

Patratu Vidyut Utpadan Nigam Ltd

(A subsidiary of NTPC in Joint Venture with JBVNL)

Ref: PVUNL/Phase-I/EC/9

Date: 17.05.2022

To,

The Member Secretary
Jharkhand State Pollution Control Board
Township Administration Building
HEC Complex, Dhurwa, Ranchi-834004

Sub.: Submission of the Half Yearly Compliance report (01.10.2021 - 31.03.2022) for Environmental Clearance for Patratu Super Thermal Power Project, Phase-I (3 X 800 MW), Patratu.

Ref: MoEF letter ref. no. J-13012/21/2015-IA.I(T) dated 07.11.2017

Sir,

Enclosed please find the Half yearly Compliance Report (01.10.2021 - 31.03.2022) for Environment Clearance conditions stipulated vide above referred MoEF&CC letter for the Patratu Super Thermal Power Project, Phase-I (3 X 800 MW), Patratu. This is in consent with the competent authority of PVUNL.

Thanking you,

Yours Sincerely,

RP
Bachin
17/5/2022

R. Mukhopadhyay
13/5/22
R Mukhopadhyay
AGM(EMG)
PVUNL

Copy to :

1. MoEF&CC RO : Ranchi
2. CPCB : Kolkata – through mail



Patratu Vidyut Utpadan Nigam Ltd

(A subsidiary of NTPC in Joint Venture with JBVNL)

Ref: PVUNL/Phase-I/EC/9

Date: 17.05.2022

To,

Additional Principal Chief Conservator of Forests (C),
Ministry of Environment, Forest and Climate Change
Regional Office (ECZ),
Bungalow No. A-2, Shyamali Colony
Ranchi – 834002

Sub.: Submission of Half Yearly Compliance report (01.10.2021-31.03.2022) for Environmental Clearance for Patratu Super Thermal Power Project, Phase-I (3 X 800 MW), Patratu.

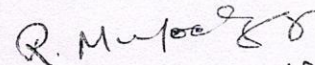
Ref: MoEF letter ref. no. J-13012/21/2015-IA.I(T) dated 07.11.2017

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Enclosed please find the Half yearly Compliance Report (01.10.2021-31.03.2022) for Environment Clearance conditions stipulated vide above referred MoEF&CC letter for the Patratu Super Thermal Power Project, Phase-I (3 X 800 MW), Patratu. This is in consent with the competent authority of PVUNL.

Thanking you,

Yours Sincerely,


R. Mukhopadhyay 17/5/22
AGM(EMG)
PVUNL



Copy to :

1. JSPCB, Ranchi
2. CPCB : Kolkata – through mail

Submission of Half Yearly Compliance report (01.04.2021- 30.03.2022) for Environmental Clearance for Patratu Super Thermal Power Project, Phase-I (3 X 800 MW), Patratu.

Rabishankar <RSMUKHOPADHYAY@NTPC.CO.IN>

Thu 02/06/2022 09:56

To: rdkolkata.cpcb@gov.in <rdkolkata.cpcb@gov.in>

Sir,

Enclosed please find the Half Yearly Compliance report (01.10.2021- 31.03.2022) for Environment Clearance conditions stipulated vide MoEF&CC letter MoEF letter ref. no. J-13012/21/2015-IA.I(T) dated 07.11.2017 for the Patratu Super Thermal Power Project, Phase-I (3 X 800 MW), Patratu.

With regards

Rabishankar Mukhopadhyay
AGM(EMG)
PVUNL
Patratu, Ramgarh
Jharkhand-829119

From: Rabishankar <RSMUKHOPADHYAY@NTPC.CO.IN>

Sent: 27 November 2021 15:39

To: rdkolkata.cpcb@gov.in <rdkolkata.cpcb@gov.in>

Subject: Submission of Half Yearly Compliance report (01.04.2021- 30.09.2021) for Environmental Clearance for Patratu Super Thermal Power Project, Phase-I (3 X 800 MW), Patratu.

Sir,

Enclosed please find the Half Yearly Compliance report (01.04.2021- 30.09.2021) for Environment Clearance conditions stipulated vide MoEF&CC letter MoEF letter ref. no. J-13012/21/2015-IA.I(T) dated 07.11.2017 for the Patratu Super Thermal Power Project, Phase-I (3 X 800 MW), Patratu. This has consent with the competent authority of PVUN.

Thanking you,

Rabishankar Mukhopadhyay
AGM(EMG)
PVUNL
Patratu, Ramgarh
Jharkhand-829119

Patratu Vidyut Utpadan Nigam Ltd

(A subsidiary of NTPC in Joint Venture with JBVNL)

Half Yearly Compliance Report

(01.11.2021-31.03.2022)

of

Patratu STPP, Phase-I (3X800 MW)

Under Construction

As per Environmental Clearance conditions

vide MoEF&CC letter no. J-13012/21/2015-IA.I (T) dated 07.11.2017

A. SPECIFIC CONDITION:

Sr. No	Conditions	Compliance Status
i	Forest land of 431.522 ha is involved in the proposed project. The FC is in the name of M/s Jharkhand Bijli Vitaran Limited. Now, the present PP viz. M/s PVUNL must get this diversion changed in its name before carrying out any work in the diverted forest land under the provisions of Forest (Conservation) Act, 1980.	162.602 acre out of 431.522 acre of land had already been de-notified vide letter no. 1042-R dtd. 09.05.1963, Revenue Department, Govt. of Bihar. For change of FC in the name M/s PVUNL for remaining 268.920 acre of land, matter is being expedited with HoFF, Ranchi office. (Note: the land area is in Acre)
ii	Fly ash deposits along the water body shall be excavated immediately. The removal of fly ash deposits in the water bodies shall be completed before the onset of next monsoon.	Removal of Fly ash deposition along Bawandhara nallah (adjoining to the ash dyke) was completed by October 2019. Photos submitted was submitted with the previous HYC (01.09.20-31.10.20). Survey of ash deposition along the Nalkari river, from Bawandhara nallah – Nalkari river confluence to Nalkari river - Damodar river confluence and 500 meters downstream of the Damodar river was carried out. It has been observed that most of the stretches of the riverbed are non-approachable due to lack of road and cover with boulders and bushes/ jungles. Intermittent ash deposition has been found in riverbed covered with soil, silt & bushes. Detailed survey report along with action plan was submitted with previous HYC (01.09.20-31.10.20). Removal of ash from Nalkari river of 1 km length (from Nalkari-Bhawandhara nallah confluence) has been completed by February 2022. Tendering for ash removal from next 1.5 km of Nalkari river is under process.
iii	If ash in the existing pond is not evacuated as per the recommendations given by previous sub-committee, embankment shall be constructed around the periphery of ash pond. A retaining wall shall also be constructed alongside of the stream to prevent wash off.	The comprehensive work for ash dyke such as construction of gabion wall, spillways, drain on the toe, slope protection, etc. based on the design provided by NTPC-Engineering has been completed. Photos submitted with the previous HYC (01.09.20-31.10.20).

