

## Channabasavanna Alegowda

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**From:** Channabasavanna Alegowda  
**Sent:** Saturday, November 28, 2020 6:18 PM  
**To:** Regional Office Bangalore  
**Cc:** mscb.cpcb@nic.in; ms@kspcb.gov.in; zobangalore.cpcb@nic.in; udupi@kspcb.gov.in  
**Subject:** Six Monthly EC compliance & CRZ Clearance report for the period of April 2020 to September 2020 for 2x600 MW Thermal Power Plant of Udupi Power Corporation Limited (UPCL)  
**Attachments:** Six Monthly EC & CRZ Compliance Report Udupi TPP \_ April'20 - Sept'20.pdf

To,  
Additional Principal Chief Conservator of Forest (APCCF), Ministry of Environment, Forest & Climate Change,  
Regional Office (Southern Zone) Kendriya Sadan, Koramangala,  
Bangalore-560 034

Sub: Six Monthly EC compliance & CRZ Clearance report for the period of April 2020 to September 2020 for 2x600 MW Thermal Power Plant of Udupi Power Corporation Limited (UPCL)

Ref: Environmental Clearance No: J-13011/23/1996-IA.II (T) Dated: 01.09.2011.  
CRZ Clearance No: 11-14/2010-IA-III dated: 18.05.2010

Dear Sir,

We are submitting herewith Six Monthly compliance to conditions of above referred Environmental Clearance & CRZ Clearance of UPCL in soft copy through e-mail.

Request you to ignore the earlier mail with the same subject.

Thanks & Regards,

Channabasavanna Alegowda  
DGM – Environment | Udupi Power Corporation Limited  
| Yelluru Village | Pillar Post | Padubidri | Udupi Dist - 574113 |  
| Karnataka |  
Phone: +91-820-270 3430 ; Adani Voice Network : 69430 | Mobile: +91 9513945015 | E-mail :  
channabasavanna.alegowda@adani.com . www.adani.com

### Form for Uploading Compliance Report

<b>Proposal No:</b>	<input type="text" value="IA/KA/THE/10220/2009"/>	<b>Proposal Name:</b>	<input type="text" value="Enhancement of Project Capacity from 1050 MW to 2x600 MW TPP at"/>
<b>Category:</b>	<input type="text" value="Thermal Projects"/>	<b>MoEF File No.:</b>	<input type="text" value="J-13011/23/1996-IA.II(T)"/>

**Year of Compliance:**  **Date of Compliance \*:**

**Remarks:**

**Upload Compliance Letter/Report \*:**  No file chosen (.pdf on

**SUBMIT**

No.	Uploaded copy of Compliance report	Remarks	Uploaded Date	Delete
/10220/2009	01182019ILHD1D6EC&CRZCompliance2x600MW-min(1).pdf		18/01/2019	
/10220/2009	03192020VUV3CVGLUPCLPhase-1HYECComplianceReportFY2019-20.pdf	UPCL-Phase-1-HY-EC-Compliance-Report-FY2019-20	19/03/2020	
/10220/2009	12082020WP9K6NY1SixMonthlyEC&CRZComplianceReportUdupiTPP_April'20-Sept'20.pdf	Six Monthly EC & CRZ Compliance Report Udupi TPP _ April'20 - Sept'20	08/12/2020	



## Power

Ref.: UPCL/ENV/EC/MoEF/601/2020-21

Date: 20.11.2020

To,  
**Additional Principal Chief Conservator of Forest (APCCF)**  
**Ministry of Environment, Forest and Climate Change**  
**Regional Office (Southern Zone),**  
Kendriya Sadan, 4<sup>th</sup> Floor, E&F Wings,  
17<sup>th</sup> Main Road, Koramangala II Block,  
Bangalore – 560 034

**Sub.: Submission of Six Monthly EC compliance report for the period of April 2020 to September 2020 for 2x600 MW Thermal Power Plant of Udupi Power Corporation Limited (UPCL)**

Ref.: Environmental Clearance No: **J-13011/23/1996-IA.II (T) Dated: 01.09.2011.**  
CRZ Clearance No: **11-14/2010-IA-III dated: 18.05.2010**

Dear Sir,

With reference to above subject, please find enclosed herewith the six monthly compliance report for the period of **April 2020 to September 2020** towards the conditions of Consolidated Environmental Clearance for **2x600 MW Thermal Power Plant** and CRZ Clearance of Sea Water Pipeline granted to Udupi Power Corporation Limited through e-mail.

This is for your kind information & record please.

