	ND	ND	ND	ND	$\mu g/m^3$	-

Remark- ND- Not Detected, LOD- Limit of Detection. (Detection Limits for CO- 0.5 mg/m3, & Mercury- 0.1 µg/m3).

Notes :

1. The results given above are related to the tested sample, for various parameters, as observed at the time of Sampling. The customer asked for the above tests only.
2. This test report will not be generated again, either wholly or in part, without prior written permission of the Laboratory.
3. The test report will not be used for any publicity/legal purpose.
4. The test samples will be disposed off after 15 days from the date of issue of test report, unless until specified by the customer.
5. Responsibility of the Laboratory is limited to the invoiced amount only.

**** End of Report ****

For EKO PRO ENGINEERS PVT. LTD.
PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

SN	Area	Detection System	Protection System	Remarks
d.	All Control rooms, MCC and Switchgear rooms (Compressor house, DG set area or any other local MCC / Swgr. rooms)	Ionisation type smoke detectors	Fire extinguishers	
5.4	**Coal Handling Plant**			
a.	Coal Conveyors	a)- b) LHS cable type heats detectors and infra red type heat detectors c) Linear heat sensing cable type heat detectors, Quartzoid bulb type heat detectors (With hydraulic / pneumatic detection pipe network) and Infra-red type heat detectors	a) Hydrants / monitors b) i) Sprinkler system ii) Solenoid operated automatic MVW spray system and hydrant system c) Automatic MVW spray system and hydrant system	Hoses to be provided in central hose houses
b.	Transfer points & crusher houses	Quartzoid bulb type heat detectors	a) Automatic MVW spray / sprinkler system and hydrant system (Landing valves and / or water monitors) b) Hydrants	
c.	Coal Handling plant Control rooms, MCC and Switchgear rooms	Ionisation type smoke detectors	a) Fire Extinguishers b) Hydrants (outside)	
d.	Cable galleries in CHP Control/ Switchgear rooms (if any)	Linear heat sensing cable type heat detectors; Ionisation and photoelectric type smoke detectors	a) Automatic MVW Spray System and Fire Extinguishers b) Hydrants (outside)	
e.	Transformers of rating 10 MVA or in case of oil field transformer with oil cap 2000 liters and above within the plant premises	Quartzoid bulb type heat detectors (With hydraulic detector pipe network)	Automatic HVW spray system and fire extinguishers hydrant system	Hoses to be provided in central hose houses
5.5	**Fuel Oil Handling**			
a.	Fuel Oil Tanks (PETROL/NGL/HSD) HFO/LDO	Linear heat sensing cable type heat detectors, Quartzoid bulb type (With pneumatic detection pipe network) heat detectors	Foam injection system and automatic / manual MVW spray system (for uninsulated tanks)	
b.	Fuel oil dyke	-	Hydrant system (Hydrants & water monitors)	Hoses to be provided in central hose houses

The various hazards in a power station and the methods to prevent these are given in the following table

SN	Area	Fire Hazard	Fire Prevention
4.1	Coal Stockyard	Self-ignition due to coal air interaction (Dry coal-wet air during March to June period is the most critical combination and moist coal-dry air the most favourable combination)	1. Coal to be visible wet while stacking. 2. Fresh coal not to be stacked over old coal. In case freshly mined coal has to be stacked over old coal, latter's temperature should first be measured. If the temp. is more than 50°C coal should be drenched with sufficient water (As per LMI V-LMI-OGN-OPS-SYST-013 "Manual on Handling and Storage of Coal" Rev. 2 Issue. 1 Clause-3.1.9). 3. Coal to be stacked layer by layer (each of 1-1.5M height) with compaction of each layer 4. Regular spray of water over coal yard to be done. 5. Stacking to be done in trapezoidal stockpile and not in conical. 6. Proper records of period of stacking to be maintained and the principle of **FIFO** (**First In First Out)** to be adopted. 7. Piles should be regularly inspected for high temperature of coal / any smoldering coal and suitable action to be taken to pour water/remove burning coal. (As per LMI V-LMI-OGN-OPS-SYST-013 "Manual on Handling and Storage of Coal" Rev. 2 Issue. 1 Clause-3.1.3). 8. Coal should be piled in such a manner that air can circulate freely to dissipate heat. For crushed coal the pile should be packed thoroughly to ensure the complete absence of air. (As per LMI V-LMI-OGN-OPS-SYST-013 "Manual on Handling and Storage of Coal" Rev. 2 Issue. 1 Clause-3.1.19). **Responsibility : AGM (CHP-opn)**
4.2	Bulldozers, Pay-loaders etc.	Coal dust and oil deposits combined with hot exhaust pipes, fuel oil tank, fuel oil leakages, cables	Regular cleaning of engine compartment, inspection to check for any fuel leakage. **Responsibility : AGM (CHP-MAINT)**

एनटीपीसी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)

VINDHYACHAL

Fire mock drill at Stage-4 LDO tank as per DMP dated_29-05-2020

1. Summary of Fire/Rescue Exercise

i) Conducted on : 29-05-2020 Time: 16:38

ii) Location of exercise scenario : Stage-4 LDO tank.

iii) Exercise Conducted By: Mr Prashant Diwedi - (Dy. Commandant CISF)

iv) Brief description of the scenario : A fire was observed in LDO tank stage IV by a operator working there.

2. Planning		**Yes/No**	**Remarks**
i)	Whether pre-planning carried out?	Yes	
ii)	Was a specific scenario drilled?	Yes	MCLS as per DMP

iii) Details of planning carried out

Objectives:-

a) To assess the awareness & preparedness of rescue plan.

b) To check preparedness of first-aider and ambulance.

c) To assess the alertness and timely involved response of officials and supporting staff.

d) To educate the officials and supporting staff to act in an orderly of an accident and how to mitigate the fire.

iv) Name and designation of observers:-

Mr CS Reddy - (AGM Safety)

Sh. NP Agarwal - (Chief Shift Incharge NTPC)

Sh. SV Reddy - (AC- Fire CISF)

3. Category of Exercise:		**Yes/No**	**Remarks**
i)	Pre informed exercise	No	
ii)	Secret / Surprise exercise	Yes	

4. a) Persons informed to the scene :		**Yes/No**	**Remarks**
i)	Rescue team	No	
ii)	First aid staff of NTPC	No	
iii)	Ambulance driver of NTPC	No	

b) Persons responded to the scene:	**Yes/No**	**Remarks**
i) Rescue team	Yes	
ii) First aid staff of NTPC	Yes	
iii)Ambulance driver of NTPC	Yes	

5. Demonstration during exercise: **Yes/No**

a) Simulation of emergency situations

i) Portable stretcher used. NA

b) Simulation rescue conditions NA

i) Human being rescued

ii) Artificial/dummies used for rescue

6. Chronological order of Events: **Time (hrs.)**

i)	Accident noticed	16:38
ii)	Rescue team informed at	16:38
iii)	NTPC first-aid staff informed	16:39
iv)	Arrival of concern to area (Sh. Abhay Raj Singh Engr Opn)	16:42
v)	Rescue team/ fire tender arrived	16:42
vi)	Evacuation mitigation started of victim and fire respectively	16:43
vii)	Arrival of work incident controller (Sh. NP Agarwal CSE)	16:45
viii)	Arrival of NTPC Ambulance at location	16:42
ix)	Termination of rescue exercise	17:15
x)	Briefing of Fire mock drill exercise at assembly point	17:20

7. Deficiencies in exercise:

Sl. No.	**Observations**	**Recommendations**
i)	Crossover path over piping not available	- To be provided for easy access near tank bund wall.
ii)	Approach for backside not available	- Permanent path required to access fire hydrant on backside of tank. Wild vegetation also need to be removed.
iii)	Wind sock not available direction.	- To be installed for approaching fire in upwind
iv)	First responders were not able to start the foam pourer system manually	- Refresher training is required to be imparted for manual operation of Foam pourer system.

8. **Additional information (If any)**
   i) Fire fighting was carried out by identified fire & rescue team.

Prepared by	**Reviewed by**
Amber Dixit (Engineer Safety)	CS Reddy (AGM Safety)

Distribution:-

To,
ES to ED (V)
Es. to CGM (O&M)
GM (Maint.,OPN, EMD, C&I,CHP,FT,FM,HR)
AC Fire-CISF

Enclosure attached: -

Snaps of Fire/Rescue/ Evacuation Mock Drill

एनटीपीसी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)

VINDHYACHAL

Snaps of Fire Mock Drill

1. **A special scheme for upliftment of SC & ST population in the study area shall be formulated and implemented in a time bound manner. The project proponent shall also identify the rights of Tribals under existing Laws and ensure its protection and implementation thereof.**

CSR activities being conducted in domain areas of **Education, Health, Skill Development and Vocational training, Rural Sports, Support to Physically Challenged persons** have benefitted the SC and ST population.

Key initiatives/ Focus areas (2014 -2020)

SNo.	Activity Head	Beneficiaries		Total
		SC	ST	
1	Education	11111	10274	21385
2	Health	10824	10519	21343
3	Skill Development	121	85	206
4	Sports	423	292	715
5	Physically Challenged Persons	38	14	52
	Total	**22528**	**21191**	**43719**

1. Education

✓ **Project Udaan –** NTPC Vindhyachal has funded Project 'Udaan' started by District Administration in 2019 with the objective to bring about quantitative and qualitative improvement in the Class X exam results that had been at below expectation level and significantly lower than the State Average. **6083 SC/ST** students of the District have been benefitted.

Project Udaan

In the first phase of Project 'Udaan' , training was imparted to Teachers during May-June '19 to equip them with strategic inputs to prepare the students for targeted based studies.

In the 2nd phase of Project 'Udaan', 13255 students studying in 144 High Schools, who appeared in Class X Board exams, have been provided with Remedial Module prepared by subject experts for 4 subjects (English, Maths, Science and Social Science). The module is to facilitate and enable the students for academic upgradation, qualitative improvement in learning and exam preparation and thereby bring out improvement in overall exam results of Class Xth.

Project Udaan (SC/ST Student Beneficiaries)						
SC			ST			Total (SC+ST)
Boys	Girls	Total	Boys	Girls	Total	
967	910	1877	1930	2276	4206	6083

Smart Tab Lab – Innovative Educational technological solution, **204 SC/ST students** benefitted.
Date driven, internet free, digital classroom for Classes 6-10

- ✓ **Film Based Teaching methodology (FBTM)** – The project was started to improve ***student learning outcomes*** in Government Primary Schools in 2018. The project entails use of a innovative Film Based Teaching Methodology **(FBTM®)** to teach Mathematics to Primary Level students of selected schools in Singrauli. A Technology Integrated Teaching Learning Interface (TITLI®) software has been installed in all schools to automate planning, delivery and monitoring of the FBTM® classes. Based on the learning levels, students were divided into two groups:
    - Group A – Slow learning speed and low attendance, Group B – Faster learning speed and regular attendance and interventions also made to ***increase school attendance***. English, Vocational and creative activities and 'Bal Sansad' were also conducted.

    - Project was started at 5 Govt. Primary school and now extended to 10 more Govt. Primary school through NGO- Bharat Learn. **Total 883 SC/ST students have been benefitted in 2 batches 2018-19 and 2019-20**.

- ✓ **Girl Empowerment Mission (GEM)** – **106 girls** of **SC/ST category** benefitted wherein under this ***Transformational Project first started at NTPC Vindhyachal amongst all NTPC stations,*** Class V girls (Age-10-12 yrs) were exposed to month long activity based learning and also various life skills coaching, self defence, counselling on various health issues , yoga , sports , computers , music dance, art & craft etc., fields/ areas which are generally not taught in their schools, to give them holistic perspective of life. 2 batches of 2018 and 2019 have participated. ***As part of inclusive education, 20 meritorious girls (9 are SC/ST) of GEM batch 2018 and 2019 are being educated in DPS & DePaul School and full expenses are being borne by NTPC***.

Personality Workshop for Govt Schools – **326 SC/ST** students have benefitted

Grassroots

Embodying hope while raising questions about rehabilitation

School Infrastructure and Stationary, celebration of Independence and Republic Day – School Furniture, water coolers etc have been provided to schools as per requirement. 13143 SC/ST students benefitted.

Asha Kiran School (***for deaf and dumb children***) is run by Suhasini Sangh (Ladies Club) and financial support provided by NTPC Vindhyachal. **18 SC/ST** students have studied in the school in past 5 years.

Solar lanterns have been distributed and **262 SC/ST students** have been benefitted

NTPC Urjanchal Scholarship was provided till 2016 and **305 SC/ST** students (Class V to XII and MBBS/ Engg students) benefitted and **NTPC Utkarsh Scholarship** has been provided to **3 SC/ST** students

2. Health

- ✓ **Medical & Health Camps** such as **General Health camp, Eye Camp, Family Planning Camp** are conducted wherein the patients are provided free consultation and medicines and also surgeries done and referred to Vindhya hospital in case further investigation and treatment of the patient is required. Blood Bank is also operational through Red Cross Society.
- ✓ Under '**Transform Singrauli' Ante Natal Camps** (for pregnant ladies and new mothers and babies)have also been organised wherein **Gur chana** has been distributed in 18 Gram panchayat and 2 wards of 'Aspirational district' as organic nutritional supplement so that iron levels of the mother and child are boosted for their well being. **7718 SC/ST patients benefitted under various Medical camps.** Even in COVID times the distribution of Gur chana amongst Pregnant women is being carried out through an NGO maintaining social distancing norms.

✓ **Mobile Health Van** operates for providing medical services and **13625 SC/ST patients benefitted**

3. Skill Development and Vocational Training

✓ Various Skill Development and Vocational Training programs such as Bag Making, Masala making, Crusiya Training, Computer Training , ***Artefact making with Ash and Gypsum*** have been organised in which **96 SC/ST** participants have benefited. NTPC Vindhyachal in partnership with SEWA Bharat, an NGO extended skill development and capacity building trainings such as Detergent, Agarbatti, soap, phenyl making, Potteries and terracotta product making, Tailoring, Beauty Parlor management, Mushroom, Bedside Nursing, Sanitary napkin manufacturing, Dona Pattal making and Computer training have been organised to the women of Singrauli with a vision of making them Self Sustainable. Formed a women's cooperative named 'Udhyogini'. Besides Social Security Linkages, Digital Financial Literacy Camps and trainings have also been conducted.

Activity	ST	SC	Total
Livelihood Trainings	41	66	107
Social Security Linkages beneficiaries	1098	1942	3040
Digital Financial Literacy Camps	269	327	596
Digital Financial Literacy Training	25	52	77
Total	**1433**	**2387**	**3820**

Lalita Saket (SC category) is a success story. After completing her training, Saket managed to earn Rs 3,000-5,000 every month by tailoring clothes for the people living in her neighbourhood and is now earning upto Rs. 9000/- per month. A sound entrepreneur, Lalita also set aside a part of her earnings every month to invest in a second stitching machine. She now plans to expand her business, which is currently stationed in her mother's room, by passing on the skill of stitching to her eldest daughter, who has completed her formal education.

SEWA Bharat – Success Stories & Sustainable beneficiaries

Sn	Name of beneficiary	Trade/ scheme Name	Category	Earning/Benefited amount
Skill and livelihood beneficiaries				
1	Ms Lalita Saket	Stitching	Schedule caste	9000 per month
2	Ms Babita Saket	Beauly culture	Schedule caste	3000-3500 per month
Social Security Beneficiaries				
3	Ms Richvai Devi Verma	Widow pension Scheme	Schedule Tribal	600 Rs per month
4	Ms Anuran Pandey	Old-age Pension	Other Backward Caste	600 Rs per month
5	Ms Navali Vishkarna	Ujjawal Gas scheme	Other Backward Caste	Getting Gas cylinders on subsidies rates.

In COVID times besides food relief material distribution, Sanitary and Delivery pads have been distributed amongst rural women and **48 SC/ST** women benefitted.

Rural Sports & Inter School Sports Meet – 715 SC/ST students have participated in Athletics Coaching camps, Inter School Sports Meets and Volleyball/ Football/ Cricket tournaments.

Meritorious girls (***Saket sisters who belong to SC category***) attended the Inter School Sports Meet organised by NTPC Vindhyachal in 2017 and thereafter participated in the Athletics coaching camps for the meritorious participants. As these girls had exceptionally performed in Sports and also had good Academics grades, NTPC Vindhyachal has sponsored their education for Class XI and XII and admitted them to Saraswati Vidya Mandir, in NTPC Vindhyachal campus, to provide them better opportunities for education and participation in Sports events. Their entire educational expenses including school fees, books, school dress and participation in Sports events of these meritorious girls has been borne by NTPC Vindhyachal and they have also been provided Bicycles.

Success stories of 3 teenaged girls

PIONEER NEWS SERVICE ■ VARANASI

Sometimes, all one needs is someone to help them reach the greatness they are ready to achieve. Tales of failure are often woven around a single link of support, one that helps the person to showcase one's best potential. A similar story is about Kusum, Rajni and Mamta Saket, three 16-year-old girls who took the first step of their lives in athletics and today they recognise the sport as their identity.

In 2016, three girls studying in a government school in Singrauli district of Madhya Pradesh came to know about the Rural Sports Meet to be held at Vindhyachal Super Thermal Power Project (VSTPP) of NTPC. These girls, who belong to poor families and earnestly live with their daily wage parents, were hesitant to participate in the first rural sports meet. Yet with uncertain steps, these girls made their way to participate in the rural sports meet organised for 24 government schools at Ambedkar Stadium in NTPC-Vindhyachal Township. VSTPP selected these three girls along with 67 other students to participate in the athletics coaching camp, who with their courage and determination performed better in the Rural Sports Meet, made their place in athletics coaching camp and then did not look back.

The girls attended a coaching camp organised by VSTPP from year to year to hone their skills and understand the finer points of the game. Practicing for three years under the guidance of expert coaches from the National Institute of Sports (NIS) and the Singrauli District Athletics Association, the girls left no stone unturned in their endeavours and overcame all obstacles in their path, the girls practiced day and night and devoted themselves to sports.

In this journey, VSTPP cooperated at every step and held hands. It helped the budding sports champions to take care of their nutritional needs and excel at every step of the way by providing them sports kits, bicycles for commuting. Girls who had once hesitated to step outside their comfort zone, now competed in district, state, regional and national level athletics competitions across the country.

Kusum Saket has a total of 17 gold medals apart from four silver and one bronze. She won two gold medals and one silver in regional athletics competitions organised for Madhya Pradesh and Chhattisgarh by Vidya Bharati All India Institute of Education affiliated to School Games Federation of India (SGFI). She also won five gold medals in the state level athletics competition. Similarly Rajni Saket won one gold, silver and bronze each in regional level athletics competition, while for gold in state level competitions. Mamta Saket won three gold and one silver in the state level competition apart from one gold and one silver in the regional level competition.

'I love competing in championships and it is the most gratifying feeling in the world to see the proud eyes of my parents and teachers. The word 'thank you' cannot be filled with gratitude, because it is not possible to express in word the gratitude I feel to NTPC-Vindhyachal for introducing me to athletics. I have spent my whole life in this sport. I want to dedicate to it further, said an excited Rajni.

'The girls performed very well by securing first class in their class X board exams. They earnestly try to achieve their goals by practicing for hours on the field along with the studies.

VSTPP got these girls admitted to the Saraswati Shishu Mandir School and also sponsored their education based on their outstanding performance on the field and their excellent academic record, so that they can get their education better. With the support of such a column by NTPC-Vindhyachal, these girls can realise their dreams of making Singrauli district on the Indian map.

Three successful rural girls of VSTPP area — Pioneer

Physical Aids for Physically Challenged persons (PCPs) –Artificial limbs, Caliper, Crutches, tricycles have been distributed wherein **48 SC/ST PCPs** have benefitted

4. It shall be ensured that an in-built monitoring mechanism for the CSR schemes identified is in place and annual social audit shall be got done from the nearest government institute of repute in the region. The project proponent shall also submit the status of implementation of the scheme from time to time.

Answer

Board level CSR Committee ensures operating system and monitoring mechanism for development and implementation of CSR activities.

1. At Station level, CSR review is done mandatorily during Monthly ORT meeting, wherein HOP and senior management team monitors the progress of CSR activities.
2. Annual CSR Audit is conducted by Regional HQ and Annual CSR meet is held to discuss, deliberate and plan for CSR activities
3. a. Need Assessment survey is conducted for a 5 year time horizon, NAS was conducted in 2015-16 and shall now be conducted in 2020-21
   b. Social Impact Evaluation (SIE) is conducted on 3 year Time horizon. Last SIE was conducted in 2017-18 and shall now be conducted in 2020-21 through institutions of repute like Ernst and Young/IIMs/PWC/IRMA etc.