iv	The ash pond shall be covered with sweet soil of sufficient width so that surface runoff can be controlled and also can act as slope stabilization.	Work Completed
v	Reclamation and stabilization of the existing ash pond shall be carried out in scientific manner (both biological and engineering measures).	The comprehensive work of ash dyke stabilization has been completed.
vi	All other measures such as constructing gabian wall, spillways & filters, drains on the toe, slope protection, etc. shall be implemented. Regional Office of the Ministry shall inspect the progress at least once in three months. The status of the ash pond and dredging of ash deposits shall be submitted along with the six-monthly compliance report to Regional Office as well as MoEF&CC, New Delhi.	The comprehensive work for ash dyke such as construction of gabian wall, spillways, drain on the toe, slope protection, etc. based on the design provided by NTPC-Engineering has been completed. Photos submitted with previous HYC (01.09.20-31.10.20).
vii	If the breach of ash pond is reported in future, PP shall have to evacuate the total ash from the pond.	Noted and shall be complied
viii	Construction and demolition waste from dismantling the existing power plant shall be disposed of in accordance with the Construction and Demolition Waste Management Rules, 2016.	Noted and being complied
ix	Minimum distance of 500m from the HFL of Nalkari river shall be maintained. Ash mound shall be developed in 340 acres and the height of the ash mound shall be restricted to 35 m (in two benches of 20 m and 15 m height each).	Stipulated minimum distance from Nalkari river will be maintained. Ash mound shall be developed as per guidelines.
x	Ash mound shall be used only in case of emergency. Fly ash utilisation shall be done as per the fly ash notification and its subsequent amendments issued from time to time.	Fly ash utilisation shall be done as per the fly ash notification and its subsequent amendments issued from time to time
xi	Garland drains along with stone pitching and gabian wall around the ash mound/ existing ash pond shall be constructed so that no wash off is let out into the Nalkari river.	Construction of garland drains and other requisite measures will be constructed around ash mound. For existing ash pond the work has been carried out as in point no. III & VI.
xii	Action plan for dredging and de-silting of ash deposited along the streams, rivers and reservoirs including Damodar and Nalkari as recommended by Sub-group in their site visit on 28.1.2013 shall be submitted within three months.	There are no reservoirs along flow path of the stream-Nalkari-Damodar river. Action plan for ash removal based on initial survey was submitted to regional office MOEFF&CC – Ranchi vide PVUNL letter dated 09.02.2018 and 07.05.2018.. Further a detailed ash deposition survey along the riverbed has been carried out and an action plan has been submitted to MoEF RO Ranchi vide letter dated 02.09.2020 and along with the previous HYC (01.09.20-31.10.20).

xiii	Volume of ash pond and quantity of fly ash shall be assessed. Time bound action plan for evacuating and using fly ash before starting the operations of proposed project.	Estimated quantity of pond ash was approx. 8.5 lakh tons. Agreement for use of approx. 3 lac cum of pond ash for construction of Ranchi ring road, Section –VII, a part of which was lifted. However as stipulated in specific condition no. (iii) the stabilization work of the ash dyke has been completed as in point no. VI.
xiv	Authenticated as well as primary baseline data for flora, fauna and bio diversity shall be submitted within one month.	The primary baseline data for flora fauna and biodiversity duly authenticated by DFO, Ramgarh has been submitted to MoEF&CC vide PVUN letter dated 17.01.2018.
xv	Time bound action plan along with financial break-up for implementing CSR activities and public hearing commitments shall be submitted within three months.	Community development (CD) plan based on Need base assessment survey and EC recommendations, approved by DC, Ramgarh and PVUN/NTPC management, submitted with the 4 th HYC. A revised and approved time bound action plan with financial breakup was submitted with HYC report (01.10.20-31.03.21)
xvi	Action plan (area, species, density, financial allocation) for achieving 33% green belt development of the total project area shall be submitted within three months.	Action plan for green belt development submitted to MoEF RO Ranchi vide letter dated 02.09.2020 and with previous HYC (01.04.20-30.09.20). Green belt development in plant area will be taken up after completion of plant construction activities. Plantation of 8000 samplings has been done through Dept. of Forest (Ramgarh) on depository basis at the total cost of Rs.1,98,77,670/-. Plantation on 10.75 acre land was carried out in rainy season 2021 through the forest department at total cost of Rs. 29,79,202/-. Plantation on 97.5 acre lands will be taken up in rainy season 2022 through forest department at total cost of Rs.2,97,82,002/- Rs. 1,48,01,943/- has been deposited to forest department as an advance. (Annexure-I).
xvii i	As per the Revised Tariff Policy notified by Ministry of Power vide dated 28.01.2016, project proponent shall explore the use of treated sewage water from the Sewage Treatment Plant of Municipality/local bodies/ similar organization located within 50 km radius of the proposed power project to minimize the water drawl from surface water bodies.	The Minutes of Meeting for the agreement of supply of treated sewage water including lying of cross-country pipeline from Ranchi STP to PSTPP plant, chaired by Secretary, UD&HD, Govt. of Jharkhand, dated 18.07.19 was issued by UD&HD. Accordingly, a draft for agreement between RMC, JUIDCO and PVUN was submitted by PVUNL to GoJ on 7.01.20 for review & comments. However, based on the new order (March 2020) from Ministry of Power, for transportation of sewage water from Municipality STP to a power Plant, a revised draft agreement was submitted to Commissioner, Ranchi Municipal Corporation, GOJ on 27 th March 2020 for review & comments. A follow up meeting with commissioner RMC was held on 06.02.21. Follow up letter send on 04.10.21 for meeting regarding draft agreement in light of CEA guidelines for secondary STP water quality. Further revised CEA guidelines for use of treated sewage water in power is under preparation. Waiting for the formal notification/guidelines by CEA/MoP.

xvii i	Compliance of EC conditions, E (P) Act, 1986, Rules and MoEF&CC Notifications issued time to time shall be achieved by a qualified environment officer to be nominated by the Project Head of the Company who shall be responsible for implementation and necessary compliance.	A qualified environment officer will be deputed during operation phase of the plant. However, an Environment Management group is in place in PVUN Limited to carry out environment related activities in PVUNL
xix	MoEF&CC Notification S.O.3305 (E) dated 7.12.2015 and subsequent notifications issued time to time shall be implemented with respect to specific water consumption, zero liquid discharge and revised emission standards. The PM, SO ₂ , NO _x and Hg emissions shall not exceed 30 mg/Nm ³ , 100mg/Nm ³ , 100mg/Nm ³ and 0.03mg/Nm ³ respectively. The specific water consumption shall not exceed 2.5m ³ /MWh and zero wastewater discharge shall be achieved.	MoEF & CC Notification S.O.3305 (E) dated 07.12.2015 and subsequent notifications shall be complied. High efficiency Electrostatic precipitators (ESP), flue gas desulphurisation (FGD) system, NO _x emission control systems to maintain emissions within the prescribed limit will be installed in Patratu STPP. Stipulation on specific water consumption and zero liquid discharge shall also be complied.
xx	MoEF&CC Notifications on fly ash utilization S.O. 763(E) dated 14.09.1999, S.O. 979(E) dated 27.08.2003, S.O. 2804(E) dated 3.11.2009, S.O. 254(E) dated 25.01.2016 and subsequent amendments shall be complied with	MoEF&CC Notifications on fly ash utilization shall be complied during operation phase of the plant.
xxi	Separate Environmental Clearance may be obtained for the proposed Township as applicable under EIA Notification 2006.	Environment clearance for the township has been accorded by SIEAA, Jharkhand vide Letter No.-EC / SEIAA / 2018-19 / 2088 / 2018 / 52 dated 07/02/2019
xxii	Solar rooftops shall be installed in the surrounding villages as part of CSR activities.	Solar streetlights (167 no.) - Erection & commissioning completed. Installation of solar lighting mast in villages – Under tendering process.
xxii i	Skill mapping of the Project Affected People (PAF) be carried out on a long term basis for their livelihood generation. A report is to be submitted within 3 months to the Ministry from the date of issuance of environmental clearance.	The land for PatratuSTPP is transferred by Govt. of Jharkhand to PVUN, so as such there is no Project affected people. However, skill development programs / activities are planned for livelihood generation of local people. Skill mapping is done through Need Assessment Survey by Xavier Institute of Social Science, Ranchi. The Perspective Plan, Suggestions & Conclusion was submitted with 4 th compliance report. Details report is available with PVUN.
xxi v	Modern methods of agriculture organic farming, compost/ vermin culture making and utilization, drip/direct to root irrigation) to be promoted in and around the Project area.	A training program was organized in November 2018, participating 66 number of villagers. At two villages (Sankul & Balkudra) training on modern methods of agriculture, organic farming was organized.
xx v	While implementing CSR, • Women empowerment is important. Therefore, proper skill based training/ long term livelihood revenue generation be created for all them. • Computer facilities may be provided in the school along with a trained	- Training to 150 women on beauty parlor, tailoring, lac bangle etc. were provided to the women of nearby villages. - In 1 st phase 30 no. of computers were given to Patratu College. 64 computers to Govt. schools were provided. - Water through tankers supplied to 10 panchayats