Thanking you,

Your sincerely,  
for **Udupi Power Corporation Limited**

**(Santosh Kumar Singh)**  
**Authorized Signatory**

**CC:**

**The Member Secretary,**  
**Central Pollution Control Board,**  
Parivesh Bhavan, East Arjun Nagar,  
Kendriya Paryavaran Bhawan, New Delhi – 110 032

**The Member Secretary**  
**Karnataka State Pollution Control Board**  
"Parisara Bhavan", #49, 4th & 5th Floor,  
Church Street, Bangalore – 560 001

**Zonal Office,**  
**Central Pollution Control Board,**  
1<sup>st</sup> and 2<sup>nd</sup> Floor, Nisarga Bhavan, A-Block, Thimmaiah  
Main Road, 7<sup>th</sup> Cross, Shivanagar, Bengaluru – 560 010

**Regional Office,**  
**Karnataka State Pollution Control Board.**  
Plot no-36-C, Shivalli industrial Area,  
Manipal, Udupi – 576 104

**Encl.:** As mentioned above

Udupi Power Corporation Ltd  
Adani Corporate House  
Shantigram, S G Highway  
Ahmedabad 382 421  
Gujarat, India  
CIN: U31909KA1996PLC019918

Tel +91 79 2555 4444  
Fax +91 79 2555 7177  
info@adani.com  
www.adanipower.com

**Six Monthly Compliance Report Of  
Environmental Clearance (EC)**

**For  
1200 MW (2×600MW) THERMAL POWER PLANT  
And**

**Coastal Regulation Zone (CRZ) Clearance**

**For  
SEA WATER PIPELINE**

**At**

**Village Yelluru (in Padubidri Industrial Area), Udupi  
District, Karnataka**

*Submitted to:*

**Regional Office  
Ministry of Environment, Forests & Climate Change,  
Central Pollution Control Board, New Delhi &  
Karnataka State Pollution Control Board, Mangalore**



*Submitted By:*

**Environment Management Department  
Udupi Power Corporation Limited  
Yelluru Village, Pilar Post, Padubidri,  
Udupi District, Karnataka**

**April'2020 – September'2020**

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## Udupi Power Corporation Limited

### INTRODUCTION:

Udupi Power Corporation Limited is a 2x600 MW imported coal based power project in the Udupi District of Karnataka. It is situated in the western coastal region of India, in the village of Yellur, between Mangalore and Udupi district.

UPCL is the first independent power project (IPP) using 100% imported coal as fuel in the country. The Udupi Power Project supplies power to the State of Karnataka.

#### Location of the Project

<b>State</b>	Karnataka
<b>District</b>	Udupi
<b>Village</b>	Yelluru (in Padubidri Industrial Area)
<b>Geographical Coordinates</b>	13 <sup>o</sup> 9'00" N 74 <sup>o</sup> 47'00" E 13 <sup>o</sup> 10'30" N 74 <sup>o</sup> 48'40" E

Both units of 600 MW at UPCL has sub critical coal fired steam generator each connected to a reheat type condensing steam turbine and generator with water cooled condenser and all other required auxiliaries. Each steam generator of 600MW is rated to generate about 2028 tons/hour of superheated steam at a pressure of about 175 kg/cm<sup>2</sup> and superheat temperature of 540<sup>o</sup>C. The steam generators are equipped with facilities for HFO/LDO firing for startup and flame stabilization at low loads. Each steam turbine is 3000 rpm rated speed, tandem compound, single re-heat, condensing type machine with extractions for regenerative feed water heating. The turbine is designed for main stream pressure of 170 kg/cm<sup>2</sup> (a) and inlet temperature of 537<sup>o</sup>C.

Being coastal area with perennial availability of seawater, usage of seawater is envisaged for condenser cooling and fresh water requirement. Re-circulating type of circulating water (CW) system with natural draft cooling towers is installed. Due to availability of Fresh water in this area is seasonal and limited; desalination of seawater is installed for meeting the freshwater requirement for the plant. About 10000 m<sup>3</sup>/hr of makeup sea water is required for both the Unit-1 & Unit-2.

The plant has all latest Pollution Control Equipment like, High Efficiency ESP's, Flue gas desulphurization plant, Low NOX burners and 275 m height chimney.

UPCL has obtained Environmental Clearances from Ministry of Environment Forest & Climate Change (MoEF&CC), Consent to Establish and Consent for Operation (CFO) from Karnataka State Pollution Control Board (KSPCB). UPCL has also obtained all necessary statutory/mandatory clearances.

Ambient Air quality Monitoring Stations were established in 4 locations inside the plant area for continuous monitoring of Ambient Air Quality. One meteorological station has also been installed for monitoring of meteorological data. UPCL is monitoring the environmental parameters in and around the plant area through NABL accredited Laboratory.