   The annual CSR spend in various domains like Education, Health & Sanitation and animal husbandry, Vocational Training, Infrastructure, Water, Sports/Art & Culture, Maintenance of Assets, and Strategically Important Activity from FY 2010-11 onwards till FY 2019-20 is as given below:-

FY (2010 onwards)	CSR Spend (Rs. Lakhs)
2010-11	47.03
2011-12	111.98
2012-13	89.47
2013-14	179.19
2014-15	479.79
2015-16	2521.28
2016-17	1668.83
2017-18	595.71
2018-19	916.67
2019-20	954.74

In addition to the CSR initiatives of Education, Health and Skill Development and Vocational training, that have benefitted the SC/ST population, the following CSR initiatives have also benefitted the community at large:-

4. Construction of roads, community centres, public health centres, Aaganbadi kendras etc.

- Integrated Water Supply Scheme for Waidhan
- District Disability Rehabilitation center (DDRC) has been constructed
- Under Construction – **Adivaasi Chaatravaas (100 bedded Girls hostel for Tribal girls)at Khanua**
- Under Construction - Stadium at Patulkhi & Khutar & Kanchan Bridge
- Concrete Road along with Drains of length 22 KM in Waidhan area
- Renovation of 23 Govt. Schools in nearby villages/wards:
- Construction of 18 Anganwadis

5. Construction of utility buildings like bus stand, panchayat kendras, rest shelters etc.
6. Organizing Kisan mela and animal welfare camps for farmers.
7. Swatcha Rally and Competitions like essay, painting, conducted during Swatchta Pakhwada
8. Camps for Physically Challenged Persons
9. 8 nos. Community Toilets have been constructed at various locations

Financial assistance has been provided for **Deen Dayal Rasoi Yojana**, a community kitchen and canteen (**Annapurna Kachra exchange Café**) started by Nagar Palika Nigam wherein in exchange for kachra (polythene waste) collected by the BPL persons, they are provided fooding.

29. Industry shall regenerate the village ponds/surface water bodies located within 5 km radius of the project site as a part of its social welfare activities.

Regeneration and beautification of Ponds has been done at Dhonti, Gahilgarh and Saraswah Lal and 415 handpumps have been installed at various locations

ENVRIONMENTAL STATEMENT OF NTPC VINDHYACHAL

YEAR: 2019-20

विंध्याचल
Vindhyachal
भारत का वृहदतम ताप विद्युत गृह
Largest Thermal Power Station of INDIA

NTPC LTD., VINDHYACHAL SUPER THERMAL POWER STATION
PO: Vindhyanagar, District Singrauli-486885, Madhya Pradesh, India

PART - H

Additional measures / investment proposal for environmental protection including abatement of pollution

Capital Expenditure (as on 31.03.20):

Description	Expenditure (Rs. / Lacs)
ESP	100624
ESP (Renovation & Moderination)	22618
Ash Water Recirculation system & Ash Handling system	40068
Flue Gas Desulfurization Plant	28158
DeNOx System	187
STP & ETP	1268
Chlorine Leakage Absorption System	17
EQMS	135
CEMS	347
AAQMS	35
Solar Power Plant	75
LED fixing	674
STP New	769
CCTV Camera	3
Total	194978 Lacs

Recurring Expenditure (2019-20):

Description	Expenditure (Rs. / Lacs)
Tree Plantation	123
AMC for AAQMS	32
AMC For EQMS	6
AMC for CEMS	13
Consent Fee	593
LWTP running expenses	28
Resin Disposal cost	8
STP running expenses	20
Third Party Monitoring Charges	18
Environmental Studies	155
Environment Day Celebrations & Env. Award application fees	4
LogicLadder communication	2
Total	1002 Lacs

EC COMPLIANCE STG V
(Jan-June'20)

Monitoring the Implementation of Environmental Safeguards

Ministry of Environment & Forests

Western Region, Regional Office Bhopal

MONITORING REPORT PART-I

DATA SHEET

S. N.	Description	
1.	Project Type: River-valley/ Mining/ Industry/ Thermal/ Nuclear/ Other (specify)	Thermal
2.	Name of the project	Vindhyachal Super Thermal Power Project, **Stage-V (1x500 MW)**
3.	Clearance letter(s)/ OM No. and date	MoEF vide letter No. J-13012/06/2009/-IS.II (T) dated 02.05.2012
4.	Location:	
		Singrauli
		Madhya Pradesh
	Location Latitude/ Longitude	Latitudes of 24^0 04'58" - 24^0 06'19" N Longitudes 82^0 38'34" - $82^{0\,41}$'29" E
5.	Address for correspondence:	Executive Director, Vindhyachal Super Thermal Power Project, Vindhyanagar, Dist Singrauli, (M.P.) Pin 486885
	Address of the Concerned Project Chief Engineer (with Pin Code and Telephone/ Telex/ Fax numbers)	Executive Director,, Vindhyachal Super Thermal Power Project, Vindhyanagar, Dist Singrauli, (M.P.) Pin 486885. Ph. 07805-247710, Fax 07805-247711
	Address of the Executive/Project Engineer/ Manager (With Pin Code & Telephone/ Telex/ Fax numbers)	Same as above

6.	Salient features:	
	a. Of the project	i) Coal based Thermal Power Plant with sub-critical boiler and enhanced steam parameters ii) Cooling Water source is outfall channel of NTPC ShaktiNagar which in-turn draws water from Rihand Reservoir. iii) All coal transportation is by means of Rail only with majority of transportation being done through NTPC-owned racks through MGR (Merry-Go-Round system). A Copy of Feasibility Report is already submitted.
	b. Of the Environmental Management Plans	i) Tall stack (275 m) for wider dispersion of flue gases. ii) High Efficiency ESP. iii) Integrated Flue Gas Desulphurisation Unit iv) Stack installed with CEMS (Continuous Emission Monitoring System) for monitoring PM, SOx, NOx. v) Effluent Treatment Plant (ETP), Sewage Treatment Plant (STP) and Ash Water Recirculation Systems are in place to ensure 100 % process water recirculation. A Copy of EIA/ EMP Report is already submitted.
7.	Break-up of the project area:	Total area of all stages of Vindhyachal project is 5999 acres including Stage -V (1x500MW).
	a. Submergence area: forest & non-forest	No submergence area and forest land involved in construction of Stg V.
	b. Others	5048 acres [for all stages (I to V)]
8.	Breakup of the project affected population	No additional land was acquired for Stg V. Hence no PAPs involved.

9.	Financial details:	
	a) Project cost as originally planned and subsequent revised estimates and the year of price reference:	
	b) Allocation made for environmental management plans	~ Rs.2000 Crore (Total for all stages of VSTPS since many facilities are common) Stg V – 620.18 crores
	c) Benefit cost ratio/ internal rate of Return and the year of assessment	
	d) Whether it includes the cost of environmental management as shown in the above	Yes
	e) Actual expenditure incurred on the project so far (as on 31/03/2020)	Rs.3104.72 Crore.
	f) Actual expenditure incurred on the environmental management plans so far (upto 31.03.2020)	~ Rs.2390 Crore (Total for all stages of VSTPS since many facilities are common)
10.	Forest land requirement:	No additional land was acquired for main plant, township or ash disposal for stage –V. The main plant and township area for expansion unit under stage-V (1x500 MW) is accommodated within the land acquired under VSTPP, Stage-I, II,III & IV. Hence, no additional forest land involved was acquired.
11.	The status of tree felling in non-forest area (such as submergence area or reservoir, approach roads), if any with quantitative information required.	-----
12.	Status of Construction (actual and/or planned)	
	Date of commencement (actual)	Date of Main Plant Award 03.05.2012
	Date of completion (Actual)	August’ 2015
13.	Reason for the delay in the project is yet to start.	-

S.No	EC Conditions	Compliance Status
a.	**Specific Conditions**	
I	Scheme for implementation for harnessing solar power within the premises of the plant particularly at available roof tops shall be formulated and status of implementation shall be submitted to the Regional office of the ministry from time to time.	Process of harnessing solar power is being aggressively pursued. Total 569 kw of Solar Rooftop power commissioned. Another 450 Kw expected to be commissioned by Mar'21. Labour gate to stage -1 building total street light replaced by solar light. NTPC Shopping complex in township total lights replaced by solar lights.
II	FGD shall be installed for the proposed expansion unit.	FGD installed and operational. 
III	The project proponent shall undertake measure and ensures that no fugitive fly ash emissions take place at any point of time	Provision is as per the condition stated. In ash pond, water sprinkling system is in place and minimum water cover is maintained to control the fugitive emission from the ash pond areas. In dry ash SILOs, water curtain in installed to control fugitive dust emission. Movable chute at SILO outlet ensures that it fits directly into the opening of the ash bulkers so that fugitive dust does not escape out.

<table>
<tr><td></td><td></td><td>  </td></tr>
<tr><td>IV</td><td>Stack of 275m height shall be installed and provided with continuous online monitoring equipments for Sox, NOx, and PM2.5 & PM_{10}. Exit velocity shall not be less than 22 m/sec. Mercury emissions from stack may also monitored on periodic basis.</td><td>A twin flue stack of 275 m height have been provided for wider dispersal of the particulate & gaseous emissions. Continuous Emission Monitoring System for SOx, NOx, SPM is installed and connected to CPCB/MPPCB servers. Online Monitoring equipment for Hg is also installed.
Exit flue gas velocity for Jan - Jun'20 period is 21.9 – 22.4 m/s (third party sampling report attached as Annexure-V -1). The variation in velocity is mainly attributable to combustion parameter variations, part-load operation and increase in air ingress in Induced draft fan suction (the air ingress points are attended during Unit shutdowns/overhauls).</td></tr>
<tr><td>V</td><td>High efficiency Electro Static Precipitators (ESPs) shall be installed to ensure that particulate emission does not exceed 50 mg/NM3.</td><td>ESP design particulate emission is < 50mg/Nm3 and the limit is being adhered to. ESP Efficiency is more than 99.9 %.
<table><tr><td>Parameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr><tr><td>SPM (Mg/Nm3)</td><td>43</td><td>46</td><td>45</td></tr></table></td></tr>
</table>

VI	Monitoring of surface water quality and quantity 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.	Surface water is being tested on regular basis in our lab (approved by MPPCB-Bhopal). Surface water consumption records are maintained on daily basis and quarterly Reports are sent to CPCB (Report for Jan-Mar'20 quarter and financial year 2019-20 is attached as **Annexure V-6**). Waste water quantity & quality is also being monitored and records are maintained. Analysis of Heavy metal in surface water is also done periodically. Waste water quality reports are submitted to MPPCB and CPCB on monthly basis. Sample third party testing report is attached as **Annexure-V-2**.
VII	Regular monitoring of ground water level shall be carried out by establishing a network of existing wells and constructions new Piezometers. Monitoring around the ash pond area shall be carried out particularly for heavy metal (Hg, Cr, As, Pb) and records maintained and submitted to the regional office of this Ministry. The data so obtained should be compared with the baseline data so as to ensure that the ground water quality is not adversely affected due to the project. No water shall be extracted for use in operation of the power plant in lean seasons.	The Plant is not using any ground water for its operation hence no adverse effect on the ground water is possible. However, ground water level measurement will be done to establish a general trend for the area. Analysis of Heavy metal in ground water in the areas around the ash dyke area is being done on regular basis. Report is attached as **Annexure –V-3**
VIII	A well designated rainwater harvesting shall be put in the place before commissioning of the plant. Central ground water Authority/Board shall be consulted for finalization of appropriate rainwater harvesting technology /design within a period of three months from the date of this clearance and details shall be furnished. The design of rain water harvesting shall comprise of rain water collection from the built-up area and open areas in the plant premises. Action plan road map for implementation shall be submitted to the ministry with in six months.	Installation of Rain Water Harvesting in Township Public Buildings is in progress; expected completion Mar'21. Feasibility study for installing rain water harvesting system in Plant area is in progress. Report expected by Sep'20. . However, station is constructing three large number of reservoirs inside the Plant premises which will serve the purpose of rain water conservation. This work is likely to be completed by Oct'21. Earlier in 2015, Feasibility study has been carried out by M/s Rajmi Exploration & Engg Ltd, Indore in consultation with Central ground water authority Bhopal in 2015. As per that study, groundwater recharging through rain water harvesting was not feasible because of the very high ground level in the Plant area. **(Annexure-V-4)**
IX	Waste water generated from the plant shall be treated before discharge to comply limits prescribed by the SPCB.	Waste water Generated in the existing plant is being treated through ETP up to the prescribed limits. The treated water is being reused as service water for equipment cooling and cleaning purposes. The water quality parameters are being monitored and maintained in the prescribed limits of MPPCB. Monthly analysis reports are being sent to MPPCB-Bhopal.

<table>
<tr><td></td><td></td><td>ETP treated effluent water quality data for the period Jan-June’20:-<table><tr><td>Parameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr><tr><td>BOD (mg/lit)</td><td>14.80</td><td>18.25</td><td>16.58</td></tr><tr><td>COD (mg/lit)</td><td>71.25</td><td>75.00</td><td>72.68</td></tr><tr><td>Suspended solid</td><td>26.67</td><td>29.86</td><td>27.83</td></tr><tr><td>Oil & Grease</td><td>2.93</td><td>4.88</td><td>4.26</td></tr><tr><td>Temperature 0 C</td><td>20.69</td><td>31.09</td><td>26.96</td></tr><tr><td>pH</td><td>7.46</td><td>7.51</td><td>7.49</td></tr></table></td></tr>
<tr><td>X</td><td>COC of 4.0 shall be adopted.</td><td>Complied. Data for Jan-June’20:<table><tr><td>Parameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr><tr><td>COC</td><td>3.99</td><td>4.55</td><td>4.29</td></tr></table></td></tr>
<tr><td>XI</td><td>Coal transportation to plant site shall be undertaken by rail and no road transportation shall be permitted.</td><td>Coal transportation is being done only through Rail only. NTPC Vindhyachal has got its own MGR system so all transportation is being done through MGR only.</td></tr>
<tr><td>XII</td><td>Sulphur and ash contents in the coal to be used in the project shall not exceed 0.5% and 34 % respectively at any given time. In case of variation of coal quality at any time fresh reference shall be made to the ministry for suitable amendments to environmental clearance conditions wherever necessary.</td><td>For the period Jan-June’20 average Ash content in coal is 34.97 % and Sulphur is less than 0.36 % as per condition stated.</td></tr>
<tr><td>XIII</td><td>A detailed study on chemical composition of coal used particularly heavy metal and radio activity contents shall be carried out through a reputed institute and report shall be submitted to the Region Office of the Ministry. Only after ascertaining its radioactive level fly ash shall be utilized for brick manufacturing.</td><td>Heavy metal study for ash conducted by NEERI.
Radio activity levels for ash checked by BRIT and found acceptable. Relevant excerpts of the Report attached as Annexure V-7</td></tr>
<tr><td>XIV</td><td>Fly ash shall not be used for agriculture purposes. No mine void filling will be undertaken as an option for ash utilization without adequate lining of mine with suitable media such that no leachates 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</td><td>Noted. Directives issued vide MoEF OM dtd 28/08/2019 will be followed.</td></tr>
</table>

	Board and implementation shall be done in close co-ordination with the SPCB.	
XV	Utilization of 100% fly ash generated shall be made 4th year of the operation. Status of implementation shall be reported to the Regional office of the Ministry from time to time.	Ash utilization (2019-20) for the station was 32.1 %. Efforts are afoot to improve it continuously. Vindhyachal being located amidst a cluster of power plants and in a remote location, low demand for fly ash, high transportation cost and lack of infrastructure for bulk transport of ash is adversely affecting our efforts.
XVI	Fly ash shall be collected in the dry form and storage facility (Silos) shall be provided. Unutilized fly ash shall be disposed off in the ash pond in the form of slurry. Mercury & Other heavy metals (As, Hg, Cr. Pb. Etc.,) will be monitored in the bottom ash also in the effluent emanating from the existing ash pond. No ash shall be disposed off in low lying areas.	Dry ash system and SILO in place. Unutilized fly ash is being disposed off in the ash pond in the form of slurry. Mercury & Other heavy metals (As, Hg, Cr. Pb. Etc.) being monitored in the bottom ash and also in the effluent emanating from the existing ash pond. Toe drain water test report of Mar'20 for dyke 4A is attached as **Annexure V-8** as sample.
XVII	Ash pond water shall be re-circulated and utilized. Ash pond shall be lined with HDPE/LDPE lining or any other suitable impermeable media such that no leachates take place at any point of time. Adequate safety measures shall also be implemented to protect the ash dyke from getting breached.	100% ash water recirculation being done. Ash pond was lined with an impervious layer of bentonite mixed with clay to prevent leachate.

XVIII	Greenbelt consisting of 3 tier of plantation of native species around the plant of at lease 50 m width shall be raised (except in area not feasible). The density of trees shall not be less than 2500 per ha and rate of survival at least 80%, additional greenbelt of appropriate density and width not less than 50m at least, shall be also developed between the ash pond and the village facing the ash pond.	Every year, NTPC Vindhyachal is planting more than 20,000 nos. of tree in and around the plant area. Additionally, 50000 trees are also planted every year through MPRVVN for which an MOU has been signed with them for next ten years (from 2016-17). In financial year 2019-20, more than 72000 saplings have been planted by NTPC-Vindhyachal. NTPC-Vindhyachal has developed the green belt around the plant as well as in the ash dyke area. Till June'20, about 23.7 lac trees have been planted over an area of about 3000 acres out of which about 2200 acres area is in and around NTPC Vindhyachal premises with plantation of about 22 lac trees (density works out to be ~ 1000 trees/acre or ~ 2500 trees/hectare). 

XIX	A special scheme for enlistment of SC & ST population in the study area shall be formulated and implemented in a time bound manner. The project proponent shall also identify the rights of Tribal's under existing laws and ensure its protection and implementation thereof.	Noted for compliance. SC/ST upliftment schemes in place. Details as per **Annexure V-9**.
XX	The Project proponent shall also adequately contribute in the development of neighboring village. Special package with implementation schedule for providing potable drinking water supply in the nearby villages and schools shall be undertaken in time bound manner.	Regularly developmental activities are taken up in the neighbouring areas. CSR initiatives in Infrastructure Development, Medical facilities, Education, Health and Skill Development and Vocational training etc are regularly taken up. A brief on the same is attached as **Annexure V-10**. Integrated Water Supply scheme in collaboration with Nagar Palika Nigam, Singrauli was implemented for which Rs.9 crore were given to Nagar Palika Nigam, Singrauli. The money was used for laying pipelines, constructing overhead water tanks etc. and in 16 wards 11599 tap connections have been provided.  

		In order to provide safe drinking water in the nearby communities, NTPC CSR/R&R has installed 415 hand pumps till date in the nearby villages and communities.  4 RO plants and 1 Water ATM have been set up in the neighbourhood and 1 more ATM is under installation. 

XXI	CSR scheme should address Public hearing issues and shall be undertaken based on need based assessment in and around the village within 5.0 km of the site and in constant consultation with the village panchayat and the District Administration. As part of CSR prior identification of local employable youth and eventual employment in the project after imparting relevant training shall be also undertaken.	Public hearing issues are being addressed; under implementation in consultation with gram panchayat & Distt. Administration. Employment being provided to the Project Affected People by outsourcing of some jobs through various man power contracts. 242 project affected people (PAPs) have been given permanent employment over the years during Stage 1 and 2. Other than this, most of the contract employees engaged in NTPC Vindhyachal are from local areas engaged through Cooperative societies or otherwise. NTPC Vindhyachal has organised several training programmes over the years for eventual employment of the youth. In the year 2018-19, NTPC collaborated with an NGO SEWA Bharat in order to engage more effectively in providing vocational training to the employable youth of the local communities. Therefore, from the year 2018 to till date, several training programmes have been organised in different domains. Agarbatti making training was provided to 71 women, Detergent making training was provided to 40 women, Terracotta training was provided to 53 women, Tailoring/Stitching training was provided to 80 women, Mushroom training was provided to 20 women, Beauty parlour training was provided to 26 women, Bedside Nursing training was provided to 40 women, Computer Literacy training was provided to 30 women, Sanitary Pad making training was provided to 40 women, and Dona-Pattal making training was provided to 29 women. In the year 2014-15, Bag Making training was provided to 80 women in two batches. A Computer training diploma programme of one year is being for 20 girls every year since 2014-15. In the year 2016-17, Bag Making training was provided to 80 women in two batches and another Masala Making & Food Processing training was provided to 35 women. In the year 2017-18, Crotia Training was provided to 40 women in two batches and Bag Making training was again provided to 80 women in two batches. Other than this, Training program was also organised for making Artefacts with ash & Gupsum for Rural Boys of the nearby communities. This training was organised

		in two batches having 10 participants in each batch.  Need Assessment survey is conducted for a 5 year time horizon, NAS was conducted in 2015-16 and shall now be conducted in 2020-21
XXII	It shall be ensured that an in-built monitoring mechanism for the CSR scheme identified is in place and annual social audit shall be got done from the nearest government institute of repute in the region. The Project proponents shall also submit the status of implementation of the scheme from	Board level CSR Committee ensures operating system and monitoring mechanism for development and implementation of CSR activities. 1. At Station level, monthly CSR review is done by HOP and senior

	time to time. The achievements should be put on company's website.	management to monitors the progress of CSR activities. 2. Annual CSR Audit is conducted by Regional HQ and Annual CSR meet is held to discuss, deliberate and plan for CSR activities 3. a. Need Assessment survey is conducted for a 5 year time horizon, NAS was conducted in 2015-16 and shall now be conducted in 2020-21 b. Social Impact Evaluation (SIE) is conducted on 3 year Time horizon. Last SIE was conducted in 2017-18 and shall now be conducted in 2020-21 through institutions of repute like Ernst and Young/IIMs/PWC/IRMA etc.
XXIII	An amount of Rs 11.20 Crores shall be earmarked as one-time capital cost for CSR programme as committed by the project proponent. Subsequently a recurring expenditure of Rs 2.20 Crores per annual shall be earmarked as recurring expenditure for CSR activities.	Being complied. Annexure V-10 provides the details of annual CSR spend.
XXIV	An Environmental cell shall be created at the project site itself and shall be headed by qualified officer, who is well versed with the environmental aspects. It shall be ensured that the Head of the Cell Shall directly report to the head of the Organization.	An Environmental cell has been created at the project site with HOD at the level of Addl. General Manager.
a.	**General Conditions**	
I	The treated effluents confirming to the prescribed standards only shall be re-circulated and reused within the plant. Arrangement shall be made that effluents and storms water do not get mixed.	Treated water from ETP conforms to the prescribed limits. The treated water is being reused in the plant processes only. The water quality parameters are being monitored and maintained in the prescribed limits of MPPCB. All the ash water used to transport ash from plant to ash dyke in slurry form is recirculated using Ash Water Recirculation System (AWRS). Drain separation work is under tendering and is expected to be completed by Oct'21.
II	A Sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising greenbelt/plantation.	6 MLD capacity STP is under operation. Treated water from sewage plant is being used for horticulture.