	<p>computer teacher to inculcate computer skill among the youths.</p> <ul style="list-style-type: none"> • Water supply provisions shall be made for all the bio-toilets under Swachh Bharat Abhiyan. • Preventive health programme may be preferred than the curative health programme such as nutrition development of small children in and around the project. 	<p>(the adjacent villages) twice a day for a period of 2 months during summer season.</p> <ul style="list-style-type: none"> - 36 nos. of medical camps were organized in FY 2021-22 at near by villages. - 100 youths of near by villages were completed 02 years training on Electrical & Fitter trade & Short-term course to 29 youths were also imparted on electrician & fitter. - Vocational training shall be provided to 30 youth. - Tailoring training course for underprivileged / unemployed of project targeted village.
xx vi	Vision document specifying prospective plan for the site shall be formulated and submitted to the Regional Office of the Ministry within six months.	Vision document Submitted along with 1st half yearly compliance report.
Xx vii	Harnessing solar power within the premises of the plant particularly at available roof tops shall be carried out and status of implementation including actual generation of solar power shall be submitted along with half yearly monitoring report.	Scheme for harnessing solar power from rooftops of the upcoming plant has been included in the EPC Package of the upcoming plant. Status of implementation and actual generation of solar power will be submitted after construction and operation of the solar system.
xx viii	A long-term study of radio activity and heavy metals contents on coal to be used shall be carried out through a reputed institute and results thereof analysed every two year and reported along with monitoring reports. Thereafter mechanism for an in-built continuous monitoring for radio activity and heavy metals in coal and fly ash (including bottom ash) shall be put in place.	Heavy metals and radioactivity for coal samples from Banhardi coal block assigned for Patratu SSTP Phase-I has been carried out and submitted along with EIA report. Further long-term study on heavy metals and radioactivity contents in coal and ash will be carried out through reputed institute periodically during the operational phase of the plant as per amendment from MoEF&CC vide letter dated 16.03.2022 (Annexure-II).
xxi x	Online continuous monitoring system for stack emission, ambient air and effluent shall be installed.	Shall be complied.
xx x	High Efficiency Electrostatic Precipitators (ESPs) shall be installed to ensure that particulate emission does not exceed 30 mg/ Nm ³ or as would be notified by the Ministry, whichever is stringent. 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 along with an environment friendly sludge disposal system.	High Efficiency Electrostatic Precipitators (ESP) will be installed in order to comply with particulate emission norms. Dust extraction and water spray systems are included in the design of the plant to suppress/avoid dust emissions from coal & ash handling areas along with suitable sludge disposal systems.
xx xi	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.	Shall be complied. Envisaged in technical specification.

xx xii	Monitoring of surface water quantity and quality shall also be regularly conducted and records maintained. The monitored data shall be submitted to the Ministry regularly. Further, monitoring points shall be located between the plant and drainage in the direction of flow of ground water and records maintained. Monitoring for heavy metals in ground water shall also be undertaken and results/findings submitted along with half yearly monitoring report.	Surface water from Nalkari river/Patratu dam is being used for construction of the plant. Quality of surface water from upstream and downstream of Nalkari river and adjacent Bawandhara nallah is being monitored on monthly basis. Ground water sample is being collected from a borewell located outside but adjacent to plant area. Report of the surface and ground water analysis (Oct'22-March'22) is given in Annexure-III . Quantity of surface water to be used for operation will be provided during operational phase of the plant.
xx xiii	A well-designed rainwater harvesting system shall be put in place within six months, which shall comprise of rain water collection from the built up and open area in the plant premises and detailed record kept of the quantity of water harvested every year and its use.	Rainwater harvesting system has been envisaged in the design of the plant and will be implemented. Records shall be maintained during operation phase of the plant.
xx xiv	No water bodies including natural drainage system in the area shall be disturbed due to activities associated with the setting up/ operation of the power plant.	The stipulation will be complied during both the construction as well as operation phase of the plant.
xx xv	Additional soil for leveling of the proposed site shall be generated within the sites (to the extent possible) so that natural drainage system of the area is protected and improved.	Additional soil for leveling of the proposed site shall be done from within the sites with all necessary precaution to protect natural drainage system of the area.
xx xvi	Fly ash shall be collected in dry form and storage facility (silos) shall be provided. Mercury and other heavy metals (As, Hg, Cr, Pb etc.) shall be monitored in the bottom ash. No ash shall be disposed of in low lying area	Fly ash shall be collected in dry form and stored in intermediate and main silos for direct supply of dry ash to potential users. No ash will be disposed off in low lying areas. Periodic monitoring of mercury and other Heavy metals (Ag, Hg, Cr, Pb etc.) shall be conducted in the bottom ash during operational phase of the plant.
xx xvii	No mine void filling will be undertaken as an option for ash utilization without adequate lining of mine with suitable media such that no leachate shall take place at any point of time. In case, the option of mine void filling is to be adopted, prior detailed study of soil characteristics of the mine area shall be undertaken from an institute of repute and adequate clay lining shall be ascertained by the State Pollution Control Board and implementation done in close co-ordination with the State Pollution Control Board.	Noted and shall be complied if mine void filling to be adopted as an option for ash utilization.
xx xvii i	Fugitive emission of fly ash (dry or wet) shall be controlled such that no agricultural or non-agricultural land is affected. Damage to any land shall be mitigated and suitable compensation provided in consultation with the local Panchayat.	Fugitive emission of fly ash and dust will be controlled, and other points will be complied.

xx xix	Green Belt consisting of three tiers of plantations of native species all around plant and at least 50 m width shall be raised. Wherever 50 m width is not feasible a 20 m width shall be raised, and adequate justification shall be submitted to the Ministry. Tree density shall not be less than 2500 per ha with survival rate not less than 80%.	Green belt will be developed after completion of construction of the plant in the free spaces wherever available inside the plant.
xi	Green belt shall also be developed around the Ash Pond over and above the Green Belt around the plant boundary.	Green belt will be developed around the ash mound during operational phase of the plant.
xli	The project proponent shall formulate a well laid Corporate Environment Policy and identify and designate responsible officers at all levels of its hierarchy for ensuring adherence to the policy and compliance with the conditions stipulated in this clearance letter and other applicable environmental laws and regulations.	A Corporate environment Policy has been submitted with EIA report. An Environment Management group (EMG) having sufficient manpower will be formed to ensure adherence to the policy and compliance with all statutory requirements during operational phase of the plant.
xlii	CSR schemes identified based on need based assessment shall be implemented in consultation with the village Panchayat and the District Administration starting from the development of project itself. As part of CSR prior identification of local employable youth and eventual employment in the project after imparting relevant training shall be also undertaken. Company shall provide separate budget for community development activities and income generating programs.	All the CD activities are being implemented in consultation with local representatives & district administration. Total allocated fund for Community development: Rs. 55.4 Crores. Expenditure on CD activities is given in Annexure – IV .
xliii	For proper and periodic monitoring of CSR activities, a CSR committee or a Social Audit committee or a suitable credible external agency shall be appointed. CSR activities shall also be evaluated by an independent external agency. This evaluation shall be both concurrent and final.	The project is under construction and accordingly community development activities are being executed. CSR activities will be taken up during operation/ revenue earning phase of the project. However, a CSR Committee has been constituted vide PVUNL board resolution dated 10.06.2020 for taking up future CSR activities. Document submitted with HYC (01.03.2020 – 30.09.2020).