**Environmental clearance was accorded to the project for 2x500 MW fully imported coal based units on 20 March 1997. This EC was amended on 25 Jan 1999 and 09 Sept 2009 permitting enhancement of capacity to 2x507.5 MW and subsequently to 2x600 MW. These amendments in EC were consolidated on 01 Sept 2011 by MoEF&CC.**

Detailed compliance status of Consolidated Environment Clearance from MoEF&CC for 2X600 MW Coal based Subcritical Thermal Power plant and CRZ clearance from State Coastal Zone Management Authority for Sea Water Pipeline is being furnished herewith.

**Udupi Power Corporation Limited**

**Compliance Status Report On Environment Clearance of**

2x600 MW Udupi Thermal Power Plant

Vide Letter No. J-13011/23/1996-IA.II (T) dated 01.09.2011

<b>S.NO</b>	<b>Conditions</b>	<b>Compliance</b>
<b>A</b>	<b>Specific Conditions</b>	
(i)	All the conditions stipulated by the Karnataka State Pollution Control Board issued from time to time should be strictly implemented including the installation of Flue Gas Desulphurization (FGD) Plant. The status of implementation of FGD shall be submitted to the Regional Office of the Ministry at Bangalore.	Complied. All the conditions stipulated under NOC/CTO granted by KSPCB are implemented. FGD units are commissioned and are in operation from the inception of Unit-1 & Unit-2 boilers. Unit-I :11 <sup>th</sup> November 2010 Unit-II :19 <sup>th</sup> August 2012
(ii)	Sulphur and ash contents in the coal to be used in the project shall not exceed 0.8% and 12 % (average) respectively at any given time. In case of variation of coal quality at any point of time, fresh reference shall be made to the Ministry	Complied Sulphur and Ash contents. Average Sulphur and Ash content in coal used for the period of Apr 2020 to Sep 2020 is as below: 1. Sulphur : 0.48% 2. Ash Content : 7.46%
(iii)	A single bi-flue stack of 275 m height shall be provided with continuous online monitoring equipment's of SO <sub>x</sub> , NO <sub>x</sub> and Particulate Matter (PM <sub>2.5</sub> & PM <sub>10</sub> ). Exit velocity of flue gases shall not be less than 22 m/sec. Mercury emissions from stack shall also be monitored on periodic basis.	Complied A Single bi-flue stack of 275 m height is provided with continuous online monitoring for SO <sub>2</sub> , NO <sub>x</sub> , Particulate matter and Mercury. Exit velocity of the flue gases from the stack for the period of Apr 2020 to Sep 2020 was 22.7 to 25.9 m/s.
(iv)	An instrumented meteorological tower shall be set up for collecting on-site meteorological data.	Complied An instrumented meteorological tower is established for online meteorological data. Meteorological data for the period of Apr 2020 to Sep 2020 is enclosed as <b>Annexure-I</b> for reference.
(v)	High Efficiency Electrostatic Precipitators (ESPs) shall be installed to ensure that particulate emission from the proposed plant does not exceed 50 mg / NM <sup>3</sup> . Low NO <sub>x</sub> Burners shall be installed.	Complied High Efficiency Electrostatic Precipitators and low NO <sub>x</sub> Burners are installed. Particulate emissions from the plant are well within the limits. Monitoring values for the period of Apr 2020 to Sep 2020 is enclosed as <b>Annexure-II</b> for reference.

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(vi)	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.	Complied Water Sprinklers are provided in coal yard, coal unloading and coal conveyor systems. Dust Extraction system has been provided at Junction towers Dry Fog dust suppression system is provided in track hopper and bunkers Wind Shield has been provided, photograph is enclosed in <b>Annexure-III</b>
(vii)	Transportation of coal from Mangalore Port to the project site shall be undertaken by rail with adequate provisions to prevent fugitive emissions	Complied Coal is being transported from Mangalore port to plant site through railway lines only by BORBN type wagons. Wagons are covered with tarpaulin sheets to avoid fugitive emission during transportation.
(viii)	Fly ash shall be collected in dry form and storage facility (silos) shall be provided. Unutilized fly ash shall be disposed off in the ash pond in the form of slurry. Mercury and other heavy metals (As, Hg, Cr, Pb etc.) will be monitored in the bottom ash as also in the effluents emanating from the existing ash pond. No ash shall be disposed off in low lying area. To prevent ground water contamination, the ash pond area should be lined with impervious layer.	Complied Fly ash is collected in dry form and stored in ash silos. All the generated fly ash is issued to the end users like Cement, RMC, Brick manufactures etc. Fly Ash Utilization details is enclosed as <b>Annexure-IV</b> . Ash pond is lined with LDPE film as impervious layer to avoid ground water contamination. Mercury and other heavy metals are monitored in the bottom ash through NABL accredited laboratory. No effluent is emanated from ash pond. No ash is disposed in the low lying areas. Test wells are constructed around the ash pond area for water monitoring and monitoring reports for the period of Apr 2020 to Sep 2020 is enclosed as <b>Annexure-V</b> for reference.
(ix)	The transportation of dry fly ash to the ash disposal area through closed bulkers shall be allowed till 30.03.2012 till the Cement Grinding unit of M/s ACC Ltd. is set up. Monitoring of particulate emissions along the route of transportation shall be carried out	Complied Cement blending unit has been installed within the UPCL plant near to Ash silos and ash is transferred from silos to blending unit through closed conduit only. Monitoring is carried out in transportation route. Four no's of online ambient air quality monitoring stations are established for ambient air quality (AAQ) monitoring. AAQ monitoring is also done in transportation