<table>
<tr><td></td><td></td><td>STP quality data for the period Jan-June’20:-
<table>
<tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>BOD (mg/lit)</td><td>21.60</td><td>23.50</td><td>23.09</td></tr>
<tr><td>COD (mg/lit)</td><td>77.00</td><td>81.75</td><td>80.23</td></tr>
<tr><td>Suspended solid</td><td>64.93</td><td>73.68</td><td>69.99</td></tr>
<tr><td>Oil & Grease</td><td>3.95</td><td>5.64</td><td>4.96</td></tr>
<tr><td>Temperature 0 C</td><td>20.95</td><td>32.28</td><td>26.99</td></tr>
<tr><td>pH</td><td>7.53</td><td>7.60</td><td>7.56</td></tr>
</table></td></tr>
<tr><td>III</td><td>Adequate safety measure shall be provided in the plant area to check/minimize spontaneous fires in coal yard, especially during summer seasons. 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.</td><td>The plant has been provided with adequate automated fire protection system. Fully equipped CISF manned central fire control station is in place.
NTPC Vindhyachal has the onsite & off site emergency plan for mitigation of control of fire and explosion hazards arising due to transportation, use of storage of coal and oil.
CHP fire safety measures, as documented in the Local Management Instructions, are attached as Annexure V-11.</td></tr>
<tr><td>IV</td><td>Storage facility for auxiliary liquid fuel such as LDO/HFO/LSHS shall be made in the plant area consultation with the department of Explosives, Nagpur; Sulphur content in the liquid fuel will not exceed 0.5%. Disaster Management plan shall be prepared to meet any eventually in case of an accident taking place due to storage of oil.</td><td>Storage facility created as per EC conditions.
Liquid fuels with sulphur content < 0.5 % not available.
NTPC Vindhyachal has the disaster management approved by the nation safety council for any kind of emergency plan and in case of any accident taking place. Measures dealing with oil storage accidents are elaborated in Annexure V-12.</td></tr>
<tr><td>V</td><td>First Aid and sanitation arrangements shall be made for the drivers and others contract workers during construction phase.</td><td>First Aid and sanitation arrangements are available at site.</td></tr>
<tr><td>VI</td><td>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 equipments like earplugs/ear muffs etc. shall be provided. Workers engaged in noise areas such as turbine area, air compressors etc shall be periodically examined to maintain audiometric record and for treatment for hearing loss including shifting to non noisy /less noisy areas.</td><td>Acoustic enclosures have been provided to control the noise level below regulatory norms & personal protective equipment have been provided wherever required.
<table>
<tr><td>Location</td><td>Parameter</td><td>Min</td><td>Max</td><td>Avg</td></tr>
<tr><td>Turbine floor St#5</td><td>Noise (dB(A)</td><td>66</td><td>72</td><td>70.0</td></tr>
</table>
Sample Monitoring Report for June’20 is attached as Annexure V-13.

Regular health checkup of all employees is being done which includes ENT examination also.</td></tr>
<tr><td>VII</td><td>Regular monitoring of ambient air ground level concentrations of SO2, NOx, PM2.5 & PM10 and Hg shall be</td><td>NTPC-Vindhyachal has installed automatic Ambient Air quality monitoring station in all four directions and at various locations prescribed by MPPCB-Bhopal for</td></tr>
</table>

<table>
<tr><td></td><td>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.</td><td>monitoring of SO2, NOx, and PM2.5 & PM10. Offline monitoring of all parameters, including Hg is also being done.
Ambient Air quality data for the period Jan-June’20:
<table>
<tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>PM10</td><td>75.20</td><td>91.29</td><td>84.16</td></tr>
<tr><td>PM2.5</td><td>40.57</td><td>52.42</td><td>45.54</td></tr>
<tr><td>SOX</td><td>20.10</td><td>25.20</td><td>22.83</td></tr>
<tr><td>NOX</td><td>20.10</td><td>24.11</td><td>21.67</td></tr>
<tr><td>Hg</td><td colspan="3">Below Detectable Limit (< 0.1 µg/m3)</td></tr>
</table>
Monitoring Reports are being submitted to CPCB on quarterly basis and to MPPCB on monthly basis.
Third party monitoring report for outside plant (Impact Zone) for March’20 is attached as Annexure V-13</td></tr>
<tr><td>VIII</td><td>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.</td><td>Provision made as per the EC condition.</td></tr>
<tr><td>IX</td><td>The Project proponent shall advertise in at least two local news paper widely circulated in the region around the project, one of which shall be in the vernacular within seven days from the date of this clearance letter, informing that the project has been accorded environmental clearance and copies of clearance letter are available with the State pollution control board/committee and may also be seen at website of the ministry of Environment & Forest at http://envfor.nic.in.</td><td>Advertisement as per the conditions has already been done.</td></tr>
<tr><td>X</td><td>A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila parishad/Municipal corporation, Urban local Body and the local NGO, if any from whom suggestions/representations, if any, received while</td><td>Copy of EC letter has been sent as per EC condition.</td></tr>
</table>

<table>
<tr><td></td><td>processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.</td><td></td></tr>
<tr><td>XI</td><td>The proponent shall upload the status of compliance of the stipulated environmental clearance conditions, including results of monitored data on their website and shall simultaneously be sent to the Regional Office of MoEF, The respective zonal officer of CPCB and the SPCB. The criteria pollutant level namely: SPM, RSPM, (PM2.5, PM10) SO2, NOx (Ambient levels as well as stack emission) shall be displayed at a convenient locations near the main gate of the company in the public domain.</td><td>Provision of ambient air quality monitoring through online has been made available to CPCB directly (PM2.5, PM10 SO2, NOx.). Display has also been provided at the Township and Plant gate. For on line stack monitoring CEMS has been installed in stack for monitoring of SOx, NOx, and SPM.
Six Monthly compliance reports of EC is being submitted to the Regional office of MoEF, & MPPCB and uploaded on the website of the company.
 

Digital Display Board At Main Gate
Ambient Air quality data for the period Jan-June’20:
<table>
<tr><td>Prameter</td><td>Minimum Value</td><td>Maximum Value</td><td>Average Value</td></tr>
<tr><td>PM10</td><td>75.20</td><td>91.29</td><td>84.16</td></tr>
<tr><td>PM2.5</td><td>40.57</td><td>52.42</td><td>45.54</td></tr>
<tr><td>SOX</td><td>20.10</td><td>25.20</td><td>22.83</td></tr>
<tr><td>NOX</td><td>20.10</td><td>24.11</td><td>21.67</td></tr>
</table></td></tr>
<tr><td>XII</td><td>The Environmental statement for each financial year ending 31st March in form-V as ins mandated to be submitted by the project proponent to the concerned State pollution Control Board as prescribed under the Environmental (Protection) Rule 1986, as amended subsequently shall also be put on the</td><td>Environment statement (Form-V) is submitted to MPPCB-Bhopal every year within the stipulated time. Form V for the year 2018-19 is attached as Annexure V-14 (Form V for 2019-20 is at the draft stage).</td></tr>
</table>

	website of the company along with the status of compliance of environmental conditions and shall be sent to the respective regional office of the ministry by E-Mail	
XIII	The project proponent shall submit six monthly reports on the status of the implementation safeguards to the MoEF, its Regional office, CPCB and SPCB. The project proponent shall upload the status of compliance of the environmental clearance conditions on their website and update the same periodically send the same by e-,ail to the Regional Office of MoEF.	Noted for compliance. Six Monthly compliance reports of EC is being submitted to the Regional office of MoEF, & MPPCB and uploaded on the website of the company.
XIV	Regional Office of the MoEF will monitor the implementation of the stipulated conditions. A complete set of documents including EIA report and Environmental management plan alongwith the additional information submitted from time to time shall be forwarded to the Regional office for their use during monitoring. Project proponent will upload the compliance status in their website and up date the same from time to time at least six monthly basis. Criteria pollutants level including NOx (from stack & ambient air) shall be displayed at the main gate of the power plant	A complete set of documents including EIA report and Environmental management plan has been submitted to the Regional office of the MoEF, Zonal office of CPCB and MPPCB-Bhopal. Six Monthly compliance reports of EC is being submitted to the Regional office of MoEF, & MPPCB and uploaded on the website of the company.
XV	Separate funds shall be allocated for implementation of environmental protection measures along with the item wise breakup. These cost shall be included as part of the project cost. The funds earmarked for the environmental protection measure shall not be diverted for other purposes and year wise expenditure should be reported to the Ministry.	Noted for compliance. Provision is as per the condition.
XVI	The project authorities shall inform the regional office as well as the Ministry regarding the date of financial closures and final approval of the project by the concerned authorities and date of start of land development work and commissioning of plant.	NTPC-Vindhyachal has intimated to MOEF through EC compliance report or to the RO-MPPCB, regarding the date of date of start of land development work and commissioning of plant.
XVII	Full Cooperation shall be extended to the Scientists/Officers from the Ministry/regional office of the ministry/CPCB/SPCB	Noted for compliance

	that could be monitoring the compliance of environmental status.	
XVIII	The ministry of environment & forests reserve the right to revoke the clearance of conditions stipulated is not implemented to the satisfaction of the Ministry. The Ministry may also impose additional environmental conditions of modify the existing ones, if necessary.	Noted
XIX	The Environmental clearance accorded shall be valid for 5 years to start operation by the power plant.	Plant has commissioned within 4 years.
XX	Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment Protection Act 1986.	All efforts will be made to proceed with factual data & transparency & no false /fabricated data's will be submitted by NTPC.
XXI	In case of any deviation or alteration in the project proposed including coal transportation system from those submitted to this ministry for clearance, afresh reference should be made to the Ministry to assess the adequacy of the conditions imposed and to add additional environmental protection measures required, if any.	Noted.
XXII	The above stipulations would be enforced among others under the water (Prevention & Control of pollution) act 1974, the Air (Prevention & Control of pollution) act 1981, The Environment Protection Act 1986 and rules there under , Hazardous Waste (management handling & trans boundary Movement) rules 2008 and its amendments, the Public liability Insurance act 1991 and its amendments.	NTPC accepts the terms & conditions of MoEF.
XXIII	Any appeal against this environmental clearance shall lie with the National Green Tribunal Act 2010.	Noted.

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Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
Contact No. : 9711159210, 9711159427, SMS/Whatsapp No. : 9711163422; E-mail : email@ekopro.in, ekoproengineers@gmail.com, website : www.ekopro.in

TEST REPORT

Stack Emission Analysis

Test Report No. : EKO/160/050620 **Issue Date : 10/06/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
Vindhya Nagar,
District - Singrauli
Madhya Pradesh

Sample Description	: Stack (Boiler Emission)
Sample Drawn on	: 23/05/2020
Sample Drawn by	: EPEPL Representative
Sampling Location	: Unit - XIII
Sampling Plan & Procedure	: SOP-SE/09
Source of Emission	: Stack Attached To ESP
Capacity	: 500 MW
Type of Stack	: MS
Remark (if any)	: Stack Monitoring Kit

RESULTS

S. No.	Parameters	Test Methods	Results	Units
1	Particulate Matter (as PM)	IS: 11255 (P-1)	42.0	mg/Nm^3
2	Sulphur Dioxide (as SO_2)	IS: 11255 (P-2)	143.0	mg/Nm^3
3	Oxide of Nitrogen (as NOx)	IS: 11255 (P-7)	483.0	mg/Nm^3
4	Oxygen (O_2)	IS: 13270	6.4	% V/V
5	Carbon Dioxide (as CO_2)	IS: 13270	12.6	% V/V
6	Stack Gas Temp.	IS: 11255 (P-3)	129.0	°C
7	Exit Velocity of Gas	IS: 11255 (P-3)	21.93	m/sec
8	Moisture in flue gas	IS: 11255 (P-3)	9.7	%
9	Mercury	EKO/CHEM/SOP/FL-083	0.013	mg/Nm^3

Remark- ND- Not Detected, LOD- Limit of Detection. (PM, SO2 & Nox at 6% O2 dry basis).

Notes :

1. The results given above are related to the tested sample, for various parameters, as observed at the time of Sampling. The customer asked for the above tests only.
2. This test report will not be generated again, either wholly or in part, without prior written permission of the Laboratory.
3. The test report will not be used for any publicity/legal purpose.
4. The test samples will be disposed off after 15 days from the date of issue of test report, unless until specified by the customer.
5. Responsibility of the Laboratory is limited to the invoiced amount only.
6. F.G.D. is Working***

**** End of Report ****

For EKO PRO ENGINEERS PVT. LTD.
PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

EKO PRO

Contact : +91 - 9810243870

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TEST REPORT

Water Sample Analysis

Test Report No : EKO/183/060220 **Issue Date : 12/02/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
Vindhya Nagar,
District - Singrauli
Madhya Pradesh

Sample Description	:	Rihand Reservoir Water
Sample Drawn on	:	05/02/2020
Sample Drawn by	:	EPEPL (Mr. Pramod Mishra)
Sample Received on	:	06/02/2020
Sampling Location	:	Near Ash dyke Rihand Dam Juaadi (Reservoir)
Sampling Plan & Procedure	:	SOP-W/66
Sample Quantity	:	3.0 Litre
Environmental Conditions	:	Normal
Analysis Duration	:	06/02/2020 To 11/02/2020
Remark (if any)	:	NA

RESULTS

S. No.	Parameters	Test Methods	Results	Units	Range of Testing / LOD	Limits as per IS:10500-2012 (Amd.No.2 Sep-2018)	
						Acceptable	Permissible
1	Colour	IS: 3025 (P-4)	ND	Hazen	1.0 to 500.0	5.0	15.0
2	Odour	IS: 3025 (P-5)	Agreeable	–	-	Agreeable	Agreeable
3	Turbidity	IS: 3025 (P-10)	3.8	NTU	1.0 to 500.0	1.0	5.0
4	pH	IS: 3025 (P-11)	7.29	–	1.0 to 13.0	6.5-8.5	No relaxation
5	Total Hardness (as $CaCO_3$)	IS: 3025 (P-21)	584.0	mg/L	1 to 10000	200.0	600.0
6	Calcium (as Ca)	IS: 3025 (P-40)	116.6	mg/L	0.5 to 5000	75.0	200.0
7	Iron (as Fe)	APHA 3125 B	ND	mg/L	0.005 to 10	1.0	No relaxation
8	Chloride (as Cl)	IS: 3025 (P-32)	390.5	mg/L	2.5 to 5000	250.0	1000.0
9	Residual Free Chlorine	IS: 3025 (P-26)	ND	mg/L	0.1 to 1.0	0.2	1.0
10	Chloramines (as Cl_2)	IS: 3025 (P-26)	ND	mg/L	1.0 to 50	4.0	No relaxation
11	Fluoride (as F)	IS: 3025 (P-60)	ND	mg/L	1.0 to 50	1.0	1.5
12	Total Dissolved Solids	IS: 3025 (P-16)	1580.0	mg/L	5.0 to 20000	500.0	2000.0
13	Magnesium (as Mg)	IS: 3025 (P-46)	71.2	mg/L	0.5 to 2500	30.0	100.0
14	Copper (as Cu)	APHA 3125 B	ND	mg/L	0.005 to 10	0.05	1.5
15	Manganese (as Mn)	APHA 3125 B	ND	mg/L	0.005 to 10	0.1	0.3
16	Sulphate (as SO_4)	IS: 3025 (P-24)	370.2	mg/L	1 to 5000	200.0	400.0
17	Nitrate (as NO_3)	IS: 3025 (P-34)	8.12	mg/L	0.1 to 100	45.0	No relaxation
18	Phenolic Compounds (as C_6H_5OH)	IS: 3025 (P-43)	ND	mg/L	0.001 to 10	0.001	0.002
19	Mercury (as Hg)	APHA 3125 B	ND	mg/L	0.001 to 10	0.001	No relaxation
20	Selenium (as Se)	EKO/CHEM/SOP-ICPMS/W-01	ND	mg/L	0.005 to 10	0.01	No relaxation
21	Arsenic (as As)	APHA 3125 B	ND	mg/L	0.005 to 10	0.01	No relaxation
22	Cyanide (as CN)	APHA 4500 CN-K	Absent	mg/L	-	0.05	No relaxation
23	Lead (as Pb)	EKO/CHEM/SOP-ICPMS/W-01	ND	mg/L	0.005 to 10	0.01	No relaxation

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Test Report No : EKO/183/060220 **Issue Date : 12/02/2020**

24	Zinc (as Zn)	EKO/CHEM/SOP-ICPMS/W-01	ND	mg/L	0.005 to 10	5.0	15.0
25	Barium (as Ba)	EKO/CHEM/SOP-ICPMS/W-01	ND	mg/L	0.01 to 10	0.7	No relaxation
26	Mineral Oil	IS: 3025 (P-39)	Absent	mg/L	0.1 to 1000	0.5	No relaxation
27	Ammonia (as Total Ammonia-N)	IS: 3025 (P-34)	ND	mg/L	0.5 to 100	0.5	No relaxation
28	Silver (as Ag)	EKO/CHEM/SOP-ICPMS/W-01	ND	mg/L	0.05 to 10	0.1	No relaxation
29	Total Chromium (as Cr)	APHA 3125 B	ND	mg/L	0.005 to 10	0.05	No relaxation
30	Total Alkalinity (as $CaCO_3$)	IS: 3025 (P-23)	412.0	mg/L	1.0 to 5000	200.0	600.0
31	Aluminium (as Al)	APHA 3125 B	ND	mg/L	0.005 to 10	0.03	0.2
32	Boron (as B)	IS: 3025 (P-57)	ND	mg/L	0.25 to 100	0.5	2.4
33	Cadmium (as Cd)	APHA 3125 B	ND	mg/L	0.001 to 10	0.003	No relaxation
34	Anionic Detergents (as MBAS)	IS: 13428 : 2005	ND	mg/L	0.1 to 100	0.2	1.0
35	Sulphide (as H_2S)	IS: 3025 (P-29)	ND	mg/L	0.05 to 20	0.05	No relaxation
36	Molybdenum (as Mo)	APHA 3125 B	ND	mg/L	0.005 to 10	0.07	No relaxation
37	Nickel (as Ni)	EKO/CHEM/SOP-ICPMS/W-01	ND	mg/L	0.01 to 10	0.02	No relaxation
38	Polychlorinated biphenyls (PCB)	EKO/CHEM/SOP-GCMSMS/W-02	ND	mg/L	0.01 to 10	0.0005	No relaxation
39	Polycyclic aromatic hydrocarbons (PAH)	EKO/CHEM/SOP-GCMSMS/W-03	ND	mg/L	0.01 to 10	0.0001	No relaxation
40	Atrazine	EKO/CHEM/SOP-ICPMS/W-01	ND	µg/l	0.01 to 1000	2.0	No relaxation
41	Alachlor	EKO/CHEM/SOP-GCMSMS/W-01	ND	µg/l	0.01 to 1000	20.0	No relaxation
42	Aldrin/Dieldrin		ND	µg/l	0.01 to 1000	0.03	No relaxation
43	Alpha HCH		ND	µg/l	0.01 to 1000	0.01	No relaxation
44	Beta HCH		ND	µg/l	0.01 to 1000	0.04	No relaxation
45	Butachlor		ND	µg/l	0.01 to 1000	125.0	No relaxation
46	Chlorpyriphos		ND	µg/l	0.01 to 1000	30.0	No relaxation
47	Delta HCH		ND	µg/l	0.01 to 1000	0.04	No relaxation
48	DDT(o,p and p,p-Isomers of DDT,DDE and DDD		ND	µg/l	0.01 to 1000	1.0	No relaxation
49	Endosulfan (Alpha,Beta & Sulphate)		ND	µg/l	0.01 to 1000	0.4	No relaxation
50	Ethion		ND	µg/l	0.01 to 1000	3.0	No relaxation
51	Gamma-HCH (Lindane)		ND	µg/l	0.01 to 1000	2.0	No relaxation
52	Malathion		ND	µg/l	0.01 to 1000	190.0	No relaxation
53	Methyl parathion		ND	µg/l	0.01 to 1000	0.3	No relaxation
54	Monocrotophos		ND	µg/l	0.01 to 1000	1.0	No relaxation
55	Phorate		ND	µg/l	0.01 to 1000	2.0	No relaxation
56	2,4 Dichlorophenoxyacetic acid	EKO/CHEM/SOP-LCMS/W-01	ND	µg/l	0.01 to 1000	30.0	No relaxation
57	Isoproturon		ND	µg/l	0.01 to 1000	9.0	No relaxation
58	Total Coliform	IS: 15185	Absent	/100mL	-	Should be Absent	No relaxation
59	E.coli	IS: 15185	Absent	/100mL	-	Should be Absent	No relaxation

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Test Report No : EKO/183/060220 **Issue Date : 12/02/2020**

Remark : ND-Not Detected

Notes:

1. The results given above are related to the tested sample, as received & mentioned parameters. The customer asked for the above tests only.
2. This test report will not be generated again, either wholly or in part, without prior written permission of the Laboratory.
3. The test report will not be used for any publicity/legal purpose.
4. The test samples will be disposed off after 15 days from the date of issue of test report, unless until specified by the customer. Sample received for biological tests will be destroyed after 7 days from the date of issue of test report.
5. Responsibility of the Laboratory is limited to the invoiced amount only.