B. GENERAL CONDITIONS

Sr. No.	Conditions	Compliance status
i	The treated effluents conforming to the prescribed standards only shall be re-circulated and reused within the plant. Arrangements shall be made that effluent and storm water does not get mixed.	Zero liquid discharge (ZLD) system shall be implemented in the plant for reuse of treated effluents conforming to the prescribed standards. An independent drainage system will be constructed to ensure that plant effluents do not mix with the storm water drainage

ii	A sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising greenbelt/plantation.	All sewage emanating from plant will be treated in a sewage treatment plant. The treated sewerage water conforming to prescribed standards shall be utilized for plantation and raising green belt to the extent possible.
iii	Adequate safety measures shall be provided in the plant area to check/ minimize spontaneous fires in coal yard, especially during summer season. Copy of these measures with full details along with location plant layout shall be submitted to the Ministry as well as to the Regional Office of the Ministry.	Adequate firefighting system to check/ minimize fire in coal stockyard and entire power station including all the auxiliaries and buildings will be implemented in the plant. Copy of these measures with full details will be submitted after commissioning of the system
iv	Storage facilities for auxiliary liquid fuel such as LDO/ HFO/ LSHS shall be made in the plant area in consultation with Department of Explosives, Nagpur. Sulphur content in the liquid fuel will not exceed 0.5%. Disaster Management Plan shall be prepared to meet any eventuality in case of an accident taking place due to storage of oil.	Storage facilities for auxiliary liquid fuel LDO/HFO are designed conforming to the safety standards. Sulfur content in the liquid fuel to be used in the plant will not exceed 0.5%. Disaster management plan for the plant has been prepared.
v	First Aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.	All arrangements related to first aid and sanitation for workers during construction phase of the project have been kept under the scope of EPC contractor.
vi	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 the high noise area, requisite personal protective equipment like earplugs/ear muffs etc. shall be provided. Workers engaged in noisy areas such as turbine area, air compressors etc shall be periodically examined to maintain audio metric record and for treatment for any hearing loss including shifting to non-noisy/less noisy areas.	Design specification for the equipment has been made to comply with the stipulation. Personal protective equipment has been arranged through contractors during construction phase. The workers in high noise area will be provided with appropriate ear protection devices during operation phase. Periodic examination and necessary treatment of the workers during operation phase shall be done as stipulated.
vii	Regular monitoring of ambient air ground level concentration of SO ₂ , NO _x , PM _{2.5} & PM ₁₀ and Hg shall be carried out in the impact zone and records maintained. If at any stage these levels are found to exceed the prescribed limits, necessary control measures shall be provided immediately. The location of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Periodic reports shall be submitted to the Regional Office of this Ministry. The data shall also be put on the website of the company.	Ambient air ground level concentration of SO ₂ , NO _x , PM _{2.5} & PM ₁₀ and Hg around the construction site of the plant is being measured monthly basis. The analysis result is placed in Annexure III. Location of AAQMS will be decided in consultation with JSPCB. Other stipulation will be complied during operational phase of the plant.
viii	Utilization of 100% Fly Ash generated shall be made from 4th year of operation. Status of implementation shall be reported to the Regional Office of the Ministry from time to time.	Ash utilization in compliance with various stipulations shall be carried out during operational phase of the project. The status of ash utilization shall be submitted to regional office of the Ministry during operational phase.

ix	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.	Necessary infrastructure & facilities such as housing, sanitation, toilet, medical facilities, safety, drinking water supply etc. are being provided to construction labour through EPC contractor. PVUNL ensures effective compliance of the stipulations
x	The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned within seven days from the date of this clearance letter, informing that the project has been accorded environmental clearance and copies of clearance letter are available with the State Pollution Control Board/Committee and may also be seen at the Website of MoEF&CC at http://envfor.nic.in .	Complied. The information on accord of Environmental clearance by MOEF&CC was published in widely circulated newspapers in the region namely: 1 Times of India (English) dated 13.11.2017. 2 Hindustan (Hindi) dated 14/11/2017
xi	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, ZilaParisad/ Municipal Corporation, urban local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.	Copy of environmental clearance letters were submitted to concerned panchayats, zila parishad on 30.01.18. The environmental clearance letter is also uploaded in PVUN website: https://pvunl.co.in
xii	The proponent shall upload the status of compliance of the stipulated environmental clearance conditions, including results of monitored data on their web site and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MOEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM (PM2.5&PM10), SO2, NOx (ambient levels as well as stack emissions) shall be displayed at a convenient location near the main gate of the company in the public domain.	The Half yearly compliance of environmental conditions is being submitted to regional office (ECZ) MoEFF & CC, Ranchi, JSPCB, CPCB Kolkata and also upload on PVUN website. Ambient air quality in terms of SO ₂ , NO _x , PM 2.5 & PM10 shall be displayed at convenient location near main gate of company during the operation phase of the project
xiii	The environment statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Offices of the Ministry by e-mail.	The environment statement for each financial year ending 31st March in Form-V will be submitted to the Jharkhand State Pollution control Board (JSPCB) and will also be put on website of the company during operational phase of the plant.

xiv	The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to MoEF&CC, its Regional Office, Central Pollution Control Board and State Pollution Control Board. The project proponent shall upload the status of compliance of the environmental clearance conditions on their website and update the same periodically and simultaneously send the same by e-mail to the Regional Office, MoEF&CC.	Noted and being complied
xv	The progress of the project shall be submitted to CEA on six monthly basis.	Noted and being complied.
xvi	Regional Office of the MoEF&CC will monitor the implementation of the stipulated conditions. A complete set of documents including Environmental Impact Assessment Report and Environment Management Plan along with the additional information submitted from time to time shall be forwarded to the Regional Office for their use during monitoring. Project proponent will upload the compliance status in their website and up-date the same from time to time at least six monthly basis. Criteria pollutants levels including NOx (from stack & ambient air) shall be displayed at the main gate of the power plant.	The environmental Impact Assessment report & Environment Management plan submitted to regional office (ECZ) MoEFF & CC, Ranchi vide PVUN letter dated 20.11.2017. Other points are noted and being complied.
xvii	Separate funds shall be allocated for implementation of environmental protection measures along with item-wise break-up. These cost shall be included as part of the project cost. The funds earmarked for the environment protection measures shall not be diverted for other purposes and year-/expenditure should be reported to the Ministry.	A separate fund for Environment protection measures is allocated. The funds earmarked for the environment protection measures shall not be diverted for other purposes.
xviii	The project authorities shall inform the Regional Office as well as the Ministry regarding the date of financial closure and final approval of the project by the concerned authorities and the dates of start of land development work and commissioning of plant.	Date of financial closure- 30.10.2017. Date of final approval of the project- 07.11.2017. Date of start of land development-19.06.2018 Other dates will be intimated as and when the stipulated activities are initiated/ completed.
xix	Full cooperation shall be extended to the Scientists/ Officers from the Ministry/ Regional Office of the Ministry/ CPCB/ SPCB who would be monitoring the compliance of environmental status	Full cooperation shall be extended to the Scientists/Officers from the Ministry/Regional office of the ministry at Ranchi/CPCB/Jharkhand SPCB during monitoring the compliance of environmental status.
xx	An as built or as completed report on EMP to be submitted stating the scope/ extent of work envisaged in the EIA along with estimated cost vis-à-vis the actual completed works and cost incurred. A certificate/	Noted