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		route and buffer zone through MoEF and NABL accredited laboratory. Air monitoring reports for the period of Apr 2020 to Sep 2020 is enclosed as <b><i>Annexure-VI</i></b>
(x)	Extensive monitoring of air quality in and around the power plant and extending up to Western Ghat should be carried out and records should be scientifically maintained. The monitoring Programme should cover the key stone species for any potential acid deposition effects.	Complied Air quality monitoring is carried through MoEF and NABL accredited laboratory at 8 locations (extending up to Western Ghats) which is finalized in consultation with KSPCB and the monitoring reports are submitted to the KSPCB office monthly. The Monitoring program covers western Ghats and measure Sulphur dioxide and Nitrogen dioxide, as main precursors for acid rain. Key Stone Species Monitoring is carried once in six months & no changes are noticed. Air quality monitoring reports for the period of Apr 2020 to Sep 2020 is enclosed as <b><i>Annexure-VI</i></b>
(xi)	No leachate shall take place at any point of time from the Coal storage area and Ash Pond and adequate safety measures such as lining with impermeable membrane / liner shall be adopted. Precautionary measure shall be taken to protect the ash dyke from getting breached and in-built monitoring mechanism shall be formulated.	Complied LDPE film is used as impervious layer to avoid ground water contamination from Coal storage and Ash Pond area. Test wells are constructed around the ash pond area for water monitoring and monitoring reports for the period of Apr 2020 to Sep 2020 is enclosed as <b><i>Annexure-V</i></b>
(xii)	Fugitive emission of fly ash (dry or wet) shall be controlled so 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.	Complied Disposal of fly ash is handled through closed conduit within plant. No damage has happened to any land at all times
(xiii)	COC of at least 1.25 shall be adopted	Complied
(xiv)	Closed Circuit Cooling Tower shall be installed and sea water shall be used for cooling purpose. The sweet water requirement shall be met from the desalination plant.	Complied Closed circuit cooling tower is provided and sea water is used for cooling purpose. Desalination plant is provided for sweet water requirement.
(xv)	No effluent will be discharged into the Mulki River. The treated effluents shall be discharged through a pipeline in the	Complied

**Udupi Power Corporation Limited**

	<p>Arabian Sea ensuring that the differential temperature is maintained at 5<sup>o</sup> C. The area and location of the intake and discharge point shall be finalized in consultation with the National Institute of Oceanography (NIO), Goa/Central Water and Power Research Station, Pune.</p>	<p>No effluent is discharged into the Mulki River and there is no connection of UPCL with Mulki River.</p> <p>All the cooling tower blow down and water outlets are discharged back to the sea from Guard Pond through Coro-coated MS-Pipe line at designated place which is finalized in consultation with NIO.</p> <p>The differential temperature is maintained within 5<sup>o</sup> C.</p> <p>The intake and outfall sea water points are finalized as per recommendations of NIO, Goa.</p>
(xvi)	<p>Brine management from desalination plant, its disposal mechanism and status of implementation shall be submitted to the Regional Office of the Ministry from time to time.</p>	<p>Complied</p> <p>Guard pond has been established to collect all the water outlets. Brine from desalination plant is sent to Guard pond and discharged to Sea.</p> <p>Continuous online monitoring system implemented in Guard pond, in addition to that water sample is being collected and analyzed once a week by MoEF&amp;CC and NABL accredited laboratory.</p> <p>Guard pond effluent monitoring reports for the period of Apr 2020 to Sep 2020 is enclosed as <b>Annexure-VII</b></p>
(xvii)	<p>Possibility for setting up transit storage within plant site for temperature control of effluent before discharging to the sea shall be examined and details submitted to the Ministry <b>within six months.</b></p>	<p>Complied</p> <p>Guard pond has been established to collect all the water outlets. Treated effluents, including blow down from the cooling towers are sent back to sea via Guard pond. Effluent temperature maintained within 5<sup>o</sup> C before discharge.</p>
(xviii)	<p>Monitoring of ground and surface water quality nearby shall 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 or advised by the State Pollution Control Board and records maintained. Monitoring for heavy metals in ground water shall be undertaken.</p>	<p>Complied</p> <p>Ground water and Surface water monitoring is carried regularly in the locations finalized in consultation with KSPCB and records are maintained.</p> <p>Monitoring reports are sent to KSPCB once in every month.</p> <p>Monitoring of heavy metals in ground water is carried out monthly.</p> <p>Water monitoring reports for the period of Apr 2020 to Sep 2020 is enclosed as <b>Annexure-VIII</b></p>