****End of Report****

For EKO PRO ENGINEERS PVT. LTD.
SHIVANGI SINGHRAIZADA
SECTION INCHARGE MICROBIOLOGY
(Authorised Signatory)

For EKO PRO ENGINEERS PVT. LTD.
PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

EKO PRO

Contact : +91 - 9810243870

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TEST REPORT

Water Sample Analysis

Test Report No : EKO/124/130220 **Issue Date : 18/02/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
: Vindhya Nagar
Distt. - Singrauli
Madhya Pradesh

Sample Description	:	Drinking Water
Sample Drawn on	:	12/02/2020
Sample Drawn by	:	EPEPL (Mr. Pramod Mishra)
Sample Received on	:	13/02/2020
Sampling Location	:	Hand Pump of near Ash Dyke Baliyari
Sampling Plan & Procedure	:	SOP-W/66
Sample Quantity	:	1.0 Litre
Environmental Conditions	:	Normal
Analysis Duration	:	13/02/2020 To 17/02/2020
Remark (if any)	:	NA

RESULTS

S. No.	Parameters	Test Methods	Results	Units	Range of Testing / LOD	Limits as per IS: 10500-2012 (Amd.No.2 Sep-2018)	
						Acceptable	Permissible
1	Colour	IS: 3025 (P-4)	ND	Hazen	1 - 500	5.0	15.0
2	Odour	IS: 3025 (P-5)	Agreeable	–	–	Agreeable	Agreeable
3	Turbidity	IS: 3025 (P-10)	4.2	NTU	1 - 500	1.0	5.0
4	Conductivity	IS : 3025 (P-14)	390.5	µS/cm	1 - 100000	-	-
5	pH	IS: 3025 (P-11)	7.24	–	1 - 13	6.5-8.5	No relaxation
6	Total Hardness (as $CaCO_3$)	IS: 3025 (P-21)	184.0	mg/L	1 - 10000	200.0	600.0
7	Calcium Hardness (as $CaCO_3$)	IS: 3025 (P-40)	105.0	mg/L	1 - 10000	--	--
8	Calcium (as Ca)	IS: 3025 (P-40)	44.9	mg/L	0.5 - 5000	75.0	200.0
9	Chloride (as Cl)	IS: 3025 (P-32)	42.5	mg/L	2.5 - 5000	250.0	1000.0
10	Fluoride (as F)	IS: 3025 (P-60)	ND	mg/L	0.1 - 50	1.0	1.5
11	Total Dissolved Solids	IS: 3025 (P-16)	234.0	mg/L	5 - 20000	500.0	2000.0
12	Total Suspended Solids	IS: 3025 (P-17)	ND	mg/L	5 - 2000	-	-
13	Magnesium (as Mg)	IS: 3025 (P-46)	17.5	mg/L	0.5 - 2500	30.0	100.0
14	Sulphate (as SO_4)	IS: 3025 (P-24)	43.6	mg/L	1 - 5000	200.0	400.0
15	Nitrate (as NO_3)	IS: 3025 (P-34)	1.86	mg/L	0.1 - 100	45.0	No relaxation
16	Total Alkalinity (as $CaCO_3$)	IS: 3025 (P-23)	180.0	mg/L	1 - 5000	200.0	600.0

Remark - ND- Not Detected, LOD- Limit of Detection.

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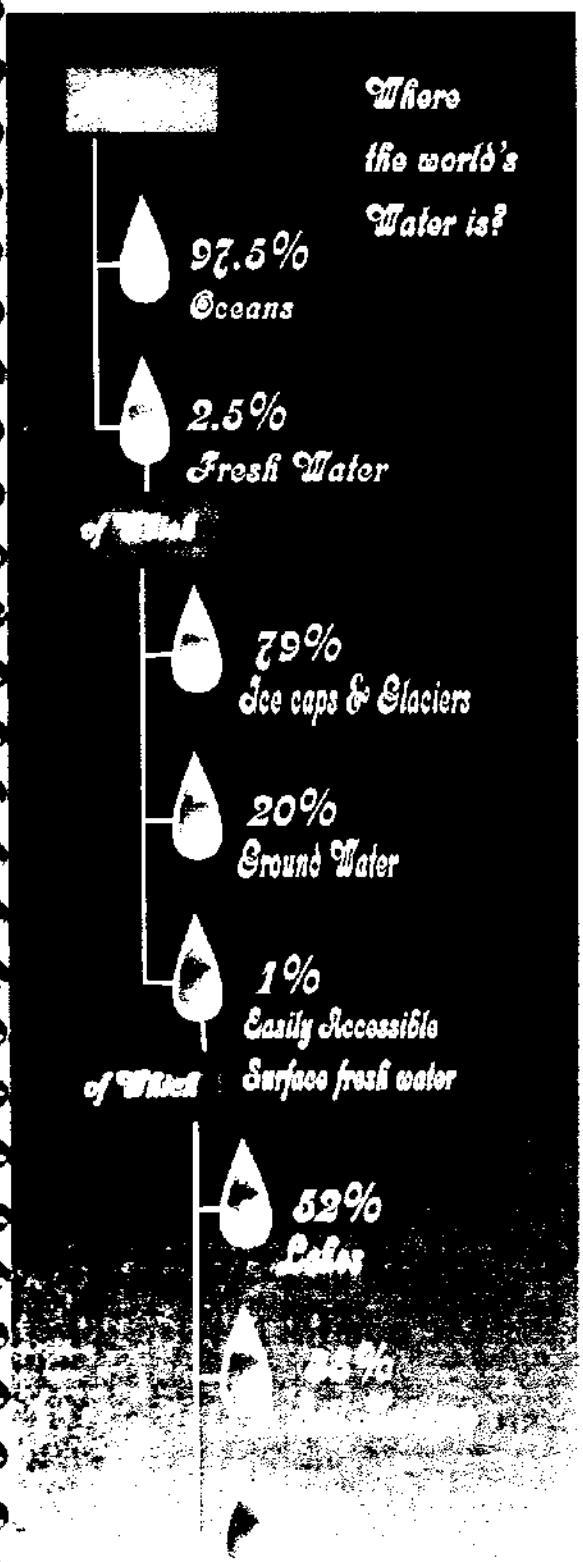
IV - 4



Report on

RAIN WATER HARVESTING SYSTEM IN NTPC PLANT AREA AT VILLAGE VINDHACHAL, DISTRICT-SINGRAULI(M.P.)

Client :- NTPC VINHYACHAL NAGAR VAIDHAN M P

Submitted by

Rajmi Geoexploration & Engg. Pvt. Ltd.

101-106 M L Tower, 292- A, Project Scheme No. 91,

Opposite Malwa Mill Super Market

Indore MP Pin- 452003

Tel. +0731-2434588, 09926845588, 094525460588,

09993470161

email :- geoexplorationindore@gmail.com

JAN- 2016

9. RECOMMENDATION FOR RAINWATER HARVESTING

On the basis of the analysis of the data, generated from the systematic and comprehensive Hydro geological survey, the Geophysical Resistivity Survey & lateral Profiling, the lineament fabric studies of the area, thoroughly understanding the aquifer geometry and its disposition at depth, Hydro meteorological studies (Rain fall intensity etc.), the location and types suitable rainwater harvesting structures was to be finalized to impound as well as recharge ground water.

As per the hydrogeological investigations the water level as observed during field work during post monsoon season rises upto 0.45 t0 2.50 m. This condition is almost water logged and some wells show the SWL at a depth of 2.0 m in pre monsoon too. This is mainly due to the discharge of water from plant area and other domestic water flows throughout the year in the nala in and around project area. The presence of sandy soil from 0.0 m to 4.50 m also boosts the seepage of water to water table aquifer from surface flow.

As per the above water level data the area seems to be water logged and no rain water harvesting will be feasible in such condition.

However, The general rainwater harvesting structures for artificial recharge is as described below.

Contour Bunding

Contour Bunding, which is a watershed management practice aimed at building up soil moisture storage involve construction of small embankments or bunds across the slope of the land. They derive their names from the construction of bunds along contours of equal land elevation. Spacing between two contour bunds depends on the slope of the area; in the study area spacing is to be considered as 20 to 25 m. The schematic of a system of contour bunds is shown below in Fig: 10.2

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TEST REPORT

Ambient Air Quality Monitoring

Test Report No. : EKO/194/190320 **Issue Date : 19/03/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
Vindhya Nagar,
District - Singrauli
Madhya Pradesh

Sample Description : Ambient Air
Sample Drawn by : EPEPL Representative
Sampling Location : L5 = Stage V (Coal Mill Area), L6 = CHP, L7 = Near Jwala Mukhi Mandir, L8 = Rose Garden Jayant
Sampling Time : 24.0 Hrs.
Sampling Plan & Procedure : SOP-AAQ/15
Remark (if any) : Instrument Use RDS & FPS

RESULTS

S. No.	Parameters	Test Methods	Sampling Date/Results				Units	Limits as per CPCB Notification, 18th Nov 2009
			L5-13.03.20	L6-16.03.20	L7-12.03.20	L8-14.03.20		
1	Particulate Matter (PM10)	IS: 5182 (P-23)	91.52	87.25	76.25	78.78	$\mu g/m^3$	100.0
2	Particulate Matter (PM2.5)	EK0/CHEM/SOP/AAQ/01	48.52	47.64	38.78	39.12	$\mu g/m^3$	60.0
3	Sulphur Dioxide (as SO_2)	IS: 5182 (P-2)	25.65	23.29	24.36	21.98	$\mu g/m^3$	80.0
4	Nitrogen Dioxide (as NO_2)	IS: 5182 (P-6)	24.32	22.14	23.23	20.42	$\mu g/m^3$	80.0
5	Carbon Monoxide (as CO)	IS: 5182 (P-10)	ND	ND	ND	ND	mg/m^3	4.0
6	Mercury (as Hg)	EKO/CHEM/SOP/FL-082	ND	ND	ND	ND	$\mu g/m^3$	-

Remark- ND- Not Detected, LOD- Limit of Detection. (Detection Limits for CO- 0.5 mg/m3, & Mercury- 0.1 µg/m3).

Notes :

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5. Responsibility of the Laboratory is limited to the invoiced amount only.

**** End of Report ****

For EKO PRO ENGINEERS PVT. LTD.
PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

Water consumption data and compliance with respect to the limit notified vide notification dated 07.12.2015 for coal/lignite based thermal power plants

Name of the Power Plant : Vindhyachal Super Thermal Power Station
State : Madhya Pradesh
Capacity (total in MW) : 4760
Unit wise Capacity : 6 X 210 MW + 7X500 MW
Applicable SWC Standard : 3.5 m^3/MWh
Zero Waste Water Discharge Condition mandatory or not: Mandatory.
Quarter: January 2020 – March 2020

Month	Power Generation (MU)	Water Consumption (m^3) **	Sp. Water Consumption (Daily Avg. in m^3/MWh)	If SWC limit not complied, reasons if any:	Outage hrs (Unit wise)
January- 20	3132.23	8826701	2.82	NA	U2 – 16.417 U6 – 81.033 U8 - 61.050 U11-117.883 U12- 5.350 U13- 53.833
February- 20	2975.58	8700999	2.92	NA	U1 - 83.283 U2- 37.633 U10-404.167 U12 -55.250
March-20	2681.33	8010042	2.99	NA	U2 – 51.550 U3 – 29.650 U7- 247.650 U8- 54.433 U10-774.000 U11–92.767
Jan. 20-March,20	8789.14	25537742	2.91	NA	U1– 83.283 U2- 105.600 U3– 29.650 U6 -81.033 U7 -247.650 U8-115.483 U10-1178.167 U11–210.65 U12–60.600 U13-53.833

Specific water consumption for the Year 2019-20 – 3.15 m3/MWh.

(Name & Designation of authorised official)
With Seal

मुनीश जैन
Munish Jain
अपर महाप्रबंधक (ईएमजी/एयुडी)
AGM (EMG/AUD)
एनटीपीसी लिमिटेड-विंध्याचल
NTPC Limited-Vindhyachal

Report

on

RADIOTRACER STUDY

of

Fly-ash disposal into Gorbi Mines

for

M/s. NTPC, Singrauli

By

Isotope Application Services
Board of Radiation & Isotope Technology
Department of Atomic Energy
Government of India

December 2019

report is shown in ANNEXURE I. Samples assayed till 09/12/2019 have not shown any traces of the presence of scandium-46 (please refer ANNEXURE II).

5.3 Assay of fly ash samples

Fly ash samples were received from NTPC for the analysis of natural radioactivity content, especially of the long lived isotopes of higher elements like Uranium, Thorium, Radium, Potassium, etc.

The received samples were placed on hermatically sealed and cooled by liquid nitrogen HPGe detector surrounded by thick lead shielding to avoid interference of natural background. This detector is connected to the computer controlled instrument to count each sample for the desired counting time. Each sample was counted for 60,000 seconds. The results are tabulated in ANNEXTURE III.

6. DISCUSSION

The injected Sc-46 radiotracer needs to be homogenously spread throughout the water in the mine void so that it can have maximum surface contact with the rocks and its fractures surrounding the void and thus percolating through them to reach to the observation bore wells in the same manner as the groundwater. It has been observed that the injected radiotracer follows the form of a plume in the void water near the injection point which is evident from the isocount mapping at various depths. Heavier particles from the fly ash could be settling on the bottom surface with a localized spread. Column of the plume rises to the surface with confined dimensions and the good amount of spread of the radiotracer is observed on the surface indicating lighter particles tend to float on the surface.

However, leaching process of the radiotracer (labeled fly ash) may be in action at various depths in the water due to physical churning of the fly ash with water molecules. The same could be in place when the finer particles escape through the cracks in the surrounding rock of the mine void and fractures. Due to their physical friction with the soil particles Sc-46 may appear in the water samples drawn from the bore wells. In the period from 04/02/2019 to 09/12/2019 the presence of Sc-46 in water samples could not be observed as tabulated in Annexure II.

Fly ash samples which were assayed for the presence of radioisotopes of heavier elements. The measured values were below the tolerance level for radionuclides of natural origin in bulk solid materials as per the directives of Atomic Energy Regulatory Board of Government of India.

7. CONCLUSION

Good spatial and temporal spread of the labeled fly ash was observed in the pond water with respect to time of disposal.

Scandium-46 leached out from labeled fly ash could not be detected in the bore wells surrounding Gorbi mine indicating no leachates are reaching the groundwater aquifers from the time of injection.

Further, dumping of fly ash could be continued in to the mine void to push particulate matter towards the boundaries of the mine void forcing the labeled fly ash towards the bore wells and to ascertain the impact of leachates in future.

Measured values of the radionuclides content in the fly ash samples were below the tolerance limits specified by Atomic Energy Regulatory Board of Government of India.

ANNEXURE III

Assay of Radioactivity content in Fly Ash Samples of NTPC, Singrauli

D-111-114

Detector: HPGe (High Purity Germanium)

Counting time: 60,000 Seconds

KeV	Gr. count	Bgd	Net count	Counts *100*100	Time secs	% Ga. Abu	Eff.	WT. in gms	T*Eff* G.Ab*WT	Avg Bq/kg
186.21	2878	384	2494.4	24944000		3.59	2.761	232.5	138272261	180.3977
911	4679	364	4314.8	43148000		25.8	0.827	232.5	297645570	144.9644
63.29	1590	6.2	1583.8	15838000		4.8	0.971	232.5	65018160	243.5935
92.59	3424	510	2913.8	29138000		5.58	2.243	232.5	174597363	166.8868
1001	153	40.8	112.2	1122000		0.837	0.775	232.5	9049016.3	123.9914
295.22	5363	215	5147.8	51478000		19.3	2.034	232.5	547623990	94.00246
351.93	9559	358	9200.6	92006000		37.6	1.757	232.5	921581640	99.83489
609.31	7350	535	6815.4	68154000		46.1	1.113	232.5	715764735	**95.21844**
1764	1422	317	1104.8	11048000		15.4	0.512	232.5	109992960	***100.443***
238	21001	602	20399.4	2.04E+08		43.3	2.392	232.5	1.445E+09	***141.187***
583	6695	360	6335.2	63352000		30.37	1.152	232.5	488041978	*129.809*
729	1448	104	1344	13440000		6.58	0.972	232.5	89220852	*150.637*
2614	3121	900	2221.2	22212000		35.64	0.343	232.5	170522484	*130.258*
1460.8	4393	2190	2203	22030000		10.7	**0.47**	232.5	70154550	**314.021**

All the values are in Bq/Kg. (Becquerel per kilogram)

- Average Uranium: 95.2±9.8
- Average Thorium: 141.2±12.9
- Average Radium: 100.4±10.2
- Average Potassium: 314±6.7

Uncertainty is calculated by formula :

U-238 = Activity in Bq/kg X SQ.RT $[(\delta N/N)^2 + (\delta wt/wt)^2 + (\delta G.Abd/G.Abd)^2 + (\delta Eff/Eff)^2]$

where
N = counts wt= weight ,G.abd = gamma abundance,Eff= efficiency

Similarly, for Thorium-232 and other radioisotopes; standard deviation is calculated.

EKO PRO

Contact : +91 - 9810243870

TC-5063

EKO PRO ENGINEERS PVT. LTD.