	completion certificate accordingly, shall have to be submitted before commissioning of the TPP.	
xxi	The Ministry reserves the right to revoke the clearance if conditions stipulated are not implemented to the satisfaction. The Ministry may also impose additional environmental conditions or modify the existing ones, if necessary.	Noted
xxii	The environmental clearance accorded shall be valid for a period of 7 years from the date of issue of this letter to start operations by the power plant.	Noted
xxiii	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.	Noted
xxiv	In case of any deviation or alteration in the project proposed including coal transportation system from those submitted to this Ministry for clearance, a fresh reference should be made to the Ministry to assess the adequacy of the condition(s) imposed and to add additional environmental protection measures required, if any.	Noted
xxv	The above stipulations would be enforced among others under the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and rules there under, Hazardous Wastes (Management, Handling & Transboundary Movement) Rules, 2008 and its amendments, the Public Liability Insurance Act, 1991 and its amendments.	Noted
xxvi	Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010. This issues with the approval of the Competent Authority.	Noted

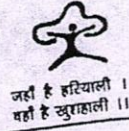
Annexure – IV

Total amount spent on Community Development Activities till March'22

Sl.No	Activities/Events	Expenditure Rs. (lakh)
1.0	EDUCATION, SKILL DEVELOPMENT & WOMEN EMPOWERMENT	97.37
2.0	HEALTH & SANITATION	54.40
3.0	SAFE DRINKING WATER	51.97
4.0	INFRASTRUCTURE	703.95
5.0	WELFARE & CULTURAL EVENTS	60.09
6.0	ENVIRONMENT & OTHERS	34.88
7.0	MID DAY MEAL & Covid Care	108.94
	Total	1111.6



कार्यालय:-वन प्रमंडल पदाधिकारी, रामगढ़ वन प्रमंडल, रामगढ़।
(रांची रोड नियर बी.आर.एल. गेट, पो-मरार, जिला-रामगढ़ पिन-829117)



जहाँ है हरियाली !
वहाँ है खुरहाली !!

Email id - dfo-ramgarh@gov.in

पत्रांक 1842 / रामगढ़, दिनांक 16/11/2021

सेवा में,

Shri Rabi Shankar Mukhupadhyay
AGM (EMG)
Patratu Vidyut Utpadan Nigam Limited
Utility Building, Po-PTPS Patratu,
Dist-Ramgarh (Jharkhand)-829119

विषय :-

वित्तीय वर्ष 2021-22 में PVUNL के अन्तर्गत वन विभाग (रामगढ़ वन प्रमंडल, रामगढ़) के द्वारा कार्यान्वित की जाने वाली वनरोपण स्थल का संशोधित विशिष्ट प्राक्कलन तैयार प्रस्ताव भेजने के संबंध में।

प्रसंग :-

इस कार्यालय का पत्रांक-1640 दिनांक 05.10.2021 एवं महालेखाकार, झारखण्ड रांची का पत्रांक-AMG-I/ dated 04.10.2021

महाशय,

उपर्युक्त विषयक प्रसंगाधीन पत्र के आलोक में सूचित करना है कि वित्तीय वर्ष 2021-22 में PVUNL के अन्तर्गत वन विभाग (रामगढ़ वन प्रमंडल, रामगढ़) के द्वारा कार्यान्वित की जाने वाली वनरोपण स्थल का संशोधित विशिष्ट प्राक्कलन तैयार कर प्रस्ताव भेजी जा रही है।

क्र. सं.	योजना का नाम	स्थल	रकवा (हे. में)	अग्रिम कार्य की राशि	कुल दस वर्षीय राशि
1	भू-संरक्षण एवं वरोपण (Barbed wire Fencing)	पतरातु	6.00	3921830.00	6631371.00
2		टेरपा	12.00	3391930.00	6580800.00
3		जयनगर	5.00	1986260.00	4615920.00
4		किरीगढ़ा	6.00	1960213.00	4669761.00
5		हफुआ	10.00	2836856.00	5865960.00
		कुल :-	39.00	14097089.00	28363812.00
	निरीक्षण/अनुश्रवण शूल्य 5 प्रतिशत की राशि			704854.45	1418190.00
		कुल योग :-		14801943.45	29782002.00

अतः अनुरोध है कि अग्रिम कार्य की राशि रु. 1,48,01,943/- का चालान के माध्यम से कोषागार के वन प्रेषण लोक लेखा (प्राप्तियां) शीर्ष 8782 में जमा कराना सुनिश्चित करें। साथ ही साथ ताकि प्राक्कलन के अनुसार कार्य प्रारंभ किया जा सके।

आपका विश्वासी,

वन प्रमंडल पदाधिकारी,
रामगढ़ 16/11/21

F. No. J-13012/21/2015-IA.I (T)
Government of India
Ministry of Environment, Forests & Climate Change
(Impact Assessment Division)

Indira Paryavaran Bhawan
2nd Floor, Vayu Wing
Aliganj, Jor Bagh Road
New Delhi - 110 003

Dated: 16th March, 2022

To,

Dr. Vijay Prakash
The Head of Department Environment Engineering
M/s NTPC Limited
NTPC Engineering Office Complex,
Sector-24, Gautam Buddha Nagar - 201 301
Noida, Uttar Pradesh

Sub: 3x800 MW (Phase-I) Patratu Super Thermal Power Project in area of 1,234 acres at Village and Tehsil Patratu, District Ramgarh, Jharkhand by M/s Patratu Vidyut Utpadan Nigam Limited - Amendment in Environment Clearance (EC) - reg.

Sir,

This has reference to your online Proposal No. IA/JH/THE/240635/2021 and letter dated 25th November, 2021 submitted to the Ministry for amendment in Environmental Clearance to the project cited in the subject.

2. The Ministry of Environment, Forest and Climate Change has considered the application. It is noted that the proposal is for amendment of Environmental Clearance to 3x800 MW (Phase-I) Patratu Super Thermal Power Project in area of 1,234 acres at Village and Tehsil Patratu, District Ramgarh, Jharkhand by M/s Patratu Vidyut Utpadan Nigam Limited.

3. The proposal was considered by the Expert Appraisal Committee (EAC) for Thermal Power Projects in its 18th EAC Meeting held on 23rd December, 2021. The comments and observations of EAC on the project may be seen in the Minutes of the meeting which are available on the web-site of this Ministry.

4. It has been noted that Environment Clearance was accorded by MoEF&CC vide letter no. J-13012/21/2015-IA-I (T) dated 7th November, 2017 for 3x800 MW Patratu Super Thermal Power Project at Patratu, District Ramgarh, Jharkhand. In EC dated 7th November, 2017 specific condition Clause No. xxviii it is mentioned that:

"A long term study of radio activity and heavy metals contents on coal to be used shall be carried out through a reputed institute. Thereafter mechanism for an in-built continuous monitoring for radio activity and heavy metals in coal and fly ash (including bottom ash) shall be put in place."