**Udupi Power Corporation Limited**

(xix)	A well designed rain water harvesting system shall be put in place which shall comprise of rain water collection from the built up and open area in the plant premises. Action plan and road map for implementation shall be submitted to the Regional Office of Ministry.	Two Numbers of Rain water harvesting ponds are constructed to harvest rain water. Please refer <b>Annexure - IX</b>													
(xx)	The project proponent shall not hamper the vocation of the fishing community in the area (if any) and it shall be ensured that local fishing community shall be allowed to carry out their vocation. Clearance from the Department of Fisheries in the State Govt. shall be obtained.	Complied Fishing activity has not been hampered. Monitoring of sea water around the intake and outfall points is being carried regularly through College of Fisheries, Mangalore. NOC has been obtained from department of Fisheries, State government of Karnataka. Clearance letter from department of Fisheries Karnataka is enclosed as <b>Annexure-X</b>													
(xxi)	Acquisition of land should be restricted to 550 ha as per the following breakup:		Complied with. Following is the current status:												
	Plant area	180 Ha	Plant area	170 Ha											
	Ash Disposal Area	150 Ha	Ash Disposal Area	46 Ha											
	Colony Area	45 Ha	Colony Area	-											
	In take pipe route	25 Ha	In take pipe route	15 Ha											
	Other requirements	50 Ha	Other requirements	8 Ha											
Rehabilitation, Green belts, Ash utilizations etc.	100 Ha	Rehabilitation, Green belts, Ash utilizations etc.,	82 Ha												
(xxii)	Green belt of adequate width and density with suitably selected native species should be developed all around the plant area and the ash disposal site. Density of trees shall not be less than 2000 per ha and survival rate not less than 80%. It shall be ensured that at least 1/3 <sup>rd</sup> of the total area is utilized for creation of green belt. Adequate financial provision should be made for this purpose.		Complied Green belt of about 3,66,655 saplings in 195 acres have been planted. Survival rate of the plantation is ensured more than 80% by taking appropriate after care methods like Watering, apply manure etc. Snapshots of Plantation are enclosed as <b>Annexure-XI</b> Adequate financial provision for the plantation under Environment budget is made separately. The amount spent for various activities under Environment for the period of April 2020 to Sep'2020.												
				<table border="1"> <thead> <tr> <th>Description</th> <th>Amount (Rs.)</th> </tr> </thead> <tbody> <tr> <td>Afforestation</td> <td>3,852,148</td> </tr> <tr> <td>Environment Monitoring</td> <td>3,174,998</td> </tr> <tr> <td>General Environment Management</td> <td>33,022,790</td> </tr> <tr> <td><b>Total</b></td> <td><b>40,049,936</b></td> </tr> </tbody> </table>		Description	Amount (Rs.)	Afforestation	3,852,148	Environment Monitoring	3,174,998	General Environment Management	33,022,790	<b>Total</b>	<b>40,049,936</b>
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(xxiii)	Local employable youth from Project Affected Family shall be trained in skills	Complied													