Environmental Consultants and Analytical Laboratory

(An ISO 9001:2015 Certified Company)

Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
Contact No. : 9711159210, 9711159427, SMS/Whatsapp No. : 9711163422; E-mail : email@ekopro.in, ekoproengineers@gmail.com, website : www.ekopro.in

TEST REPORT

Water Sample Analysis

Test Report No : EKO/188/090320 **Issue Date : 16/03/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
Vindhya Nagar,
District - Singrauli
Madhya Pradesh

Sample Description	:	Water Sample
Sample Drawn on	:	07/03/2020
Sample Drawn by	:	EPEPL (Mr. Pramod Mishra)
Sample Received on	:	09/03/2020
Sampling Location	:	Ash Dyke Toe Drain V-4A
Sampling Plan & Procedure	:	SOP-W/66
Sample Quantity	:	3.0 Litre
Environmental Conditions	:	Normal
Analysis Duration	:	09/03/2020 To 14/03/2020
Remark (if any)	:	NA

RESULTS

S. No.	Parameters	Test Methods	Results	Units	Range of Testing / LOD	Limits as per IS:10500-2012 (Amd.No.2 Sep-2018)	
						Acceptable	Permissible
1	Colour	IS: 3025 (P-4)	ND	Hazen	1.0 to 500.0	5.0	15.0
2	Odour	IS: 3025 (P-5)	Agreeable	–	-	Agreeable	Agreeable
3	Turbidity	IS: 3025 (P-10)	5.3	NTU	1.0 to 500.0	1.0	5.0
4	pH	IS: 3025 (P-11)	6.97	–	1.0 to 13.0	6.5-8.5	No relaxation
5	Total Hardness (as $CaCO_3$)	IS: 3025 (P-21)	180.0	mg/L	1 to 10000	200.0	600.0
6	Calcium (as Ca)	IS: 3025 (P-40)	38.1	mg/L	0.5 to 5000	75.0	200.0
7	Iron (as Fe) #	APHA 3125 B	ND	mg/L	0.005 to 10	1.0	No relaxation
8	Chloride (as Cl)	IS: 3025 (P-32)	110.5	mg/L	2.5 to 5000	250.0	1000.0
9	Residual Free Chlorine	IS: 3025 (P-26)	ND	mg/L	0.1 to 1.0	0.2	1.0
10	Chloramines (as Cl_2)	IS: 3025 (P-26)	ND	mg/L	1.0 to 50	4.0	No relaxation
11	Fluoride (as F)	IS: 3025 (P-60)	ND	mg/L	0.1 to 50	1.0	1.5
12	Total Dissolved Solids	IS: 3025 (P-16)	390.0	mg/L	5.0 to 20000	500.0	2000.0
13	Magnesium (as Mg)	IS: 3025 (P-46)	20.7	mg/L	0.5 to 2500	30.0	100.0
14	Copper (as Cu)	APHA 3125 B	ND	mg/L	0.005 to 10	0.05	1.5
15	Manganese (as Mn)	APHA 3125 B	ND	mg/L	0.005 to 10	0.1	0.3
16	Sulphate (as SO_4)	IS: 3025 (P-24)	50.9	mg/L	1 to 5000	200.0	400.0
17	Nitrate (as NO_3)	IS: 3025 (P-34)	2.14	mg/L	0.1 to 100	45.0	No relaxation
18	Phenolic Compounds (as C_6H_5OH)	IS: 3025 (P-43)	ND	mg/L	0.001 to 10	0.001	0.002
19	Mercury (as Hg)	APHA 3125 B	ND	mg/L	0.001 to 10	0.001	No relaxation
20	Selenium (as Se)	EKO/CHEM/SOP-ICPMS/W-01	ND	mg/L	0.005 to 10	0.01	No relaxation
21	Arsenic (as As)	APHA 3125 B	ND	mg/L	0.005 to 10	0.01	No relaxation
22	Cyanide (as CN)	APHA 4500 CN-K	Absent	mg/L	-	0.05	No relaxation
23	Lead (as Pb)	EKO/CHEM/SOP-ICPMS/W-01	ND	mg/L	0.005 to 10	0.01	No relaxation

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Test Report No : EKO/188/090320 **Issue Date : 16/03/2020**

24	Zinc (as Zn)	EKO/CHEM/SOP-ICPMS/W-01	ND	mg/L	0.005 to 10	5.0	15.0
25	Barium (as Ba)	EKO/CHEM/SOP-ICPMS/W-01	ND	mg/L	0.01 to 10	0.7	No relaxation
26	Mineral Oil	IS: 3025 (P-39)	Absent	mg/L	0.1 to 1000	0.5	No relaxation
27	Ammonia (as Total Ammonia-N)	IS: 3025 (P-34)	ND	mg/L	0.5 to 100	0.5	No relaxation
28	Silver (as Ag)	EKO/CHEM/SOP-ICPMS/W-01	ND	mg/L	0.05 to 10	0.1	No relaxation
29	Total Chromium (as Cr)	APHA 3125 B	ND	mg/L	0.005 to 10	0.05	No relaxation
30	Total Alkalinity (as $CaCO_3$)	IS: 3025 (P-23)	168.0	mg/L	1.0 to 5000	200.0	600.0
31	Aluminium (as Al)	APHA 3125 B	ND	mg/L	0.005 to 10	0.03	0.2
32	Boron (as B)	IS: 3025 (P-57)	ND	mg/L	0.25 to 100	0.5	2.4
33	Cadmium (as Cd)	APHA 3125 B	ND	mg/L	0.001 to 10	0.003	No relaxation
34	Anionic Detergents (as MBAS)	IS: 13428 : 2005	ND	mg/L	0.1 to 100	0.2	1.0
35	Sulphide (as H_2S)	IS: 3025 (P-29)	ND	mg/L	0.05 to 20	0.05	No relaxation
36	Molybdenum (as Mo) #	APHA 3125 B	ND	mg/L	0.005 to 10	0.07	No relaxation
37	Nickel (as Ni)	EKO/CHEM/SOP-ICPMS/W-01	ND	mg/L	0.01 to 10	0.02	No relaxation
38	Polychlorinated biphenyls (PCB)	EKO/CHEM/SOP-GCMSMS/W-02	ND	mg/L	0.01 to 10	0.0005	No relaxation
39	Polycyclic aromatic hydrocarbons (PAH)	EKO/CHEM/SOP-GCMSMS/W-03	ND	mg/L	0.01 to 10	0.0001	No relaxation
40	Total Coliform	IS: 15185	Absent	cfu/100mL	≥ 1	Should be Absent	No relaxation
41	E.coli	IS: 15185	Absent	Per 100mL	-	Should be Absent	No relaxation

Remark : # Non-Accredited Parameters
ND-Not Detected

Notes:

1. The results given above are related to the tested sample, as received & mentioned parameters. The customer asked for the above tests only.
2. This test report will not be generated again, either wholly or in part, without prior written permission of the Laboratory.
3. The test report will not be used for any publicity/legal purpose.
4. The test samples will be disposed off after 15 days from the date of issue of test report, unless until specified by the customer. Sample received for biological tests will be destroyed after 7 days from the date of issue of test report.
5. Responsibility of the Laboratory is limited to the invoiced amount only.

****End of Report****

For EKO PRO ENGINEERS PVT. LTD.
SHIVANGI SINGH RAIZADA
SECTION INCHARGE MICROBIOLOGY
(Authorised Signatory)

For EKO PRO ENGINEERS PVT. LTD.
PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

Special Upliftment Schemes for SC/ST

1. **NTPC Utkarsh scholarship scheme for BE/B.Tech/MBBS/ITI/Class XII/Class X students, which aims to benefit neighbouring villages and other areas, has special provisions for SC/ST.**

2. **Adivaasi Chaatravaas (100 bedded Girls hostel for Tribal girls) at Khanua is under construction.**

3. **There are following special Provisions for Schedule Caste and Schedule Tribes in RFCTLARR Act' 2013 that is effective from 01.01.2014 and the same has been incorporated in NTPC's R&R policy.**

   The Schedule 2 of the Act presents all elements of Rehabilitation & Resettlement entitlements for the affected families. The Act provides for special provisions/ additional benefits to Scheduled Caste and Scheduled Tribe families, under Section 41, Subsections 1-11, and Section 42, subsections 1-3. Notably among these additional provisions are : (a) free land for community and social gatherings; (b) in case of displacement, a Development Plan to be prepared; and (c) continuation of reservation and other Schedule V and Schedule VI area benefits from displaced area to resettlement area. It also stipulates that displacement of tribal people should be kept to a minimum and undertaken only after possibilities of non-displacement and least displacement have been exhausted.

   In line with the Policy provisions for protection of rights of SC/ST and their upliftment, various initiatives/activities/ and strategic interventions under CSR and Community development in areas of Education, Health, Skill Development and Vocational training, Rural Sports, Support to Physically Challenged persons that have benefitted the SC and ST population is attached.

In line with the Company Policy provisions for protection of rights of SC/ST and their upliftment, various initiatives/activities/ and strategic interventions under CSR and Community development in areas of Education, Health, Skill Development and Vocational training, Rural Sports, Support to Physically Challenged persons that have benefitted the SC and ST population is attached.CSR activities being conducted in domain areas of **Education, Health, Skill Development and Vocational training, Rural Sports, Support to Physically Challenged persons** have benefitted the SC and ST population.

Key initiatives/ Focus areas (2014 -2020)

SNo.	Activity Head	Beneficiaries		Total
		SC	ST	
1	Education	11111	10274	21385
2	Health	10824	10519	21343
3	Skill Development	121	85	206
4	Sports	423	292	715
5	Physically Challenged Persons	38	14	52
	Total	**22528**	**21191**	**43719**

1. Education

✓ **Project Udaan –** NTPC Vindhyachal has funded Project 'Udaan' started by District Administration in 2019 with the objective to bring about quantitative and qualitative improvement in the Class X exam results that had been at below expectation level and significantly lower than the State Average. **6083 SC/ST** students of the District have been benefitted.

Project Udaan

In the first phase of Project 'Udaan' , training was imparted to Teachers during May-June '19 to equip them with strategic inputs to prepare the students for targeted based studies.

In the 2nd phase of Project 'Udaan', 13255 students studying in 144 High Schools, who appeared in Class X Board exams, have been provided with Remedial Module prepared by subject experts for 4 subjects (English, Maths, Science and Social Science). The module is to facilitate and enable the students for academic upgradation, qualitative improvement in learning and exam preparation and thereby bring out improvement in overall exam results of Class Xth.

Project Udaan (SC/ST Student Beneficiaries)						
SC			ST			Total (SC+ST)
Boys	Girls	Total	Boys	Girls	Total	
967	910	1877	1930	2276	4206	6083

Smart Tab Lab – Innovative Educational technological solution, **204 SC/ST students** benefitted.
Date driven, internet free, digital classroom for Classes 6-10

- ✓ **Film Based Teaching methodology (FBTM) –** The project was started to improve ***student learning outcomes*** in Government Primary Schools in 2018. The project entails use of innovative Film Based Teaching Methodology **(FBTM®)** to teach Mathematics to Primary Level students of selected schools in Singrauli. A Technology Integrated Teaching Learning Interface (TITLI®) software has been installed in all schools to automate planning, delivery and monitoring of the FBTM® classes. Based on the learning levels, students were divided into two groups:
    - Group A – Slow learning speed and low attendance, Group B – Faster learning speed and regular attendance and interventions also made to ***increase school attendance***. English, Vocational and creative activities and 'Bal Sansad' were also conducted.

    - Project was started at 5 Govt. Primary school and now extended to 10 more Govt. Primary school through NGO- Bharat Learn. **Total 883 SC/ST students have been benefitted in 2 batches 2018-19 and 2019-20**.

- ✓ **Girl Empowerment Mission (GEM) – 106 girls** of **SC/ST category** benefitted wherein under this ***Transformational Project first started at NTPC Vindhyachal amongst all NTPC stations,*** Class V girls (Age-10-12 yrs) were exposed to month long activity based learning and also various life skills coaching, self defence, counselling on various health issues , yoga , sports , computers , music dance, art & craft etc., fields/ areas which are generally not taught in their schools, to give them holistic perspective of life. 2 batches of 2018 and 2019 have participated. ***As part of inclusive education, 20 meritorious girls (9 are SC/ST) of GEM batch 2018 and 2019 are being educated in DPS & DePaul School and full expenses are being borne by NTPC***.

- ✓ **Personality Workshop for Govt Schools – 326 SC/ST** students have benefitted


Grassroots

Grassroots

Embodying hope while raising questions about rehabilitation

School Infrastructure and Stationary, celebration of Independence and Republic Day – School Furniture, water coolers etc have been provided to schools as per requirement. 13143 SC/ST students benefitted.

Asha Kiran School (***for deaf and dumb children***) is run by Suhasini Sangh (Ladies Club) and financial support provided by NTPC Vindhyachal. **18 SC/ST** students have studied in the school in past 5 years.

Solar lanterns have been distributed and **262 SC/ST students** have been benefitted

NTPC Urjanchal Scholarship was provided till 2016 and **305 SC/ST** students (Class V to XII and MBBS/ Engg students) benefitted and **NTPC Utkarsh Scholarship** has been provided to **3 SC/ST** students

2. Health

- ✓ **Medical & Health Camps** such as **General Health camp, Eye Camp, Family Planning Camp** are conducted wherein the patients are provided free consultation and medicines and also surgeries done and referred to Vindhya hospital in case further investigation and treatment of the patient is required. Blood Bank is also operational through Red Cross Society.
- ✓ Under '**Transform Singrauli' Ante Natal Camps** (for pregnant ladies and new mothers and babies)have also been organised wherein **Gur chana** has been distributed in 18 Gram panchayat and 2 wards of 'Aspirational district' as organic nutritional supplement so that iron levels of the mother and child are boosted for their well being. **7718 SC/ST patients benefitted under various Medical camps.** Even in COVID times the distribution of Gur chana amongst Pregnant women is being carried out through an NGO maintaining social distancing norms.

- ✓ **Mobile Health Van** operates for providing medical services and **13625 SC/ST patients benefitted**

3. Skill Development and Vocational Training

✓ Various Skill Development and Vocational Training programs such as Bag Making, Masala making, Crusiya Training, Computer Training , ***Artefact making with Ash and Gypsum*** have been organised in which **96 SC/ST** participants have benefited. NTPC Vindhyachal in partnership with SEWA Bharat, an NGO extended skill development and capacity building trainings such as Detergent, Agarbatti, soap, phenyl making, Potteries and terracotta product making, Tailoring, Beauty Parlor management, Mushroom, Bedside Nursing, Sanitary napkin manufacturing, Dona Pattal making and Computer training have been organised to the women of Singrauli with a vision of making them Self Sustainable. Formed a women's cooperative named 'Udhyogini'.

Besides Social Security Linkages, Digital Financial Literacy Camps and trainings have also been conducted.

Activity	ST	SC	Total
Livelihood Trainings	41	66	107
Social Security Linkages beneficiaries	1098	1942	3040
Digital Financial Literacy Camps	269	327	596
Digital Financial Literacy Training	25	52	77
Total	**1433**	**2387**	**3820**

Lalita Saket (SC category) is a success story. After completing her training, Saket managed to earn Rs 3,000-5,000 every month by tailoring clothes for the people living in her neighbourhood and is now earning upto Rs. 9000/- per month. A sound entrepreneur, Lalita also set aside a part of her earnings every month to invest in a second stitching machine. She now plans to expand her business, which is currently stationed in her mother's room, by passing on the skill of stitching to her eldest daughter, who has completed her formal education.

SEWA Bharat – Success Stories & Sustainable beneficiaries

Sn	Name of beneficiary	Trade/ scheme Name	Category	Earning/Benefited amount
Skill and livelihood beneficiaries				
1	Ms Lalita Saket	Stitching	Schedule caste	9000 per month
2	Ms Babita Saket	Beauly culture	Schedule caste	3000-3500 per month
Social Security Beneficiaries				
3	Ms Richvai Devi Verma	Widow pension Scheme	Schedule Tribal	600 Rs per month
4	Ms Anuran Pandey	Old-age Pension	Other Backward Caste	600 Rs per month
5	Ms Navali Vishkarna	Ujjawal Gas scheme	Other Backward Caste	Getting Gas cylinders on subsidies rates.

In COVID times besides food relief material distribution, Sanitary and Delivery pads have been distributed amongst rural women and **48 SC/ST** women benefitted.

4. **<u>Rural Sports & Inter School Sports Meet</u> – 715 SC/ST students** have participated in Athletics Coaching camps, Inter School Sports Meets and Volleyball/ Football/ Cricket tournaments.

Meritorious girls (***Saket sisters who belong to SC category***) attended the Inter School Sports Meet organised by NTPC Vindhyachal in 2017 and thereafter participated in the Athletics coaching camps for the meritorious participants. As these girls had exceptionally performed in Sports and also had good Academics grades, NTPC Vindhyachal has sponsored their education for Class XI and XII and admitted them to Saraswati Vidya Mandir, in NTPC Vindhyachal campus, to provide them better opportunities for education and participation in Sports events. Their entire educational expenses including school fees, books, school dress and participation in Sports events of these meritorious girls has been borne by NTPC Vindhyachal and they have also been provided Bicycles.

Success stories of 3 teenaged girls

PIONEER NEWS SERVICE ■ VARANASI

Sometimes, all one needs is someone to help them reach the greatness they are ready to achieve. Tales of failure are often woven around a single link of support, one that helps the person to showcase one's best potential. A similar story is about Kusum, Rajni and Mamta Saket, three 16-year-old girls who took the first step of their lives in athletics and today they recognise the sport as their identity.

In 2016, three girls studying in a government school in Singrauli district of Madhya Pradesh came to know about the Rural Sports Meet to be held at Vindhyachal Super Thermal Power Project (VSTPP) of NTPC. These girls, who belong to poor families and earnestly live with their daily wage parents, were hesitant to participate in the first rural sports meet. Yet with uncertain steps, these girls made their way to participate in the rural sports meet organised for 24 government schools at Ambedkar Stadium in NTPC-Vindhyachal Township. VSTPP selected these three girls along with 67 other students to participate in the athletics coaching camp, who with their courage and determination performed better in the Runi Sports Meet, made their place in athletics coaching camp and then did not look back.

The girls attended a coaching camp organised by VSTPP from year to year to hone their skills and understand the finer points of the game. Practicing for three years under the guidance of expert coaches from the National Institute of Sports (NIS) and the Singrauli District Athletics Association, the girls left no stone unturned in their endeavours and overcame all obstacles in their path, the girls practiced day and night and devoted themselves to sports.

In this journey, VSTPP cooperated at every step and held hands. It helped the budding sports champions to take care of their nutritional needs and excel at every step of the way by providing them sports kits, bicycles for commuting. Girls who had once hesitated to step outside their comfort zone, now competed in district, state, regional and national level athletics competitions across the country.

Kusum Saket has a total of 17 gold medals apart from four silver and one bronze. She won two gold medals and one silver in regional athletics competitions organised for Madhya Pradesh and Chhattisgarh by Vidya Bharati All India Institute of Education affiliated to School Games Federation of India (SGFI). She also won five gold medals in the state level athletics competition. Similarly Rajni Saket won one gold, silver and bronze each in regional level athletics competition, while for gold in state level competitions. Mamta Saket won three gold and one silver in the state level competition apart from one gold and one silver in the regional level competition.

"I love competing in championships and it is the most gratifying feeling in the world to see the proud eyes of my parents and teachers. The word 'thank you' cannot be filled with gratitude, because it is not possible to express in word the gratitude I feel to NTPC-Vindhyachal for introducing me to athletics. I have spent my whole life in this sport. I want to dedicate to it further, said an excited Rajni.

The girls performed very well by securing first class in their class X board exams. They earnestly try to achieve their goals by practicing for hours on the field along with the studies.

VSTPP got these girls admitted to the Saraswati Shishu Mandir School and also sponsored their education based on their outstanding performance on the field and their excellent academic record, so that they can get their education better. With the support of such a column by NTPC-Vindhyachal, these girls can realise their dreams of making Singrauli district on the Indian map.

Three successful rural girls of VSTPP area

Pioneer


5. **Physical Aids for Physically Challenged persons (PCPs)** –Artificial limbs, Caliper, Crutches, tricycles have been distributed wherein **48 SC/ST PCPs** have benefitted

Brief on CSR activities fo NTPC Vindhyachal

The annual CSR spend in various domains like Education, Health & Sanitation and animal husbandry, Vocational Training, Infrastructure, Water, Sports/Art & Culture, Maintenance of Assets, and Strategically Important Activity from FY 2010-11 onwards till FY 2019-20 is as given below:-

FY (2010 onwards)	CSR Spend (Rs. Lakhs)
2010-11	47.03
2011-12	111.98
2012-13	89.47
2013-14	179.19
2014-15	479.79
2015-16	2521.28
2016-17	1668.83
2017-18	595.71
2018-19	916.67
2019-20	954.74

Key initiatives/ Focus areas (2014 -2020)

SNo.	Activity Head
1	Education
2	Health
3	Skill Development
4	Sports
5	Physically Challenged Persons
6	Infrastructure development, Medical & Others

1. Education

✓ **Project Udaan –** NTPC Vindhyachal has funded Project 'Udaan' started by District Administration in 2019 with the objective to bring about quantitative and qualitative improvement in the Class X exam results that had been at below expectation level and significantly lower than the State Average.

In the first phase of Project 'Udaan' , training was imparted to Teachers during May-June '19 to equip them with strategic inputs to prepare the students for targeted based studies.

In the 2nd phase of Project 'Udaan', 13255 students studying in 144 High Schools, who appeared in Class X Board exams, have been provided with Remedial Module prepared by subject experts for 4 subjects (English, Maths, Science and Social Science). The module is to facilitate and enable the students for academic upgradation, qualitative improvement in learning and exam preparation and thereby bring out improvement in overall exam results of Class Xth.

✓ **Film Based Teaching methodology (FBTM)** – The project was started to improve ***student learning outcomes*** in Government Primary Schools in 2018. The project entails use of innovative Film Based Teaching Methodology **(FBTM®)** to teach Mathematics to Primary Level students of selected schools in Singrauli. A Technology Integrated Teaching Learning Interface (TITLI®) software has been installed in all schools to automate planning, delivery and monitoring of the FBTM® classes. Based on the learning levels, students were divided into two groups:

- Group A – Slow learning speed and low attendance, Group B – Faster learning speed and regular attendance and interventions also made to ***increase school attendance***. English, Vocational and creative activities and 'Bal Sansad' were also conducted.

  Project was started at 5 Govt. Primary school and now extended to 10 more Govt. Primary school through NGO- Bharat Learn.

✓ **Girl Empowerment Mission (GEM)** – Under this ***Transformational Project first started at NTPC Vindhyachal amongst all NTPC stations,*** Class V girls (Age-10-12 yrs) were exposed to month long activity based learning and also various life skills coaching, self defence, counselling on various health issues , yoga , sports , computers , music dance, art & craft etc., fields/ areas which are generally not taught in their schools, to give them holistic perspective of life. 2 batches of 2018 and 2019 have participated. ***As part of inclusive education, 20 meritorious girls (9 are SC/ST) of GEM batch 2018 and 2019 are being educated in DPS & DePaul School and full expenses are being borne by NTPC***.