5. The project proponent has requested that EC dated 7th November, 2017 (EC

R. J. Dr

specific condition Clause No. xxviii) stated as: "...In-built continuous..." may be amended with "...regular periodical monitoring...". It has been informed that the M/s PVUNL has explored the technologies for in-built continuous monitoring of radioactivity and heavy metals in coal and ash. Further, it was noted that no instrument for online in-built continuous monitoring of heavy metals is available. Only periodic sampling of Heavy metals and radioactivity is usually being conducted through reputed Laboratory/ Institute.

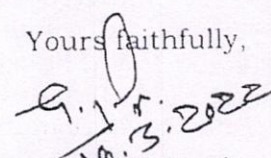
6. The sectoral Expert Appraisal Committee after detailed deliberations in its 18th meeting held on 23rd December, 2021 AND 19th meeting held on 11th January, 2022 through Video conferencing on the information submitted and as presented, recommended the proposal for amendment in Environmental Clearance. Based on recommendation of EAC, Ministry hereby grants the amendments as requested by the project proponent in EC dated 7th November, 2017 for specific condition Clause No. xxviii to 3x800 MW (Phase-I) Patratu Super Thermal Power Project in area of 1,234 acres at Village and Tehsil Patratu, District Ramgarh, Jharkhand by M/s Patratu Vidyut Utpadan Nigam Limited, under the provisions of EIA Notification, 2006 and as amended subject to the compliance of the following additional terms & conditions/ specific conditions for environmental safeguards:

- (i) 24x7 online Continuous monitoring system for ambient air quality parameters SO_x, NO_x and PM shall be established with connected server to CPCB and SPCB.
- (ii) Other conditions of the EC letter dated 7th November, 2017 shall remain unchanged.

7. All other conditions stipulated in Environment Clearance dated 7th November, 2017 shall remain same.

This issues with the approval of the Competent Authority.

Yours faithfully,


(Yogendra Pal Singh)
Scientist 'E'

Email id: yogendra78@nic.in
Tele fax: 011-20819364

Copy to:

- 1) The Secretary, Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi - 110 001.
- 2) The Chairman, Central Electricity Authority, Sewa Bhawan, R. K. Puram, New Delhi - 110 066.
- 3) The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD cum-Office Complex, East Arjun Nagar, Delhi - 110 032.
- 4) The Secretary, Department of Environment, Nepal House, Doranda Ranchi, Jharkhand - 834 002.
- 5) The Regional Officer, Integrated Regional Office, Ministry of Environment and Forest, Bungalow No. A-2, Shyamali Colony, Ranchi - 834 002.

- 6) The PCCF & Chief Wildlife Warden, Govt. of Jharkahnd, P.O. Doranda, Van Bhawan, Ranchi - 834 002.
- 7) The Chairman, Jharkhand State Pollution Control Board, CTI Colony, Sector 4, Birsa Nagar, Ranchi, Jharkhand - 834 004.
- 8) The District Collector, Ramgarh Sub Divisional Office, NH33, Ramgarh Cantonment, Jharkhand - 829 122.
- 9) Guard file/Monitoring File.
- 10) Website of MoEF&CC.

Y.P.S.
16.5.2022
(Yogendra Pal Singh)
Scientist 'E'

Patratu Vidyut Utpadan Nigam Limited
Patratu STPP (Phase-I, 3X800 MW)

Tested & Analysed by Shiva Test House, Patna

Recognised as Environmental Laboratory by MoEFCC, GOI, by Deptt. Of Industry, Forests & Environment, Govt. of Bihar and State Pollution Control Board & Accredited by NABL

Original Test Reports are with PVUNL

Date	Location	Ambient Air Quality ($\mu\text{g}/\text{m}^3$)															Ambient Noise Level						
		PM10					PM2.5					SO2					NO2					Day Time dB(A)	Night Time dB(A)
		D1	D2	D3	Avg.value	D1	D2	D3	Avg.value	D1	D2	D3	Avg.value	D1	D2	D3	Avg.value	D1	D2	D3	Avg.value		
20.10.21	Open Storage Yard (West Corner)	69.4	73.2	82.5	75.0	38.2	36.4	48.8	41.1	9.2	9.8	10.6	9.9	14.2	23.1	27.2	21.5	BDL	BDL	BDL	21.5	65.1	52.0
	North Corner, Corridor for Transmission Line	72.2	78.1	80.6	77.0	42.4	47.2	48.8	46.1	9.0	9.6	10.4	9.7	24.2	23.1	29.1	25.5	BDL	BDL	BDL	25.5	63.2	53.5
	South Corner, Railway Siding	67.2	72.4	71.2	70.3	40.2	41.3	39.5	40.3	11.5	10.8	12.4	11.6	30.1	34.2	23.4	29.2	BDL	BDL	BDL	29.2	61.8	56.1
	East Corner, Railway Siding	72.5	78.3	80.8	77.2	43.1	46.2	49.5	46.3	10.8	11.2	9.8	10.6	34.4	30.2	24.0	29.5	BDL	BDL	BDL	29.5	62.8	52.9
18.11.21	Open Storage Yard (West Corner)	70.2	75.1	81.8	75.7	36.6	37.2	46.2	40.0	9.6	10.2	10.4	10.1	17.4	24.2	30.4	24.0	BDL	BDL	BDL	24.0	66.3	51.8
	North Corner, Corridor for Transmission Line	73.4	80.1	81.2	78.2	43.2	46.6	47.4	45.7	8.8	10.4	10.2	9.8	25.2	24.4	28.8	26.1	BDL	BDL	BDL	26.1	64.5	52.6
	South Corner, Railway Siding	68.4	73.2	72.5	71.4	39.6	42.1	40.5	40.7	10.8	11.6	12.2	11.5	31.6	35.4	25.2	30.7	BDL	BDL	BDL	30.7	62.3	56.5
	East Corner, Railway Siding	75.1	80.5	82.2	79.3	44.2	46.5	50.2	47.0	11.2	11.6	10.2	11.0	36.4	32.5	26.1	31.7	BDL	BDL	BDL	31.7	63.1	53.7
17.12.21	Open Storage Yard (West Corner)	72.1	77.2	84.9	78.1	39.2	45.2	50.6	45.0	10.2	9.6	11.0	10.3	14.3	23.3	27.7	21.8	BDL	BDL	BDL	21.8	65.1	52.2
	North Corner, Corridor for Transmission Line	75.8	80.8	86.1	80.9	49.1	45.2	51.1	48.4	9.8	10.3	10.9	10.3	25.3	23.3	29.8	26.1	BDL	BDL	BDL	26.1	63.3	53.5
	South Corner, Railway Siding	70.5	76.0	74.5	73.7	41.7	40.0	43.7	41.8	12.1	11.1	12.9	12.0	31.0	34.9	22.3	29.4	BDL	BDL	BDL	29.4	62.2	55.4
	East Corner, Railway Siding	75.7	82.4	84.4	80.8	45.3	48.2	51.1	48.2	11.6	12.0	9.8	11.1	34.1	30.5	26.2	30.3	BDL	BDL	BDL	30.3	64.5	53.1
22.01.22	Open Storage Yard (West Corner)	78.4	80.2	68.7	75.8	40.4	42.8	38.9	40.7	10.8	10.2	9.4	10.1	18.8	26.2	22.4	22.5	BDL	BDL	BDL	22.5	67.2	51.4
	North Corner, Corridor for Transmission Line	82.4	78.8	70.4	77.2	44.5	40.7	38.8	41.3	10.4	10.2	9.6	10.1	26.8	24.6	22.2	24.5	BDL	BDL	BDL	24.5	64.5	52.2
	South Corner, Railway Siding	74.4	80.6	69.9	75.0	39.7	44.5	37.8	40.7	11.8	12.2	11.2	11.7	33.6	35.4	27.8	32.3	BDL	BDL	BDL	32.3	63.1	56.3
	East Corner, Railway Siding	83.8	80.5	74.8	79.7	44.9	42.7	40.2	42.6	12.2	11.8	10.2	11.4	34.4	29.8	25.2	29.8	BDL	BDL	BDL	29.8	64.9	55.4
26.02.22	Open Storage Yard (West Corner)	83.1	76.5	72.8	77.5	43.7	40.8	37.8	40.8	10.4	9.3	10.0	9.9	21.4	27.8	23.7	24.3	BDL	BDL	BDL	24.3	68.1	51.1
	North Corner, Corridor for Transmission Line	87.3	83.5	74.6	81.8	44.7	43.1	39.0	42.3	11.0	10.8	10.2	10.7	28.4	26.1	23.5	26.0	BDL	BDL	BDL	26.0	65.5	51.8
	South Corner, Railway Siding	78.9	81.2	74.1	78.1	42.1	44.7	40.1	42.3	11.4	10.8	11.9	11.4	35.6	37.5	29.5	34.2	BDL	BDL	BDL	34.2	64.4	56.7
	East Corner, Railway Siding	86.3	85.3	79.3	83.6	42.8	45.3	42.6	43.6	11.9	12.5	10.8	11.7	36.5	31.6	26.7	31.6	BDL	BDL	BDL	31.6	65.1	56.4
31.03.22	Open Storage Yard (West Corner)	74.3	79.5	87.4	80.4	40.4	46.6	49.3	45.4	10.5	9.9	11.3	10.6	20.8	24.0	28.5	24.4	BDL	BDL	BDL	24.4	65.7	53.6
	North Corner, Corridor for Transmission Line	73.5	78.4	83.5	78.5	47.6	43.8	52.6	48.0	10.1	10.6	11.2	10.6	26.1	24.0	30.7	26.9	BDL	BDL	BDL	26.9	63.9	53.4
	South Corner, Railway Siding	68.4	73.7	72.3	71.5	40.4	38.8	45.0	41.4	12.5	11.4	13.3	12.4	31.9	35.9	23.0	30.3	BDL	BDL	BDL	30.3	62.7	54.9
	East Corner, Railway Siding	73.4	79.9	81.9	78.4	43.9	46.8	52.6	47.6	11.9	12.4	10.1	11.5	35.1	31.4	27.0	31.2	BDL	BDL	BDL	31.2	64.7	54.1