**Udupi Power Corporation Limited**

	relevant to the project for eventual employment in the project itself. The action taken report and details thereof to this effect shall be submitted to the Regional Office of the Ministry and the State Govt. Dept. concerned from time to time.	As per the recommendations from KIADB, project affected families are taken on employment and provided required trainings and skill developments. The copy of the letter submitted to KIADB is enclosed as <b><i>Annexure-XII</i></b>
(xxiv)	The project affected people should be rehabilitated and resettled in consultation with the State Govt. of Karnataka. A Rehabilitation Committee should be constituted with representatives from the state of Govt. of Karnataka, affected people, local recognized NGOs, technical institutions, experts etc.	Complied Rehabilitation and Resettlement is already provided to the project affected people as per R&R policy of Government of Karnataka.
(xxv)	Status of implementation of R&R including its financial component spent and action pending shall be submitted to the regional Office of the Ministry from time to time.	Complied
(xxvi)	Financial requirements for implementations of the environmental mitigative measures should be earmarked and shall not be diverted for the other purposes. Adequate provision should be ensured for enhancement of funds required, if any, in future.	Complied Financial requirement for Environmental mitigative measures was earmarked at the time of project as per EIA Notification and measures have been implemented. Operating expenses are earmarked in operation budget on yearly basis. In case, if any future requirement occurs, funds will be provided as & when required.
(xxvii)	The project proponent shall also adequately contribute in the development of the neighboring villages. Special package with implementation schedule for free potable drinking water supply in the nearby villages and schools shall be undertaken in a time bound manner.	Complied Potable drinking water supply through RO plant is done. The company is also providing assistance in Medical, Education and Infrastructural facilities etc., to the neighboring villages. Scholarships, green nurturing and school grants are also providing to nearby villages.
(xxviii)	The project proponent shall formulate sustainable livelihood scheme for landless and marginalized section of society (such as landless farmers) in the area who are directly or indirectly affected due to power project.	Complied The Company has engaged local people for various activities like Green belt Development, Area development and other service works like catering etc.,
(xxix)	At least three nearest village shall be examined for possible adoption and	Complied

**Udupi Power Corporation Limited**

	basic amenities like development of roads; drinking water supply, primary health centre, primary school etc shall be developed in co-ordination with the district administration	UPCL along with the District Administration has identified various schools in the neighboring villages for adoption and for providing basic amenities like toilet facilities, drinking water, green nurturing, etc.
(xxx)	An amount of Rs. 5.0 Crores shall be earmarked as one time capital cost for CSR programme. Subsequently a recurring expenditure of Rs. 1.0 Crores per annum till the life the plant shall be earmarked as recurring expenditure for CSR activities. Details of the activities to be undertaken shall be submitted within one month along with road map for implementation.	Being Complied Rs.5 crore was earmarked onetime cost for CSR during the project phase stage of 2x600 MW plant. Over Rs.1 crore is earmarked and used for all CSR activities every year.
(xxxi)	CSR scheme shall be identified based on need based assessment in and around the villages 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 as required after imparting relevant training shall be also undertaken as necessary.	Complied CSR schemes are identified based on need assessment and constant consultation with village Panchayat and the District Administration. CSR team is engaged for assessment and consultation with local villages for CSR activities on a continuous basis. For local youth, scholarships and various other schemes including trainings are provided so as to get them proper education and getting eventual employment opportunities. Snapshots of CSR activities are enclosed as <b>Annexure-XIII</b>
(xxxii)	It shall be ensured that in-built monitoring mechanism for the schemes identified is in place and annual social audit shall be got done from the nearest government institute of repute in the region. The project proponent shall also submit the status of implementation of the scheme from time to time.	Complied Socio Economic study was carried at the project time as a part of EIA study. Impact assessment of CSR interventions is periodically done internally.
(xxxiii)	A Monitoring Committee should be constituted for reviewing the compliance to various safeguard measures by involving recognized local NGOs. Pollution Control Board, Institutions, Experts etc.	Monitoring Committee is framed comprises of NGO, College Experts and Institution Experts to review Safeguard measures implemented by UPCL.
<b>B</b>	<b>General Conditions:</b>	

**Udupi Power Corporation Limited**

(i)	A Corporate Environmental Policy shall be formulated and after due approval of the Board of Directors of the Company shall be submitted to the Ministry <b>with six months</b> . The policy shall specifically address issues of adherence to environmental policy so formulated and environmental clearance conditions stipulated for the power project and also others including matters related to violations of stipulated conditions (if any) to the Board.	Complied
(ii)	The treated effluents confirming to the prescribed standards only shall be re-circulated and reused within the plant. Arrangements shall be made that effluents and storm water do not get mixed.	Complied All the Effluents are treated through ETP (Effluent Treatment Plant) to meet the effluent standards and the treated water is used for Green belt development/dust suppression.
(iii)	A sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising greenbelt / plantation.	Complied. Modular STP has been installed treating sewage water and discharging for green belt development.
(iv)	A well designed rainwater harvesting shall be constructed. Central Groundwater Authority / Board shall be consulted for finalization of appropriate rainwater harvesting technology within <b>a period of three months</b> from the date of issue of clearance and details shall be furnished to the Regional Office of the Ministry.	Two numbers of Rain water harvesting ponds are constructed to harvest rain water. Construction of additional rain water harvesting ponds is underway. Photos is enclosed as <b>Annexure XVII</b>
(v)	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.	Complied Adequate safety measures like fire hydrant, fire extinguishers, smoke detectors, hose reel, hose house, water monitor, D.V system, Fire water pump house, fire tenders are available to prevent from spontaneous fires.
(vi)	Storage facilities for auxiliary liquid fuel such as LDO and HFO/LSHS shall be made in the plant area in consultation with Department of Explosives, Nagpur. Sulphur content in the liquid fuel will not exceed 0.5%. Disaster Management	Storage facilities in the plant for auxiliary liquid fuel are provided and the facilities are approved by Department of Explosives, Nagpur.