✓ **Personality Workshop for Govt Schools**


Grassroots

Grassroots

Embodying hope while raising questions about rehabilitation

The recent announcement by the Ministry for Human Resources Development, of the government's plan to set up a special university for the disabled may well cater to each special problem. The current dilemma is that there is a problem of regular influx of students in regular areas while urban children have problems of adjustments. The assessment of social and emotional development may vary from one community to another, economic profile and, often, the individual need of each child. Some CSR projects are, however, making a difference

MANJIRA MAJUMDAR, Kolkata / Sagwah, Uttar Pradesh

School Infrastructure and Stationary, celebration of Independence and Republic Day – School Furniture, water coolers etc have been provided to schools as per requirement.	**Asha Kiran School** (***for deaf and dumb children***) is run by Suhasini Sangh (Ladies Club) and financial support provided by NTPC Vindhyachal.

Solar lanterns have been distributed	**NTPC Urjanchal Scholarship & NTPC Utkarsh Scholarship scheme**

2. Health

- ✓ **Medical & Health Camps** such as **General Health camp, Eye Camp, Family Planning Camp** are conducted wherein the patients are provided free consultation and medicines and also surgeries done and referred to Vindhya hospital in case further investigation and treatment of the patient is required. Blood Bank is also operational through Red Cross Society.
- ✓ Under '**Transform Singrauli' Ante Natal Camps** (for pregnant ladies and new mothers and babies)have also been organised wherein **Gur chana** has been distributed in 18 Gram panchayat and 2 wards of 'Aspirational district' as organic nutritional supplement so that iron levels of the mother and child are boosted for their well being. Even in COVID times the distribution of Gur chana amongst Pregnant women is being carried out through an NGO maintaining social distancing norms.

- ✓ **Mobile Health Van** operates for providing medical services

3. Skill Development and Vocational Training

✓ Various Skill Development and Vocational Training programs such as Bag Making, Masala making, Crusiya Training, Computer Training , ***Artefact making with Ash and Gypsum*** have been organised in which **96 SC/ST** participants have benefited. NTPC Vindhyachal in partnership with SEWA Bharat, an NGO extended skill development and capacity building trainings such as Detergent, Agarbatti, soap, phenyl making, Potteries and terracotta product making, Tailoring, Beauty Parlor management, Mushroom, Bedside Nursing, Sanitary napkin manufacturing, Dona Pattal making and Computer training have been organised to the women of Singrauli with a vision of making them Self Sustainable. Formed a women's cooperative named 'Udhyogini'.

Besides Social Security Linkages, Digital Financial Literacy Camps and trainings have also been conducted.

Activity	ST	SC	Total
Livelihood Trainings	41	66	107
Social Security Linkages beneficiaries	1098	1942	3040
Digital Financial Literacy Camps	269	327	596
Digital Financial Literacy Training	25	52	77
Total	**1433**	**2387**	**3820**

Lalita Saket (SC category) is a success story. After completing her training, Saket managed to earn Rs 3,000-5,000 every month by tailoring clothes for the people living in her neighbourhood and is now earning upto Rs. 9000/- per month. A sound entrepreneur, Lalita also set aside a part of her earnings every month to invest in a second stitching machine. She now plans to expand her business, which is currently stationed in her mother's room, by passing on the skill of stitching to her eldest daughter, who has completed her formal education.

SEWA Bharat – Success Stories & Sustainable beneficiaries

Sn	Name of beneficiary	Trade/ scheme Name	Category	Earning/Benefited amount
Skill and livelihood beneficiaries				
1	Ms Lalita Saket	Stitching	Schedule caste	9000 per month
2	Ms Babita Saket	Beauly culture	Schedule caste	3000-3500 per month
Social Security Beneficiaries				
3	Ms Richvai Devi Verma	Widow pension Scheme	Schedule Tribal	600 Rs per month
4	Ms Anuran Pandey	Old-age Pension	Other Backward Caste	600 Rs per month
5	Ms Navali Vishkarna	Ujjawal Gas scheme	Other Backward Caste	Getting Gas cylinders on subsidies rates.

In COVID times besides food relief material distribution, Sanitary and Delivery pads have been distributed amongst rural women.

4. **<u>Rural Sports & Inter School Sports Meet</u>** –Athletics Coaching camps, Inter School Sports Meets and Volleyball/ Football/ Cricket tournaments are organised regularly.

Meritorious girls (***Saket sisters who belong to SC category***) attended the Inter School Sports Meet organised by NTPC Vindhyachal in 2017 and thereafter participated in the Athletics coaching camps for the meritorious participants. As these girls had exceptionally performed in Sports and also had good Academics grades, NTPC Vindhyachal has sponsored their education for Class XI and XII and admitted them to Saraswati Vidya Mandir, in NTPC Vindhyachal campus, to provide them better opportunities for education and participation in Sports events. Their entire educational expenses including school fees, books, school dress and participation in Sports events of these meritorious girls has been borne by NTPC Vindhyachal and they have also been provided Bicycles.

Success stories of 3 teenaged girls

PIONEER NEWS SERVICE ■ VARANASI

Sometimes, all one needs is someone to help them reach the greatness they are ready to achieve. Tales of failure are often woven around a single link of support, one that helps the person to showcase one's best potential. A similar story is about Kusum, Rajni and Mamta Saket, three 16-year-old girls who took the first step of their lives in athletics and today they recognise the sport as their identity.

In 2016, three girls studying in a government school in Singrauli district of Madhya Pradesh came to know about the Rural Sports Meet to be held at Vindhyachal Super Thermal Power Project (VSTPP) of NTPC. These girls, who belong to poor families and earnestly live with their daily wage parents, were hesitant to participate in the first rural sports meet. Yet with uncertain steps, these girls made their way to participate in the rural sports meet organised for 24 government schools at Ambedkar Stadium in NTPC-Vindhyachal Township. VSTPP selected these three girls along with 67 other students to participate in the athletics coaching camp, who with their courage and determination performed better in the Rural Sports Meet, made their place in athletics coaching camp and then did not look back.

The girls attended a coaching camp organised by VSTPP from year to year to hone their skills and understand the finer points of the game. Practicing for three years under the guidance of expert coaches from the National Institute of Sports (NIS) and the Singrauli District Athletics Association, the girls left no stone unturned in their endeavours and overcame all obstacles in their path, the girls practiced day and night and devoted themselves to sports.

In this journey, VSTPP cooperated at every step and held hands. It helped the budding sports champions to take care of their nutritional needs and excel at every step of the way by providing them sports kits, bicycles for commuting. Girls who had once hesitated to step outside their comfort zone, now competed in district, state, regional and national level athletics competitions across the country.

Kusum Saket has a total of 17 gold medals apart from four silver and one bronze. She won two gold medals and one silver in regional athletics competitions organised for Madhya Pradesh and Chhattisgarh by Vidya Bharati All India Institute of Education affiliated to School Games Federation of India (SGFI). She also won five gold medals in the state level athletics competition. Similarly Rajni Saket won one gold, silver and bronze each in regional level athletics competition, while for gold in state level competitions. Mamta Saket won three gold and one silver in the state level competition apart from one gold and one silver in the regional level competition.

"I love competing in championships and it is the most gratifying feeling in the world to see the proud eyes of my parents and teachers. The word 'thank you' cannot be filled with gratitude, because it is not possible to express in word the gratitude I feel to NTPC-Vindhyachal for introducing me to athletics. I have spent my whole life in this sport. I want to dedicate to it further, said an excited Rajni.

The girls performed very well by securing first class in their class X board exams. They earnestly try to achieve their goals by practicing for hours on the field along with the studies.

VSTPP got these girls admitted to the Saraswati Shishu Mandir School and also sponsored their education based on their outstanding performance on the field and their excellent academic record, so that they can get their education better. With the support of such a column by NTPC-Vindhyachal, these girls can realise their dreams of making Singrauli district on the Indian map.

Three successful rural girls of VSTPP area

Pioneer


5. **Physical Aids for Physically Challenged persons (PCPs)** –Artificial limbs, Caliper, Crutches, tricycles have been distributed

6. Other CSR initiatives that have also benefitted the neighbouring communities at large:
    a. Construction of roads, community centres, public health centres, Aaganbadi kendras etc.
    b. Integrated Water Supply Scheme for Waidhan
    c. District Disability Rehabilitation center (DDRC) has been constructed
    d. Adivaasi Chaatravaas (100 bedded Girls hostel for Tribal girls) at Khanua (under construction)
    e. Under Construction - Stadium at Patulkhi & Khutar & Kanchan Bridge
    f. Concrete Road along with Drains of length 22 KM in Waidhan area
    g. Renovation of 23 Govt. Schools in nearby villages/wards
    h. Construction of 18 Anganwadis
    i. Construction of utility buildings like bus stand, panchayat kendras, rest shelters etc.
    j. Organizing Kisan mela and animal welfare camps for farmers.
    k. Swatcha Rally and Competitions like essay, painting, conducted during Swatchta Pakhwada
    l. Camps for Physically Challenged Persons
    m. 8 nos. Community Toilets have been constructed at various locations

n. Financial assistance has been provided for **Deen Dayal Rasoi Yojana**, a community kitchen and canteen (**Annapurna Kachra exchange Café**) started by Nagar Palika Nigam wherein in exchange for kachra (polythene waste) collected by the BPL persons, they are provided fooding.

o. Regeneration and beautification of Ponds has been done at Dhonti, Gahilgarh and Saraswah Lal and 415 handpumps have been installed at various locations.

SN	Area	Detection System	Protection System	Remarks
d.	All Control rooms, MCC and Switchgear rooms (Compressor house, DG set area or any other local MCC / Swgr. rooms)	Ionisation type smoke detectors	Fire extinguishers	
5.4	**Coal Handling Plant**			
a.	Coal Conveyors	a)- b) LHS cable type heats detectors and infra red type heat detectors c) Linear heat sensing cable type heat detectors, Quartzoid bulb type heat detectors (With hydraulic / pneumatic detection pipe network) and Infra-red type heat detectors	a) Hydrants / monitors b) i) Sprinkler system ii) Solenoid operated automatic MVW spray system and hydrant system c) Automatic MVW spray system and hydrant system	Hoses to be provided in central hose houses
b.	Transfer points & crusher houses	Quartzoid bulb type heat detectors	a) Automatic MVW spray / sprinkler system and hydrant system (Landing valves and / or water monitors) b) Hydrants	
c.	Coal Handling plant Control rooms, MCC and Switchgear rooms	Ionisation type smoke detectors	a) Fire Extinguishers b) Hydrants (outside)	
d.	Cable galleries in CHP Control/ Switchgear rooms (if any)	Linear heat sensing cable type heat detectors; Ionisation and photoelectric type smoke detectors	a) Automatic MVW Spray System and Fire Extinguishers b) Hydrants (outside)	
e.	Transformers of rating 10 MVA or in case of oil field transformer with oil cap 2000 liters and above within the plant premises	Quartzoid bulb type heat detectors (With hydraulic detector pipe network)	Automatic HVW spray system and fire extinguishers hydrant system	Hoses to be provided in central hose houses
5.5	**Fuel Oil Handling**			
a.	Fuel Oil Tanks (PETROL/NGL/HSD) HFO/LDO	Linear heat sensing cable type heat detectors, Quartzoid bulb type (With pneumatic detection pipe network) heat detectors	Foam injection system and automatic / manual MVW spray system (for uninsulated tanks)	
b.	Fuel oil dyke	-	Hydrant system (Hydrants & water monitors)	Hoses to be provided in central hose houses

The various hazards in a power station and the methods to prevent these are given in the following table

SN	Area	Fire Hazard	Fire Prevention
4.1	Coal Stockyard	Self-ignition due to coal air interaction (Dry coal-wet air during March to June period is the most critical combination and moist coal-dry air the most favourable combination)	1. Coal to be visible wet while stacking. 2. Fresh coal not to be stacked over old coal. In case freshly mined coal has to be stacked over old coal, latter's temperature should first be measured. If the temp. is more than 50°C coal should be drenched with sufficient water (As per LMI V-LMI-OGN-OPS-SYST-013 "Manual on Handling and Storage of Coal" Rev. 2 Issue. 1 Clause-3.1.9). 3. Coal to be stacked layer by layer (each of 1-1.5M height) with compaction of each layer 4. Regular spray of water over coal yard to be done. 5. Stacking to be done in trapezoidal stockpile and not in conical. 6. Proper records of period of stacking to be maintained and the principle of **FIFO** (**First In First Out)** to be adopted. 7. Piles should be regularly inspected for high temperature of coal / any smoldering coal and suitable action to be taken to pour water/remove burning coal. (As per LMI V-LMI-OGN-OPS-SYST-013 "Manual on Handling and Storage of Coal" Rev. 2 Issue. 1 Clause-3.1.3). 8. Coal should be piled in such a manner that air can circulate freely to dissipate heat. For crushed coal the pile should be packed thoroughly to ensure the complete absence of air. (As per LMI V-LMI-OGN-OPS-SYST-013 "Manual on Handling and Storage of Coal" Rev. 2 Issue. 1 Clause-3.1.19). **Responsibility : AGM (CHP-opn)**
4.2	Bulldozers, Pay-loaders etc.	Coal dust and oil deposits combined with hot exhaust pipes, fuel oil tank, fuel oil leakages, cables	Regular cleaning of engine compartment, inspection to check for any fuel leakage. **Responsibility : AGM (CHP-MAINT)**

विंध्याचल
Vindhyachal

Type text here

DISASTER MANAGEMENT PLAN

OF VINDHYACHAL SUPER THERMAL POWER STATION

REVIEWED ON: 26.05.2018, REVISION NO: 05 (2018)

NTPC Limited

VINDHYACHAL SUPER THERMAL POWER STATION
VINDHYANAGAR, SINGRAULI – 486885 (M.P.)

				5. Trained operators are deployed. 6. In case the leakage is heavy, the generator is immediately shut down and purged out with CO2. 7. It is ensured that cutting and welding works near generator are not allowed with hydrogen in casing. 8. Mostly all piping and equipments have been made thermally insulated to reduce heat loss. 9. Rotary equipments are well guarded. 10. Acoustic enclosures have been installed around turbines to reduce noise levels. 11. Ear-plugs are provided and its use is ensured. 12. Fire extinguishers of different types are ensured in sufficient numbers at different places for emergency handling. 13. Comprehensive network of fire hydrant system with fire hoses and nozzles in place.
4	Fuel oil handling Area	HFO & HSD	Fire	1. Fire Hydrants provided. 2. Foam spray system provided. 3. Foam type fire extinguishers provided for emergency. 4. Sprinkler system is installed.
5	Chlorination building	PT Plant- I, II, III & CW-I, II, III.	Exposure to Chlorine	1. To control such leakage emergency sealing kits have been provided. 2. Staffs have been trained to seal any leakage with the help of emergency kit consisting of Breathing apparatus, apron etc. 3. Neutralization pit to neutralize the leakage if any.

In case of a major emergency, as per the instructions from CIC and WIC, Site Controller along with other key personnel shall coordinate for emergency management functions as per duties assigned in Table 5.1. Ambulance, Hospital and surrounding off-site community which are coming within the vulnerable zones of IDLH will also be informed accordingly.

Head of Safety will reach the spot, assess the situation and provide necessary advice accordingly.

d. Action to be taken after the end of chlorine emergency
After neutralization and end of emergency, water shall be disposed to ETP along with main plant effluent for further treatment.

The chlorination plant shall be restarted only after attending leakages as per the operating instructions.
All low-lying areas especially along downwind direction are to be tested and be confirmed of absence of chlorine, as the leakage of chlorine can settle in low-lying areas.

7.1.2 In case of leakage of HFO/LDO:

a. Action to be taken by the operator
- Report the incident immediately to the Shift Charge Engineer.
- Reach the leakage spot and cooperate with maintenance team in arresting/containing the leakage.
- Ensure that dyke outlet is closed and no oil is coming out from the dyke to avoid mixing with water in storm water drain.
- Monitor the area to protect any kind of ignition sources.

Engineering team will let out chlorine in the neutralizing pit through proper means.

b. Action to be taken by the Shift Charge Engineer In case of leakage of oil in FOPH area, he will
  - Confirm the leakage in discussion with the operator.
  - Arrange staff of mechanical maintenance to go to the spot of leak and take necessary action to contain the release.
  - Arrange to inform the following personnel immediately:
    - AGM/DGM/Sr.Supdt/ Shift In-charge (Site Controller) depending on seriousness
    - CISF team (Fire & Rescue)
- HOD(Safety) / Safety Officer

c. Action to be taken by the DGM/Chief Manager/ Shift In-charge (Site Controller)

He will coordinate all the activities during the release. He will ensure Fire safety precautions to prevent any fire hazard leading to an emergency. In case of emergency, he will arrange to inform all key persons and take necessary actions as laid down in Table 5.1.

In case of fire, water hydrant system as well as foam pourer systems will be on operation and only mechanical foam, which is biodegradable, will be used.

In case of a major emergency, as per the instructions from CIC and WIC, Site Controller along with other key personnel shall coordinate for emergency management functions as per duties assigned in Table 5.1.

Head of Safety will reach the spot and ensure that all necessary fire safety precautions are taken to prevent any fire hazard and provide necessary advice.

d. Action to be taken after the end of HFO/LDO release emergency

- Water used in fire fighting will be dispersed to industrial waste water drain.
- Transfer the oil (HFO/LDO) from leaking tank to other tank as follows:
- Keep the suction of the leaking tank open to the pump.
- Close the suction of the other tank.
- Open the re-circulation to the other tank and close the re-circulation of the leaking tank.

- Spilled oil from the tank in the dyke shall be removed by pumping the same and collect in the separate tank.

7.2 Declaration of Emergency and Evacuation procedures:

Public address system has been provided in the plants. Telephone, inter communication facilities and walki-talkies etc. are also available at desks and with officials. The emergency alarm will be a wailing sound for 45 seconds irrespective of type of emergency.

Shift In charge/Shift engineer from ECC will operate the siren on approval by the WIC.

Contact : +91 - 9810243870

EKO PRO ENGINEERS PVT. LTD.

Environmental Consultants and Analytical Laboratory

(An ISO 9001:2015 Certified Company)

Office & Laboratory : 32/41, South Side of G. T. Road, UPSIDC Industrial Area, Ghaziabad - 201 009 (Delhi-NCR) INDIA.
Contact No. : 9711159210, 9711159427, SMS/Whatsapp No. : 9711163422; E-mail : email@ekopro.in, ekoproengineers@gmail.com, website : www.ekopro.in

TEST REPORT

Ambient Air Quality Monitoring

Test Report No. : EKO/194/190320 **Issue Date : 19/03/2020**

Issued To : VINDHYACHAL SUPER THERMAL POWER STATION
Vindhya Nagar,
District - Singrauli
Madhya Pradesh

Sample Description : Ambient Air
Sample Drawn by : EPEPL Representative
Sampling Location : L5 = Stage V (Coal Mill Area), L6 = CHP, L7 = Near Jwala Mukhi Mandir, L8 = Rose Garden Jayant
Sampling Time : 24.0 Hrs.
Sampling Plan & Procedure : SOP-AAQ/15
Remark (if any) : Instrument Use RDS & FPS

RESULTS

S. No.	Parameters	Test Methods	Sampling Date/Results				Units	Limits as per CPCB Notification, 18th Nov 2009
			L5-13.03.20	L6-16.03.20	L7-12.03.20	L8-14.03.20		
1	Particulate Matter (PM10)	IS: 5182 (P-23)	91.52	87.25	76.25	78.78	$\mu g/m^3$	100.0
2	Particulate Matter (PM2.5)	EK0/CHEM/SOP/AAQ/01	48.52	47.64	38.78	39.12	$\mu g/m^3$	60.0
3	Sulphur Dioxide (as SO_2)	IS: 5182 (P-2)	25.65	23.29	24.36	21.98	$\mu g/m^3$	80.0
4	Nitrogen Dioxide (as NO_2)	IS: 5182 (P-6)	24.32	22.14	23.23	20.42	$\mu g/m^3$	80.0
5	Carbon Monoxide (as CO)	IS: 5182 (P-10)	ND	ND	ND	ND	mg/m^3	4.0
6	Mercury (as Hg)	EKO/CHEM/SOP/FL-082	ND	ND	ND	ND	$\mu g/m^3$	-

Remark- ND- Not Detected, LOD- Limit of Detection. (Detection Limits for CO- 0.5 mg/m3, & Mercury- 0.1 µg/m3).

Notes :

1. The results given above are related to the tested sample, for various parameters, as observed at the time of Sampling. The customer asked for the above tests only.
2. This test report will not be generated again, either wholly or in part, without prior written permission of the Laboratory.
3. The test report will not be used for any publicity/legal purpose.
4. The test samples will be disposed off after 15 days from the date of issue of test report, unless until specified by the customer.
5. Responsibility of the Laboratory is limited to the invoiced amount only.