Ground Water Sample adjacent to plant area

Date	Parameters	Location		Date	Parameters	Location	
		Shah Colony	Results			Shah Colony	Results
20.10.21	pH		7.31		Iron,mg/l		0.49
	Dissolved Oxygen,mg/l		4.4		Copper,mg/l		<0.01
	BOD (3 days at 27-C),mg/l		<1.0		Manganese,mg/l		<0.03
	COD,mg/l		<1.0		Mercury,mg/l		<0.0001
	Total Suspended Solids,mg/l		40.0		Cadmium,mg/l		<0.001
	Total Dissolved Solids,mg/l		348.0		Selenium,mg/l		<0.01
	Conductivity, (µmho/cm)		588.0	20.10.21	Arsenic,mg/l		<0.01
	Turbidity, NTU		<1.0	Quarterly	Cyanide,mg/l		<0.01
	Total Alkalinity as CaCO3,mg/l		192.0	analysis	Lead,mg/l		<0.01
	Total Hardness as CaCO3,mg/l		196.0		Zinc,mg/l		0.40
	Sodium as Na,mg/l		42.0		Total Chromium,mg/l		<0.01
	Sulphate as SO4,mg/l		23.2		Aluminium,mg/l		<0.01
	Nitrate as NO3,mg/l		2.0		Boron,mg/l		<0.1
					Total Coliform, CFU/100 ml		Absent
				E.coli, CFU/100 ml		Absent	
18.11.21	pH		7.27				
	Dissolved Oxygen,mg/l		4.1				
	BOD (3 days at 27-C),mg/l		<1.0				
	COD,mg/l		<1.0				
	Total Suspended Solids,mg/l		35.0				
	Total Dissolved Solids,mg/l		358.0				
	Conductivity, (µmho/cm)		596.0				
	Turbidity, NTU		<1.0				
	Total Alkalinity as CaCO3,mg/l		196.0				
	Total Hardness as CaCO3,mg/l		188.0				
	Sodium as Na,mg/l		40.0				
	Sulphate as SO4,mg/l		22.8				
	Nitrate as NO3,mg/l		2.1				
17.12.21	pH		7.36		Iron,mg/l		0.48
	Dissolved Oxygen,mg/l		4.2		Copper,mg/l		<0.01
	BOD (3 days at 27-C),mg/l		<1.0		Manganese,mg/l		<0.03
	COD,mg/l		<1.0		Mercury,mg/l		<0.0001
	Total Suspended Solids,mg/l		42.0		Cadmium,mg/l		<0.001
	Total Dissolved Solids,mg/l		352.0		Selenium,mg/l		<0.01
	Conductivity, (µmho/cm)		594.0	17.12.21	Arsenic,mg/l		<0.01
	Turbidity, NTU		<1.0	Quarterly	Cyanide,mg/l		<0.01
	Total Alkalinity as CaCO3,mg/l		184.0	analysis	Lead,mg/l		<0.01
	Total Hardness as CaCO3,mg/l		192.0		Zinc,mg/l		0.43
	Sodium as Na,mg/l		44.9		Total Chromium,mg/l		<0.01
	Sulphate as SO4,mg/l		19.4		Aluminium,mg/l		<0.01
	Nitrate as NO3,mg/l		1.8		Boron,mg/l		<0.1
					Total Coliform, CFU/100 ml		Absent
				E.coli, CFU/100 ml		Absent	

22.01.22	pH	7.39	pH	7.43
	Dissolved Oxygen,mg/l	4.4	Dissolved Oxygen,mg/l	4.6
	BOD (3 days at 27°C),mg/l	<1.0	BOD (3 days at 27°C),mg/l	<1.0
	COD,mg/l	<1.0	COD,mg/l	<1.0
	Total Suspended Solids,mg/l	38.0	Total Suspended Solids,mg/l	34.0
	Total Dissolved Solids,mg/l	364.0	Total Dissolved Solids,mg/l	360.0
	Conductivity, (µmho/cm)	604.0	Conductivity, (µmho/cm)	588.0
	Turbidity, NTU	<1.0	Turbidity, NTU	<1.0
	Total Alkalinity as CaCO3,mg/l	188.0	Total Alkalinity as CaCO3,mg/l	180.0
	Total Hardness as CaCO3,mg/l	180.0	Total Hardness as CaCO3,mg/l	172.0
	Sodium as Na,mg/l	46.0	Sodium as Na,mg/l	42.0
	Sulphate as SO4,mg/l	20.2	Sulphate as SO4,mg/l	18.8
	Nitrate as NO3,mg/l	2.0	Nitrate as NO3,mg/l	1.9
31.03.22	pH	7.39	Iron,mg/l	0.52
	Dissolved Oxygen,mg/l	4.4	Copper,mg/l	<0.01
	BOD (3 days at 27°C),mg/l	<1.0	Manganese,mg/l	<0.03
	COD,mg/l	<1.0	Mercury,mg/l	<0.0001
	Total Suspended Solids,mg/l	35.0	Cadmium,mg/l	<0.001
	Total Dissolved Solids,mg/l	364.0	Selenium,mg/l	<0.01
	Conductivity, (µmho/cm)	599.0	Arsenic,mg/l	<0.01
	Turbidity, NTU	<1.0	Cyanide,mg/l	<0.01
	Total Alkalinity as CaCO3,mg/l	184.0	Lead,mg/l	<0.01
	Total Hardness as CaCO3,mg/l	196.0	Zinc,mg/l	0.45
	Sodium as Na,mg/l	45.0	Total Chromium,mg/l	<0.01
	Sulphate as SO4,mg/l	19.8	Aluminium,mg/l	<0.01
	Nitrate as NO3,mg/l	2.0	Boron,mg/l	<0.1
		Total Coliform, CFU/100 ml	Absent	
		E.coli, CFU/100 ml	Absent	