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	Plan shall be prepared to meet any eventuality in case of an accident taking place due to storage of oil.	Liquid fuel is procured from Oil Companies (GOI Undertakings) and Sulphur content condition is complied with. Environment and disaster preparedness plan is in place and approved by Inspector of Factories and Boilers.
(vii)	Regular monitoring of ground water level shall be carried out by establishing a network of existing wells and constructing new piezometers. Monitoring around the ash pond area shall be carried out particularly for heavy metals (Hg, Cr, As, Pb) and records maintained and submitted to the Regional Office of this Ministry. The data so obtained should be compared with the baseline data so as to ensure that the ground water quality is not adversely affected due to the project.	Being Complied Regular monitoring is being carried in existing wells and test wells constructed around ash pond area and reports are submitted monthly to KSPCB office and the same is submitted to RO-MoEF&CC once in six months. Monitoring reports are enclosed as <b>Annexure-V and Annexure-VIII</b> The compared baseline data for the period of April 2020 to September 2020 is enclosed as <b>Annexure-XIV</b>
(viii)	Monitoring surface water quantity and quality shall also be regularly conducted and records maintained. The monitored data shall be submitted to the Ministry regularly. Further, monitoring points shall be located between the plant and drainage in the direction of flow of ground water and records maintained. Monitoring for heavy metals in ground water shall be undertaken.	Complied Surface water monitoring is carried regularly in the monitoring points finalized in consultation with KSPCB. Monitoring reports are submitted regularly to RO-KSPCB and same is submitted to RO-MoEF&CC once in six months. Monitoring reports for the period of April 2020 to September 2020 is enclosed as <b>Annexure-VIII</b> However, surface water Quantity measurement is not applicable.
(ix)	First Aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase	Complied with. All the arrangements are made during the construction phase.
(x)	Noise levels emanating from turbines shall be so controlled such that the noise in the work zone shall be limited to 75 dBA. For people working in the high noise area, requisite personal protective equipment like earplugs / ear muffs etc. shall be provided. Workers engaged in noisy areas such as turbine area, air compressors etc shall be periodically examined to maintain audiometric record and for treatment for any hearing	Complied Enclosures are provided for turbines to control the noise. The persons working in the high noise area are provided with ear plugs/ear muffs All the employees working in the area are examined periodically for audiometric and records are maintained.

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	loss including shifting to non-noisy / noise less areas.	
(xi)	Regular monitoring of ground level concentration of SO <sub>2</sub> , NO <sub>x</sub> , PM <sub>2.5</sub> & PM <sub>10</sub> and Hg shall be carried out in the impact zone and records maintained. If at any stage these levels are found to exceed the prescribed limits, necessary control measures shall be provided immediately. The location of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Periodic reports shall be submitted to the Regional Office of this Ministry. The data shall also be put on the website of the company.	Being Complied Regular monitoring is carried as per NAAQ standards in all the locations finalized by KSPCB. Ambient Air Quality Monitoring stations are established in the plant for continuous monitoring of pollution levels. Monitoring reports are regularly submitted to KSPCB and RO-MoEF&CC and copy of the report along with the data is being kept on company website in six monthly compliance reports <a href="http://www.adanipower.com/downloads">http://www.adanipower.com/downloads</a>
(xii)	Provision shall be made for the housing of construction labor (as applicable) within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project	Complied
(xiii)	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	Complied
(xiv)	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parisad / Municipal Corporation, urban local Body and the Local NGO, if any, from whom suggestions / representations, if any, received while processing the proposal. The clearance letter shall also be put on the website of the Company by the project proponent.	Complied Clearance letter is displayed in company website as part of the Six monthly compliance report of EC conditions. <a href="http://www.adanipower.com/downloads">http://www.adanipower.com/downloads</a>
(xv)	An Environmental Cell shall be created at the project site itself and shall be headed by an officer of appropriate	Complied A well-qualified Environment cell is established. Head of the Environment