**** End of Report ****

For EKO PRO ENGINEERS PVT. LTD.
PURNIMA CHAUHAN
TECHNICAL MANAGER
(Authorised Signatory)

ENVRIONMENTAL STATEMENT OF NTPC VINDHYACHAL

YEAR: 2018-19

NTPC LTD., VINDHYACHAL SUPER THERMAL POWER STATION
PO: Vindhyanagar, District Singrauli-486885, Madhya Pradesh, India

CONTENTS

ABOUT NTPC VINDHYACHAL

NTPC-Vindhyachal Super Thermal Power Station (VSTPS) is the **Largest Thermal Power Station of India, 9th largest in the world** and is the flagship unit of NTPC Ltd (a MAHARATNA company of Govt. of India). The station is engaged in generating Electricity using coal as fuel, and delivering to the Western Region Power Grid. The station enjoys the advantage of being a pithead station, with its own Merry Go Round System for coal transportation from linked mines. The station is headed by a Business Unit Head (BUH) with various functional heads under him to deliver the strategy.

The process of generation of electricity at VSTPS starts with the raw coal crushing in CHP. This crushed coal is sent to boiler where it is burnt to generate steam in boiler tubes. Make up water is drawn from NTPC Singrauli discharge canal & is treated to generate de-mineralized (DM) water and circulated through the boiler tubes and converted into steam, which drives the turbo generator, creating electric energy. This energy is stepped up to high voltage (400KV) power by generator-transformer and supplied to customer. Water drawn from Singrauli discharge canal is used to cool the de-pressurized steam in the Condenser. The hot circulating water from the condenser is in-turn cooled in the cooling towers in a closed cycle with makeup for evaporation losses. The ash generated out of combustion of coal is collected at the bottom of the Boiler and ESPs, is discharged into Ash Pond by the Ash Slurry pumps. Dry ash from ESP is transferred to Silos to facilitate utilization.

NTPC Vindhyachal is using CII-EXIM Business Excellence Model for periodic evaluation of strengths and weakness of its business processes and health of the station as a whole. Vindhyachal Super Thermal Power Station consistently ranks amongst the cleanest, cost effective, reliable and quality power generating stations of India.

NTPC Vindhyachal is Largest Thermal Power Plant of India

NTPC-VSTPS AT A GLANCE	
Location	Vindhyachal Super Thermal Power Station PO: Vindhyanagar, Distt-Singrauli (M.P), Pin - 486885
Capacity	210MW X 6units + 500MW X 7units = 4760 MW, 13 units
Land	5800 Acres including ash dyke
Water Source	Discharge Canal from NTPC Singrauli
Coal Source	Nighai, Dudhichua Coal Mines of NCL
Transmission System	a. <u>400 KV:</u> i) 4 lines to Jabalpur ii) 4 lines to Satna iii) 2 lines to Korba iv) 2 lines to PGCIL Pooling Stn v) 2 lines for WR-NR HVDC back-to-back link b. <u>132 KV</u> 2 Lines to Waidhan
Nearest City	Varanasi & Rewa at 220 Kms. approx.
Nearest Railway Station/ Airport	Rly Station: Shaktinagar (10 Kms approx.) Airport: Varanasi (250 Kms approx.)

NTPC Vindhyachal at a Glance

Years of Operation:

VSTPS foundation stone was laid down by the then Prime Minister of India Late Smt. Indira Gandhi on 12th Nov, 1982 and its first unit was synchronized on 10th Oct, 1987. Adjacent table shows the journey of capacity addition & becoming the largest power station of India. Various state of the art technologies are being used in VSTPS for ease of operation and efficiency improvement in line with upcoming new technologies.

Stage	Unit No	Date of Synch.	Date of COD	Age in years
Stage-I	1	10.10.87	01.09.88	31 years
	2	20.7.88	01.09.89	30 years
	3	25.02.89	01.02.90	29 years
	4	26.12.89	01.09.90	29 years
	5	31.03.90	01.04.91	28 years
	6	01.02.91	01.02.92	27 years
Stage-2	7	03.03.99	01.07.00	19 years
	8	26.02.00	01.10.00	19 years
Stage-3	9	22.07.06	01.12.06	13 years
	10	08.03.07	15.07.07	12 years
Stage-4	11	13.06.12	01.03.13	06 years
	12	22.03.13	27.03.14	05 years
Stage-5	13	06.08.15	30.10.15	04 Year

NTPC Vindhyachal Years of Operation

Main Products, Services and Delivery mechanism

The Station units are engaged in generating Electricity using coal as fuel and delivering power to the Western Region Power Grid. Due to its location in the western region electrical grid Vindhyachal is occupying a pivotal position in the energy scenario of this region. The power generated from this station is delivered to the various bulk power purchasers in the region. These bulk power purchasers are the SEBs of various states and TRANSCOs of the states with whom long term PPA's have been signed from the inception stage itself.

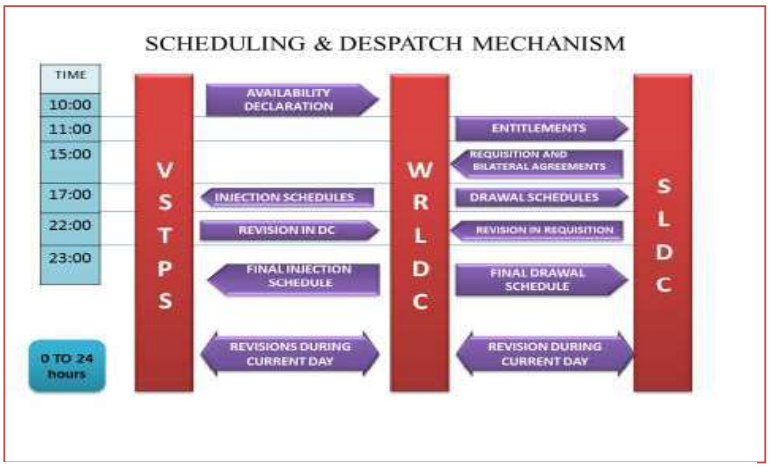


Fig:.1 Scheduling & Despatch Mechanism

Beneficiary States		
States	**% allocation**	**MW**
Maharashtra	33.6	1599
MP	27.4	1304
Gujarat	24.2	1152
Goa & DD	5.2	248
Chhattisgarh	4.66	222
Unallocated	4.94	235

Table:.1

The Station operates under three-part tariff regime and declares its Declared Capacity (DC) on day ahead basis. The scheduling of power is done by WRLDC based on the demand from the customers. The Station generates power according to the schedule given by WRLDC. One of the key expectations of all these customers is the delivery of power as per the agreed schedule. **Fig** :**.1** shows the delivery mechanism for reaching customers which is termed as Day ahead Scheduling and Dispatch mechanism. **Table:1** shows the beneficiary states from VSTPS. Real time monitoring for matching supply with the demand is done with the help of Integrated frequency monitoring system, a software which has been developed in-house.

PURPOSE, VISION, MISSION and VALUES

VSTPS has adopted a culture of Environmental Excellence, Sustainable Development, Total Quality and Safety in the power generation process coupled with development of surrounding community by providing healthy and stimulating environment for its employees and family members. It firmly believes that only a satisfied employee can bring about productivity and innovative solutions. NTPC Vision, Mission and Values are the driving force in our endeavour to ultimately produce and deliver Quality Power at optimum cost and in eco-friendly manner through team efforts and effective management systems.

Organization Vision, Mission, Core values and Station Vision			
NTPC Vision	**NTPC Mission**	**NTPC Core values**	**VSTPS Vision**
"To be the World's leading power company, energizing India's growth"	"Provide reliable power and related solutions in an economical, efficient and environment friendly manner, driven by innovation and agility."	• Integrity • Customer Focus • Organisational Pride • Mutual Respect and Trust • Initiative and learning • Total Quality and safety	To be India's Leading Power Station, Exceeding Stakeholders' Expectations.

Fig:.2

Vindhyachal Vision: Station Management has developed station specific Vision in line with NTPC Vision and articulated it as "**To be one of the largest, best and most efficient power stations of India**" after due deliberation. Subsequently, Station Management developed the attributes of Vision like '*Largest, Best and Most Efficient*' in terms of deliverables, targets, time-lines and actions/ strategies and also translated the same to various functional and Department levels. NTPC Vision/ Mission/ Values as well as the Station Vision are widely communicated and made uniformly understood across the station through standard presentation, various in house magazines, stationery, displays, intranet, training sessions and interactive meetings with employees, meets and events organized for vendors, customers and society representatives. The status of achievement of the deliverables is regularly reviewed and it is observed that while some of the deliverables have already been actualised such as Largest (to be 4760 MW) and best (Lowest Repair & Maintenance cost, Man/MW ratio etc), in some of the other attributes there is scope for improvement when compared with performance of NTPC best, accordingly action plan is under implementation.

Facilities, Technologies and Equipments

NTPC Vindhyachal has the world class facilities in the township, wherein all facilities to support of employees are available like world class school for children, Hospitals with latest facilities, Coaching institute for Medical Engineering entrance exams, Clubs for organising cultural activities, swimming pools, shopping centres, subsidized transportation facilities for Varanasi and Railway Stations etc.

The basic technologies of Boiler and Turbine in Stage-I and Stage-II to V are described in **Fig 1(a).5**. The control and other state of the technologies used in the station are DDCMIS, MAX DNA, VFD, DVR, CCTV, PADO etc. VSTPS steadily invests in operations to improve reliability. Ash utilization, LWTP and AWRS help to operate with minimal environmental impact. Stage-I 210 MW Units are of USSR make and the 500 MW Boiler, TG along with auxiliaries are equipped with state of the art technology supplied by M/s BHEL.

Stage	Unit No	Size of the unit	Operator interface	Technology	Make
Stage-I	1	210 MW	DDCMIS	Boiler: Dry bottom, corner fired, balanced draft, convective reheat, direct fired tilting burner type Turbine: Impulse reaction, reheat, closed cycle with regenerative blending type Generator: 210 MW, OFAF cooling, Self-Excited	**USSR**
	2	210 MW	DDCMIS		
	3	210 MW	DDCMIS		
	4	210 MW	DDCMIS		
	5	210 MW	DDCMIS		
	6	210 MW	DDCMIS		
Stage-2	7	500 MW	DDCMIS	Boiler: Controlled circulation, refilled tubing, dry bottom, top supported, radiant heat single drum balanced draft, tilting tangential type Turbine: KWU, 3 cylinder, reaction, reheat closed cycle type Generator & Aux: 500 MW, OFAF cooling, self-excited	**BHEL**
	8	500 MW	DDCMIS		
Stage-3	9	500 MW	DDCMIS		
	10	500 MW	DDCMIS		
Stage-4	11	500 MW	DDCMIS		
	12	500 MW	DDCMIS		
Stage-5	13	500 MW	DDCMIS		

Table :3: Facilities, Equipment & Technologies

NTPC Vindhyachal has also installed state of the art equipment of latest technology for protection of environment and pollution abatement & control. The details are as under:

a. 13 Nos. of High Efficiency Electrostatic Precipitators in all the units having efficiency more than 99.6% for control of particulate matter emissions through stacks.
b. Flue Gas Desulfurisation Unit has been installed in Unit 13 to reduce the SO2 emission levels to less than 100 mg/Nm3. Contract for installing FGD in 4 more Units has also been awarded.
c. 22 Nos. of closed circuit cooling towers for conservation of water.
d. 04 Nos. of Ash Water Recirculation systems for reuse of ash slurry disposal water after settlement of ash.
e. Dust suppression systems in the coal handling plants to minimize fugitive coal dust emission.
f. Coal slurry settling ponds for reuse of water.
g. 04 Nos. of Liquid Waste Treatment Plant (LWTP) for maintaining zero discharge of effluent and reuse of wastewater after treatment.
h. Sewage Treatment Plant of 6 MLD capacity for treatment of domestic sewage water and 100% recycling of treated sewage water.
i. Construction of New Sewage treatment plant of 6 MLD with MBBR technology is in progress.
j. Replacement of ash pipe lines with cast basalt lines which are virtually leak proof

Other State of Art Technologies used at VSTPS
FGD system in Unit-13 for SOx reduction
Optical Fibre vibration sensor for Measurement of Generator winding vibration
Wireless communication for Operation and monitoring of CW pumps, CT fans and AWRS using License free band
Modbus Communication & GSM network for issuing remote command for Remote calibration of SOX/NOX analyser by CPCB
VFDs for CT Fans for power saving
Dynamic Boiler Flame Analyser
PADO system for online performance optimization

TSI for on-line signature analysis of turbine vibrations
SWAS for online analysis of quality of steam & water
Preventing Erosion using High Chrome-Nickel Alloy for wet parts in Ash Slurry Pump
Micro-pulse PFT, Guided Radar based transmitters, SMART positioners in Valves.

Organization ISO certification

Vindhyachal is certified for QMS as **per ISO 9001:2015**, EMS as per **ISO 14001:2015** and OHSMS as per **OHSAS 18001:2007** and having its online Integrated Management System. The station is also certified in 5-S for workplace management. Apart from the above organization has taken accreditation form NABL for Coal lab.

ISO 14001:2015

IRCLASS
SYSTEMS AND SOLUTIONS PRIVATE LIMITED

CERTIFICATE OF APPROVAL

Issued by Indian Register Quality Systems
(A Division of IRCLASS Systems and Solutions Private Limited)

This is to certify that the Environmental Management Systems of

Organisation: NTPC Limited - Vindhyachal Super Thermal Power Station

Address: P. O. Vindhyanagar, Waidhan
Dist. Singrauli,
Madhya Pradesh - 486 885

has been assessed and found conforming to the following requirement

Standard: ISO 14001:2015

Scope: Generation of Thermal Power (4760 MW) and Supply to Grid

Certificate No.: IRQS/1830973

Original Certification Date : 16/07/2007

Current Date of Granting : 01/08/2018

Expiry Date : 06/07/2019

Indian Register Quality Systems
MGMT SYS RvA C 071

Shashi Nath Mishra
Head IRQS

This approval is subject to continued satisfactory maintenance of the Environmental Management Systems of the organization to the above standard, which will be monitored by IRQS. The use of the Accreditation Mark indicates accreditation with respect to activities covered by the certificate with accreditation no. C071. Condition Overleaf

COA/IRQS/RvA/EMS/Rev 00

Head Office: 52A, Adi Shankaracharya Marg, Opp. Powai Lake, Powai, Mumbai - 400 072, India.

PART - A

Environmental Statement for the Financial Year ending 31st March 2019

GENERAL INFORMATION

(i)	**Name and address of the owner/Occupier of the industries, operation or processes**	:	Shri Debashis Sen, **Executive Director (Vindhyachal),** NTPC Limited, Vindhyachal Super Thermal Power Station P.O. Vindhyanagar, Dist: Singrauli (MP) Pin: 486885
(ii)	**Industries category**	:	Coal Based Thermal Power Plant
(iii)	**Production Capacity**	:	Stage- I: 6 x 210 MW = 1260 MW Stage - II: 2 x 500 MW = 1000 MW Stage - III: 2 x 500 MW = 1000 MW Stage - IV: 2 x 500 MW = 1000 MW Stage - V: 1 x 500 MW = 500 MW **Total Station Capacity: 4760 MW**
(v)	**Year of establishment**	:	Stage - I October 1987 to September 1991. Stage - II March 1999 to July 2000. Stage - III Dec 2006 to July 2007. Stage -IV November 2012 To March 2013 Stage -V October 2015
(vi)	**Date of last Environment statement submitted**	:	25/09/2018

PART - B

WATER AND RAW MATERIAL CONSUMPTION

1. Water consumption in KL/Day

(i) For industrial cooling & boiler feed (Cat - I), in KL/Day

Stage	Capacity	Cooling Water	Boiler Feed	Total
Station	4760MW	262500	7119	269619

(ii) For Domestic Purpose (Cat - II) , in KL/Day

Stage	Capacity	For Domestic Purpose	Total
Station & township	4760MW	9469	9469

(iii) For other plant Process (Cat - III) , in KL/Day

Stage	Capacity	Total
Station	4760MW	75134

Name of Products	Process water consumption per unit of products		
	2017-18	2018-19	PLF% (2018-19)
Electricity	37495.572 MUs	37538.975	90.03%
Process water consumption	0.85 lit/kwh	0.731 lit/kwh	

2. Raw Material Consumption

Name of raw materials	Name of Products	Consumption of raw material per unit of output	
	Electricity	2017 - 18	2018-19
Coal		0.654 kg/kwh	0.659 kg/kwh
Oil		0.16 ml/kwh	0.189 ml/kwh
Any other		NA	N/A

PART - C

POLLUTION DISCHARGED TO ENVIORNMENT

Pollutants	Concentration of Pollutants in discharges	% Variation from Prescribed standard
1. Water		
Ash pond out flow		
TSS	69.61 mg/lit	NA
pH	7.39 Avg.	NA
BOD	15.20 mg/lit	NA
Plant drains:		
TSS	25.24 mg/lit	NA
pH	7.43 Avg.	NA
BOD	15.21 mg/lit	NA
Domestic Sewage:		
TSS	61.24 mg/lit	NA
pH	7.59 Avg.	NA
BOD	16.79 mg/lit	NA
2. Air (stack)		
Unit-1		
SPM(mg/NM^3)	98.07	
SOx (mg/NM3)	1051.41	NA
NOx(mg/NM3)	594.69	
Unit-2		
SPM(mg/NM^3)	97.64	
SOx (mg/NM^3)	1038.48	NA
NOx(mg/NM^3)	600.57	

Unit-3

SPM(mg/NM^3)	96.58	
SOx (mg/NM^3)	1038.81	NA
NOx(mg/NM^3)	598.28	

Unit-4

SPM(mg/NM^3)	97.70	
SOx (mg/NM^3)	1045.20	NA
NOx(mg/NM^3)	600.35	

Unit-5

SPM(mg/NM^3)	98.35	
SOx (mg/NM^3)	1038.39	NA
NOx(mg/NM^3)	599.98	

Unit-6

SPM(mg/NM^3)	96.69	
SOx (mg/NM^3)	1036.96	NA
NOx(mg/NM^3)	604.20	

Unit-7

SPM(mg/NM^3)	71.27	
SOx (mg/NM^3)	1047.53	NA
NOx(mg/NM^3)	580.91	

Unit-8

SPM(mg/NM^3)	70.16	
SOx (mg/NM^3)	1035.77	NA
NOx(mg/NM^3)	583.90	

Unit-9

SPM(mg/NM^3)	46.47	
SOx (mg/NM^3)	1042.75	NA
NOx(mg/NM^3)	556.66	

Unit-10

SPM(mg/NM^3)	46.36	
SOx (mg/NM^3)	1042.86	NA
NOx(mg/NM^3)	569.12	

Unit-11

SPM(mg/NM^3)	45.88	NA
SOx (mg/NM^3)	1039.12	
NOx(mg/NM^3)	570.79	

Unit-12

SPM(mg/NM^3)	**46.07**	**NA**
SOx (mg/NM^3)	**1035.73**	
\NOx(mg/NM^3)	**599.28**	

Unit-13

SPM(mg/NM^3)	**45.50**	**NA**
SOx (mg/NM^3)	**785.14**	
\NOx(mg/NM^3)	**529.77**	

3. Air (Ambient)

	UOM	PT Plant	NH - 2	MGR Workshop	Hindi School
PM_{10}	µg/m^3	58.34	56.35	60.67	55.56
$PM_{2.5}$	µg/m^3	34.17	34.44	36.82	38.39
SO_2	µg/m^3	36.59	37.04	42.74	35.79
NO_X	µg/m^3	35.23	37.35	39.38	37.30

PART - D

HAZARDOUS WASTE

Hazardous wastes	2017 - 18	2018-19
1. From Process		
(a) Used Oil	50 MT	Nil
(b) Resin from DM-Plant	NIL	14.99 MT
(c) Discarded Container	12.24 MT	Nil
(d) Used batteries	524 Nos.	Nil
2.From pollution control facilities: NIL		

PART - E

SOLID WASTES

Solid Wastes	2017 - 18	2018 - 19
a. From Process		
(i) Coal Ash	7958003 MT	8324181 MT
b. From Pollution Control Facility: Nil		
c. Quantity recycled or re-utilized within the unit.		
(i) Ash utilization	1957993 MT	2673727 MT

Ash Utilization Details

	Quantity (Lac MT)	
	2017 - 18	**2018-19**
Fly ash issued to Industries (Cement & Asbestos)	0.43	0.66
Fly ash issued to outside brick plants	1.11	0.99
Fly ash used for brick manufacturing at NTPC Vindhyachal	0.15	0.23
Fly ash used for Ash Dyke Raising	3.98	16.88
Fly ash used in Landfill / Wasteland development	5.67	2.13
Bottom ash cover in Ash Dyke & Others	8.23	5.81
TOTAL	19.57	26.73

PART - F

	Quantity	Nature	Disposal method
A. Hazardous Waste			
Used Oil	Nil	Black liquid	Sold to authorized agencies.
Spent Resin	14.99 MT	Granular solid	Disposed through TSDF
Discarded containers	Nil	Solid	Sold to authorized agencies.
B. Solid Waste			
Coal Ash	8324181 MT	Enclosed	Enclosed

Characteristics of Fly Ash:

Paramters	Unit	Concentration
Loss on Ignition	%	0.12 - 0.37
Silica	%	64 - 64
Reactive SiO_2	%	27.5 - 31.5
Iron Oxide	%	5.5 - 7.0
Alumina	%	23.36 - 24.51
SiO_2+Al_2O_3+Fe_2O_3	%	94.01 - 94.89
Calcium Oxide	%	0.68 - 1.17
Magnesium Oxide	%	1.04 - 1.58
Total Sulphur	%	0.08 - 0.16
Available Alkalies	%	0.07 - 0.16
Chloride	%	0.003 - 0.004

Disposal of Fly Ash:

Fly ash is utilized by providing it free of cost on as is where basis to cement industries, asbestos industries, ash brick manufactures. Ash is also utilized for civil works in ash dyke, wasteland development etc. Unutilized fly ash is being disposed off in the captive ash dykes.