Surface Water Sample

Date	Parameters	Location		Date	Parameters	Location		
		Upstream Nalkari River, Near Patratu Dam	Downstream Nalkari River, Near Jai Nagar			Upstream Nalkari River, Near Patratu Dam	Downstream Nalkari River, Near Jai Nagar	
20.10.21	pH	7.35	7.41	7.29	Iron,mg/l	0.68	0.71	0.64
	Dissolved Oxygen,mg/l	7.4	7.0	7.5	Copper,mg/l	<0.01	<0.01	<0.01
	BOD (3 days at 27°C),mg/l	1.2	1.4	1.4	Manganese,mg/l	<0.03	<0.03	<0.03
	COD,mg/l	8.0	12.0	12.0	Mercury,mg/l	<0.0001	<0.0001	<0.0001
	Total Suspended Solids,mg/l	180.0	184.0	182.0	Cadmium,mg/l	<0.001	<0.001	<0.001
	Total Dissolved Solids,mg/l	384.0	362.0	308.0	Selenium,mg/l	<0.01	<0.01	<0.01
	Conductivity, (µmho/cm)	472.0	488.0	502.0	Arsenic,mg/l	<0.01	<0.01	<0.01
	Turbidity, NTU	4.6	4.9	1.9	Cyanide,mg/l	<0.01	<0.01	<0.01
	Total Alkalinity as CaCO3,mg/l	172.0	172.0	180.0	Lead,mg/l	<0.01	<0.01	<0.01
	Total Hardness as CaCO3,mg/l	168.0	180.0	216.0	Zinc,mg/l	0.71	0.72	0.48
	Sodium as Na,mg/l	40.0	42.5	38.1	Total Chromium,mg/l	<0.01	<0.01	<0.01
	Sulphate as SO4,mg/l	22.2	26.8	22.2	Aluminium,mg/l	<0.01	<0.01	<0.01
	Nitrate as NO3,mg/l	0.70	0.72	0.72	Boron,mg/l	0.12	0.19	0.19
				Total Coliform, CFU/100 ml	Absent	Absent	Absent	
				E.coli, CFU/100 ml	Absent	Absent	Absent	

18.11.21	pH	7.48	7.43	7.37
	Dissolved Oxygen,mg/l	7.6	7.3	7.8
	BOD (3 days at 27°C),mg/l	1.3	1.5	1.6
	COD,mg/l	12.0	12.0	16.0
	Total Suspended Solids,mg/l	152.0	158.0	166.0
	Total Dissolved Solids,mg/l	372.0	368.0	282.0
	Conductivity, (µmho/cm)	484.0	492.0	492.0
	Turbidity, NTU	4.2	4.5	2.1
	Total Alkalinity as CaCO ₃ ,mg/l	160.0	168.0	184.0
	Total Hardness as CaCO ₃ ,mg/l	172.0	184.0	224.0
	Sodium as Na,mg/l	36.0	40.0	36.0
	Sulphate as SO ₄ ,mg/l	22.8	24.8	22.8
	Nitrate as NO ₃ ,mg/l	0.74	0.76	0.78

17.12.21	Quaterly analysis 17.12.21	Iron,mg/l	0.72	0.76	0.66
		Copper,mg/l	<0.01	<0.01	<0.01
		Manganese,mg/l	<0.03	<0.03	<0.03
		Mercury,mg/l	<0.0001	<0.0001	<0.0001
		Cadmium,mg/l	<0.001	<0.001	<0.001
		Selenium,mg/l	<0.01	<0.01	<0.01
		Arsenic,mg/l	<0.01	<0.01	<0.01
		Cyanide,mg/l	<0.01	<0.01	<0.01
		Lead,mg/l	0.68	0.68	0.50
		Zinc,mg/l	<0.01	<0.01	<0.01
		Total Chromium,mg/l	<0.01	<0.01	<0.01
		Aluminium,mg/l	<0.01	<0.01	<0.01
		Boron,mg/l	0.11	0.16	0.16
		Total Coliform, CFU/100 ml	Absent	Absent	Absent
		E.coli, CFU/100 ml	Absent	Absent	Absent

22.02.22	26.02.22	pH	7.46	7.40	7.38
		Dissolved Oxygen,mg/l	7.6	7.2	7.6
		BOD (3 days at 27°C),mg/l	1.4	1.6	1.5
		COD,mg/l	12.0	16.0	12.0
		Total Suspended Solids,mg/l	110.0	122.0	160.0
		Total Dissolved Solids,mg/l	280.0	288.0	298.0
		Conductivity, (µmho/cm)	452.0	462.0	484.0
		Turbidity, NTU	4.7	4.8	1.9
		Total Alkalinity as CaCO ₃ ,mg/l	120.0	128.0	152.0
		Total Hardness as CaCO ₃ ,mg/l	148.0	148.0	180.0
		Sodium as Na,mg/l	36.0	38.0	32.0
		Sulphate as SO ₄ ,mg/l	20.8	22.8	22.2
		Nitrate as NO ₃ ,mg/l	0.56	0.62	0.48

31.03.22	pH	8.02	7.70	6.87	Iron, mg/l	0.60	0.64	0.60
	Dissolved Oxygen, mg/l	7.6	7.1	6.9	Copper, mg/l	<0.01	<0.01	<0.01
	BOD (3 days at 27°C), mg/l	1.4	1.8	1.6	Manganese, mg/l	<0.03	<0.03	<0.03
	COD, mg/l	12.0	16.0	16.0	Mercury, mg/l	<0.0001	<0.0001	<0.0001
	Total Suspended Solids, mg/l	65.0	77.0	88.0	Cadmium, mg/l	<0.001	<0.001	<0.001
	Total Dissolved Solids, mg/l	226.0	235.0	258.0	Selenium, mg/l	<0.01	<0.01	<0.01
	Conductivity, (µmho/cm)	360.0	369.0	412.0	Arsenic, mg/l	<0.01	<0.01	<0.01
	Turbidity, NTU	4.2	4.3	4.5	Cyanide, mg/l	<0.01	<0.01	<0.01
	Total Alkalinity as CaCO ₃ , mg/l	144.0	148.0	148.0	Lead, mg/l	<0.01	<0.01	<0.01
	Total Hardness as CaCO ₃ , mg/l	160.0	164.0	164.0	Zinc, mg/l	0.52	0.60	0.44
	Sodium as Na, mg/l	40.0	43.0	32.0	Total Chromium, mg/l	<0.01	<0.01	<0.01
	Sulphate as SO ₄ , mg/l	20.8	22.2	21.2	Aluminium, mg/l	<0.01	<0.01	<0.01
	Nitrate as NO ₃ , mg/l	0.52	0.58	0.64	Boron, mg/l	0.11	0.16	0.16
					Total Coliform, CFU/100 ml	Present	Present	Present
					E.coli, CFU/100 ml	Absent	Absent	Absent

Quaterly
analysis
31.03.22