PART - G

Impact of the pollution control measures taken on conservation of natural resources and consequently on the cost of production

1. Energy Conservation measures during the year 2018-19:

S.No.	Title of Project	In Energy term (MU)	In Energy Term (Ton of Coal)	Annual Electrical Cost Saving (Rs Lacs)
1	Conventional Lights replaced with LED.	20.000	--	300.0
2	1- 569 KWp Solar PV pannel on roof top Commissioned	0.608	--	9.1
3	1-Polymer coating done in CW Pump-1A in stage-I. Saving 60 kw since 19.05.2018.- Polymder coating in CW Pump-2A/2B done (29.9.18)	0.970	--	14.5
4	1- BFP-1A cartridge replacement in Stage-I. Saving 170 KW since 19.05.2018	1.277	--	19.2
5	Draft Power improvement by 210 KW. (OH completed in 16.01.19)	0.373	--	5.6
6	VFD istallation for FAHP pump in stage-II (Two nos, each in Unit-7 & 8). Commissioned in Aug-18. (Expected saving 10 KW in each pump).	0.117	--	1.7
7	Revamping of duct in Unit-8 in Jul-18. (1.0 KW/MW saving in draft power). OH completed on 25.07.18.	2.892	--	43.4
8	Stage-II reciprocating type A/C compressor is replaced with Screw Chiller type. Saving 170 Kw.	1.102	--	16.5
9	U#8 Capital OH of Turbine. HPT & IPT efficiency improved by 6% & 2% respectively. Gain in Heat Rate by 37 Kcal/Kwh.	-	--	562.7

10	Unit#11 Condenser tube chemical cleaning during OH. Gain due to improvement in Vacuum by 10 Kcal/Kwh (saving for 12 months considered) . Unit commissioned on 29.8.2017 after OH & Chemical cleaning).	-	11873	254.3
11	CT-7B Fills replacement done in 2017-18. (Saving considered 5 kcal/kwh for 12 month in 2018-19)	-	5891	126.2
12	Unit-10 Boiler modification through global settlement done in Oct-17. Gain due to reduction in RH spray and FG temp considered (Avg 10 kcal/kwh for 12 month in 2018-19)	--	11904	255.0
13	30 Nos CT fan stopped in night time for 10 hr.	1.116	-	16.7
14	15 Nos(12-18 Nos) CT fan stopped in night time for 10 hr.	1.070	-	16.0
15	7 Nos(6-8 Nos) CT Fan stopped in Day time for 10 hr.	0.499	-	7.5
16	Two nos CLCW pumps (one in each unit-7&8) stopped.	0.720	-	10.8
17	7 Nos(6-8) CT Fans stopped in Night time for 10 hr.	0.250	---	3.7
18	10Nos (10-12) CT Fans stopped in Day & Night time for 24 hr.	0.082	---	1.2
19	Two nos ACW pumps (one in each unit-11&12) stopped.	0.640	---	9.6
	Total:	31.7	29668	1613.7

2. 87000 Nos. trees were planted during the year 2018-19. Till date more than 23 Lac trees have been planted in and around NTPC Vindhyachal.
3. The treated sewage water from Sewage treatment Plant is being reused for horticulture work inside NTPC Plant area. Analysis reports of treated STP water quality is sent on monthly basis to MPPCB.

4. NTPC Vindhyachal has installed a dedicated fly ash brick manufacturing plant having 07 nos. of ash brick manufacturing machines. Above ash brick plant utilizes the ash produced at NTPC Vindhyachal for brick production. NTPC Vindhyachal only fly ash based bricks in all its construction activities being undertaken within the plant and township premises. These ash bricks are also utilized in the CSR activities being undertaken by NTPC Vindhyachal.

5. Additionally, fly ash is being provided to all the users free of cost for manufacturing of ash based products like cement, ash bricks / blocks / tiles, asbestos sheet etc.

	2017-18	2018-19
Ash Brick Utilized	60.4 Lacs	77.52 Lacs
Ash Brick produced	57.5 Lacs	76.85 Lacs

6. Permanent layer of water is being maintained in the ash dyke (free board) at all times to avoid any fugitive dust emission. Additionally, during the height raising works of the dyke, tarpaulin covering of the exposed accumulated ash and regular sprinkling of water on the exposed ash is ensured to avoid any fugitive dust emission.

7. All the internal roads are constructed with metal top.
8. Concreting of the entire plant area has been done to avoid fugitive dust emission.
9. Regular water sprinkling is being done on coal stock piles and on roads.
10. Fly Ash is being dispatched only in closed trucks to avoid fugitive dust emission.
11. 22 nos. of cooling towers have been installed for temperature reduction of re-circulating water and to prevent thermal Pollution
12. Re-use of cooling water for ash handling and coal dust suppression

13. Sewage Treatment Plant (STP) has been installed for treatment of Domestic Waste Water. Treated Domestic Water is being utilized in Horticulture and Plant process.
14. Treatment & re-circulation of decanted water to Plant from ash ponds/lagoons by 4 nos. Ash Water Recirculation Pump Houses (AWRS).
15. An initiative towards reduction in usage of ozone depleting substances, Vapor Absorption Machines (VAMs) which uses mixer of Lithium Bromide, Octyl Alcohol and DM water for air conditioning, in place of traditionally used CFCs, have been put in place in Stage # 1, Stage # 3 and Stage # 4 units.
16. Training on Environment Protection & Pollution Control Measures is regularly taken as per NTPC Training policy.
17. Celebration of World Water Day (22 March) World Environment Day (5th June) by holding Environment awareness campaigns and Mass tree plantation.

Competitions like Best suggestion, Poster Painting, Essay Writings, Slogan Writings etc., are organized and Prizes distributed to Winners among Employees, Housewives, School Children & other participants.

18. Rain water harvesting scheme under implementation at NTPC Vindhyachal
19. Installed Continuous Emission Monitoring system for round the clock monitoring of Stack emissions.
20. Installed Effluent quality monitoring system for round the clock monitoring of treated effluent quality

Continuous Ambient Air Quality Monitoring System

Effluent Quality Monitoring System

Sl.	Equipment	Qty (Nos.)	Make	Location of installation	Parameter monitoring	Periodicity
01	Ambeint air quality monitoring station (AAQMS)	04	Chemtrols	At the plant boundary in all 04 directions	Ambient Air Meteorological data, PM10, PM2.5, SO2, NOx, CO.	Real time
02	Continuous emission monitoring system (CEMS)	13	AICPL (STG 1-3) Fuji, Japan (STG 4,5)	In the stacks	Stack Particulate Matter, SO2, NOX	Real time
03	Effluent Quality Monitoring System (EQMS)	04	SWAN	At the outlet of Effluent treatment plants	Flow, pH, Conductivity, TOC, BOD, COD, TSS, Oil & Grease.	Real time.

21. 02 nos. of Waste to Compost Machines have been installed for disposal of Bio-degradable Municipal Solid waste being generated from Township and plant.

22. Bio diesel is also prepared in the township from the seeds of the Karanj tree.

23. Installation of Bio gas Plant of 24KWh capacity.

PART - H

Additional measures / investment proposal for environmental protection including abatement of pollution

Capital Expenditure:

Description	Expenditure (Rs. / Lacs)	Remarks
ESP	100624	As on 31.03.2019
ESP (Renovation & Moderination)	22618	As on 31.03.2019
Ash Water Recirculation system & Ash Handling system	40956	As on 31.03.2019
Flue Gas Desulfurization Plant	23039	As on 31.03.2019
STP & ETP	1313	As on 31.03.2019
Chlorine Leakage Absorption System	17	As on 31.03.2019
EQMS	105	As on 31.03.2019
CEMS	347	As on 31.03.2019
Solar Power Plant	75	As on 31.03.2019
LED fixing	673	As on 31.03.2019
STP New	130	As on 31.03.2019
Total	189897 Lacs	

Recurring Expenditure (2018-19):

Description	Expenditure (Rs. / Lacs)
Tree Plantation	102.10
AMC for AAQMS	33.0
AMC For EQMS	5.4
AMC for CEMS	11.39
Consent Fee	143.69
LWTP running expenses	27.80

Resin Disposal cost	10.83
STP running expenses	20.00
Third Party Monitoring Charges	18.4
Environmental Studies	13
Environment Day Celebrations & Env. Award application fees	3.54
Total	**389.15 Lacs**

PART - I

Other particulars in respect of environmental protection and abatement of pollution

1. Special Effort in improving ESP emission in Stage # 1 & Stage# 2 through partnering with expertise of M/s BHEL in the form of Renovation and Modernization of ESP for enhancing the efficiency to control the stack emission & conducting Gas Distribution Test for measuring flue gas velocity distribution in ESP passes and corrective actions initiated based on GD Test results. ESP R&M work is completed in Stage - I and Stage - II units to bring down the emission below 100 mg/Nm3.
2. The Stage-I, II & III, IV and Stage - V Ash Water Recirculation System (AWRS) is under continuous operation.
3. Liquid waste treatment plants are operational. Treated effluent is being reused in plant premises itself.
4. Sewage Treatment Plant is operational, treated sewage water is being reused in horticulture purposes and in plant process.
5. 'Pollutants Source Apportionment' & 'Human Health Risk Assessment' studies has been conducted at NTPC Vindhyachal
6. Post Commissioning EIA study for Stage - IV is completed.
7. Inventorization of pollutants of the industries located around Rihand Reservoir is in progress.
8. Feasibility study of Rain Water harvesting has been completed.
9. CEMS & EQMS have been installed at NTPC Vindhyachal and are fully operational. These equipment have been connected with CPCB & MPPCB.
10. NTPC Vindhyachal has proactively step in towards development and usage of renewable energy sources within plant preemies as well as township premises. Some of the renewable energy projects already completed by NTPC Vindhyachal are:

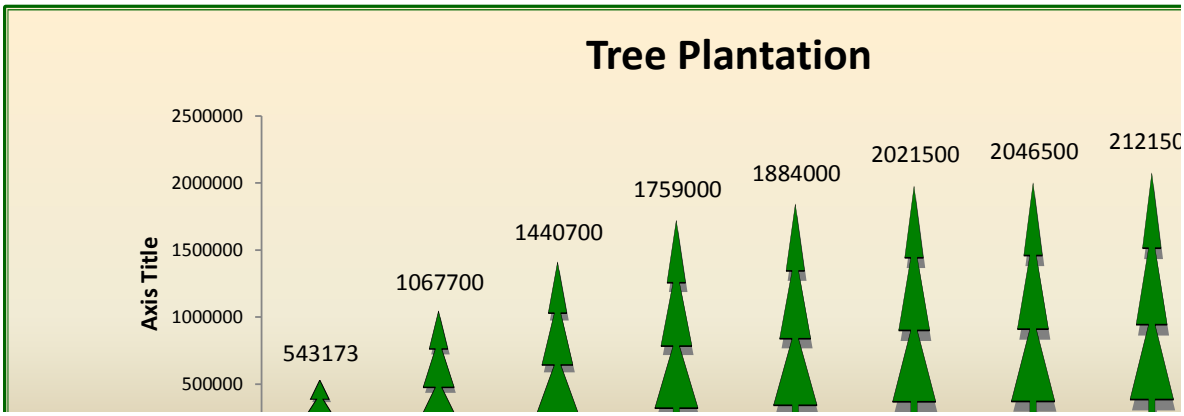
- Installation and commissioning of online Energy Management System to closely monitor the energy consumption on real time basis.
- Installation of 450 KVA solar PV modules in Stage - V.
- Installation of 30 KVA solar PV modules in shopping complex.
- Installation of 145 Nos. of solar street lights.
- Installation of Bio-diesel plant of 110 litre/day capacity.
- Installation of Bio gas Plant of 24KWh capacity.

- Installation of Solar water Heater in township (100 LPD)
- Application of operation of CW pumps, clarified water pumps & cooling tower fans.
- Replacement of conventional general lighting service (GLS) lamps and conventional fluorescent lamp tube light (FTLs) with compact fluorescent lamp (CFLs) / LED lamps at various locations.
- Energy Audit of Plant
- Replacement of inefficient BFP cartage and attending BFP recirculation valves and attending duct leakages /APH seal & basket replacement.
- Flue gas modification using CFD.
- Polymer coating of CW pumps of stage 1 units
- 178795 no of LED lights are installed by replacement of conventional lights in plant & township in 2017-18 & 2018-19.

11. Apart from above, NTPC Vindhyachal has taken the ambitious project of installation of following renewable energy sources:

- Roof top Solar project of 569 KWp on roof top of Stage-III Service building & Switchyard Building is commissioned.
- Installation of 50 KW solar PV module on the roofs of TG hall of Stage - I & Stage - III units - Procurement action initiated.
- Installation of additional 4.1 MW solar PV modules in Plant Premises
- Installation of 4.1 MW solar PV modules on the buildings (schools, hospitals, common building, quarters etc). in the township area at a cost of Rs. 29 Crores.
- Installation of 02 nos. of composting machines.
- Solar Plant of 15 MW Capacity

12. Afforestation has not only contributed to the enrichment and restoration of local ecosystem but also helped in carbon sequestration by serving as a ‘sink’ for pollutants released from the station and thereby protecting the quality of ecology and environment. Further, NTPC has embarked upon long-term Memorandums with State authorities to assist National Commitment of INDC in COP 21, by planning to plant 10 million trees across the country. NTPC Vindhyachal has the plan of planting 05 Lac trees in next 10 years in different areas of Madhya Pradesh through M.P. Rajya Van Vikas Nigam. Entire cost of such plantation activities shall be borne by NTPC Vindhyachal.



13. Under the Aspirational Distt. Program, NTPC Vindhyachal is directly involved in the development of 18 villages and 2 wards.
14. NTPC Vindhyachal has taken the initiative to provide multi skilling training to 137 girls from the under privileged sections from the areas around the Power plant for community development under the GEM program (Girl Empowerment Mission).
15. Several forums and mechanisms are being used by NTPC Vindhyachal for identification of key areas for community support. Some of the examples are perception surveys by engaging organizations of repute, establishment of Village Development Advisory Committees (VDAC), interaction with public representatives, Govt. Authorities, NGOs etc. Some the major activities being undertaken by NTPC Vindhyachal through above participation forums are:

Attributes	Last two need assessment Surveys by XIDAS & SEWA	VDAC/Public representatives/NGOs	GOVT Authorities
Education	Repair of school building, construction of toilets, labs, provision of sports items/kit, furniture and equipment in schools, stationery and school bags for children, scholarship for students, Computer Training, Vocational Training, Tailoring and nursing programmes ,	Repair of school buildings, training programs for women and youth for skill development, construction of stadium at GOVT school at village Patulkhi (Sidhi), sports equipments in GOVT schools and construction of stadiums in nearby villages	Super 30 program and increase in its reach, smart classes in GOVT schools, development of 1 or 2 GOVT schools as model schools, training programmes for skill enhancement, intervention in non-formal education for paving
Health	Medical camp and awareness campaigns for various diseases, fogging of pesticides, dispensary at village level and medical equipments	Malnutrition and Malaria eradication, primary health centre in nearby villages	Aid to GOVT hospital for purchase of equipments

Sanitation	Construction of drainage systems, community toilets and regular cleaning of the villages and awareness programs.	Construction of community toilets, installation of hand pumps in toilets made under Swach Vidhalay Abhiyan, cleaning nearby villages	Contribution in Sewerage Treatment plant being constructed by GOVT and utilisation of treated water in the plant and township of NTPC VSTPS
Water Facility	Installation of hand pumps & RO Plants, drinking water facilities in villages	Installation of hand pumps & RO plants, piped drinking water facilities in villages	Installation of hand pumps, contribution to the integrated water supply scheme, renovation of ponds and talabs
Infrastructure	Construction of roads, Community hall, aganbadis with all facilities	Construction of roads, Community hall, aganbadis, marriage hall, renovation of burial grounds, religious places	Construction of Kachan Bridge ,District Disability rehabilitation centre and ash filling of low lying areas, rest shelters and light mast at Semra baba temple ,provision of JCB and tower wagon for Nagar Palika Nigam

NTPC Vindhyachal has also formed a NGO named Pragati Sanstha which works hand in hand with other communities in association with relevant state Govt. authorities to assess need of society and perform activities like health check up camps, sports, and assistance during natural disaster.

NTPC Vindhyachal runs Asha Kiran School for differently abled children of NTPC employees and surrounding communities within its own premises. This school is one of its kind in the region and is well recognized by several organizations.

VSTPS has been providing best of medical and welfare facilities not only to its employees' family but also to nearby villages and labourers. VSTPS takes it as a challenge for the development of community and to make the society as the partner towards sustainable development.

NTPC Vindhyachal is undertaking several community support and development programmes under CSR initiatives. Some of the important initiatives taken by NTPC Vindhyachal are:

1. Girl Empowerment Mission- 137 girls undergone the full time residential summer workshop, 10 girls being educated in DPS & DePaul School, full expenses being borne by NTPC
2. Film Based Teaching Method - Initially started in 5 Govt. Primary school through NGO- Bharat, Extended to 10 Govt schools based on good results achieved through this initiative
3. 20 gram panchayats adopted under Aspirational District - Focus on Health, Nutition, Eduction and Swachhta
4. Installed and operating 04 number of RO plants (03 x 10 KL + 01 x 02 KL) in the vicinity for providing safe drinking water to nearby community.

5. Installation of integrated water supply systems - Contributed Rs 9 crore to integrated water supply of Nagar Nigam
6. 02 nos. of water ATM's are under construction
7. Installation of water cooler at Bus stand and other public places
8. Hand Pumps installed in villages.
9. Super 30 Coaching scheme for preparation of IIT and Medical entrance exams for the students of nearby community.
10. Establishment of skill development centres for self employment.
11. Construction of roads, community centres, public health centres, Anganbadi kendras etc.
12. Construction of utility buidlings like bus stand, panchayat kendras, toilets, rest shelters etc.
13. Support to schools for better infrastructure.
14. Organizing kisan mela and animal welfare camps for farmers.
15. Organizing rural sports meet.
16. Health Check up camps through mobile hospital in the remote areas.
17. Installation of solar lamps, water purifiers etc

Details of expenditure made on CSR & Community Development activities is given below:

CSR ACTIVITIES	
Fin. Year	**Amount Spent (Rs. / Lakh)**
2016 -17	664.50
2017-18	578.03
2018-19	906.81

Expenditure made on community support.

Contribution to 'Swachh Bharat Mission'.

Being a responsible corporate citizen of the country, NTPC Vindhyachal is actively contributing to the 'Swachh Bharat Mission' of Govt. of India.

- For this around 1000 toilets have been constructed by NTPC Vindhyachal in different Govt. Schools being operated in Singrauli District of Madhya Pradesh State. Whereas NTPC Ltd. has constructed about 29000 toilets covering 82 districts of 17 states of India.
- 09 nos. Community toilets constructed in near by villages.
- Swacchta Campaigns & Rallies organised
- Nukkad Nataks organised for spreading awareness on Swachchta
- Regular swachh bharat abhiyan drives are being organized at NTPC Vindhyachal township, and office premises in which employees including top management of the station actively participate in the program by way of clearing / brooming of roads and other common places.
- Essay, poster painting, slogan writing competitions , nukkad natak etc. regarding swachh bharat abhiyan are also being organized regularly for employees and students of the township.

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Toilet Constructed by NTPC under Swachh Bharat Abhiyan

Minister of State (I/c) for Power, Coal, New & Renewable Energy and Mines, Govt. of India facilitating CMD-NTPC for contribution of NTPC in Swachh Bharat Abhiyan

13. In order to effectively reduce the emission of Sulphur dioxide in flue gases, NTPC Vindhyachal has installed a state of the art Wet Flue Gas Desulfurization Unit (WFGD) in its Unit # 13.

    By installation of FGD NTPC Vindhyachal is capable of significantly reducing emission of sulfur dioxide in the atmosphere thereby contributing to the goal of reducing impact of acid rains and promoting sustainable development.

During running of FGD plant, SOx emission values comes down from 1000 mg/Nm3 to < 100 mg/Nm3.

S.No	SOx Unit#13	Gypsum generation
2017-18	94.5 mg/Nm3	6672 MT
2018-19	87.50 mg/Nm3	14437 MT

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