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	<p>seniority and qualification. It shall be ensured that the head of the Cell shall directly report to the Head of the Organization. The status report on the functioning of the Cell shall be submitted to the regional office of the Ministry periodically. The Cell shall comprise of an expert in Marine Biology, Fishery and Mangroves preservation.</p>	<p>department is directly reporting to station head.</p> <p>Director &amp; Research Karnataka veterinary, Animal &amp; fisheries sciences University Bidar is a member of Environmental Monitoring committee is providing necessary technical assistance in Marine Biology, Fishery and Mangroves preservation issues.</p>
(xvi)	<p>The proponent shall upload the status of compliance of the stipulated environmental clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MOEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM (PM<sub>2.5</sub> &amp; PM<sub>10</sub>), SO<sub>2</sub>, NO<sub>x</sub> (ambient levels as well as stack emissions) shall be displayed at a convenient location near the main gate of the company in the public domain.</p>	<p>Complied</p> <p>Status of compliance of the stipulated environmental clearance conditions including results of monitored data is kept website and shall update on Six monthly basis.</p> <p><a href="http://www.adanipower.com/downloads">http://www.adanipower.com/downloads</a></p> <p>Monitoring parameters are displayed near main gate.</p> <p>Online Continuous emission monitoring (CEMS) data is supplied to CPCB and displayed in the public domain through the below said website.</p> <p>URL: <a href="http://cpcbtrdms.nic.in/">http://cpcbtrdms.nic.in/</a></p> <p>Regularly monitoring data is submitted to Regional Office of MoEF&amp;CC, Regional Office of KSPCB and Zonal Office of CPCB.</p>
(xvii)	<p>The environment statement for each financial year ending 31<sup>st</sup> March in Form – V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Offices of the Ministry by e-mail.</p>	<p>Complied</p> <p>Copy of Environmental statement for the Financial Year 2019-20 is submitted to RO-MoEF&amp;CC and RO-KSPCB. Copy is enclosed as <b>Annexure-XV</b></p> <p>The copy of Environmental statement is kept in six monthly EC compliance report to MoEF&amp;CC. Six monthly report is uploaded on company's website.</p> <p><a href="http://www.adanipower.com/downloads">http://www.adanipower.com/downloads</a></p>
(xviii)	<p>The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests, its Regional Office, Central Pollution Control Board and State Pollution</p>	<p>Complied</p> <p>Six monthly compliance reports are regularly submitted to Regional Office of MoEF&amp;CC, Regional Office of KSPCB and Zonal Office of CPCB.</p> <p>The same is displayed on the company's website.</p>

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	Control Board. The project proponent shall upload the status of compliance of the environment 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, Ministry of Environment and Forests	<a href="http://www.adanipower.com/downloads">http://www.adanipower.com/downloads</a>															
(xix)	<p>Regional Office of the Ministry of Environment &amp; Forests will monitor the implementation of the stipulated conditions.</p> <p>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.</p> <p>Project proponent will up-load the compliance status in their website and up-date the same from time to time at least six monthly basis.</p> <p>Criteria pollutants levels including NOx (from stack &amp; ambient air) shall be displayed at the main gate of the power plant.</p>	<p>Complied</p> <p>Complete set of document including EIA/EMP report was submitted to MoEF&amp;CC and KSPCB for project approval.</p> <p>Status of compliance of the stipulated environmental clearance conditions including results of monitored data has been uploaded on company's website and is being be updated on Six monthly basis.</p> <p><a href="http://www.adanipower.com/downloads">http://www.adanipower.com/downloads</a></p> <p>Environmental Monitoring parameters are displayed near the main gate.</p>															
(xx)	<p>Separate funds shall be allocated for implantation of environmental protection measures along with item-wise break-up. These cost shall be included as part of the project cost. The funds earmarked for the environment protection measures shall not be diverted for other purposes and year-wise expenditure should be reported to the Ministry.</p>	<p>Complied</p> <p>Funds for Environmental protection measures were earmarked at the time of project as per EIA report and measures have been implemented.</p> <p>Yearly environmental budget is part of the yearly operating cost of the project.</p> <p>The total Environment Expenditure for the period of April'2020 to September'2020 included the following:</p> <table border="1"> <thead> <tr> <th>S.No</th> <th>Detail Description</th> <th>Amount (Rs)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Afforestation</td> <td>3,852,148</td> </tr> <tr> <td>2</td> <td>Environment Monitoring</td> <td>3,174,998</td> </tr> <tr> <td>3</td> <td>General Environment Management</td> <td>33,022,790</td> </tr> <tr> <td></td> <td><b>Total</b></td> <td><b>40,049,936</b></td> </tr> </tbody> </table>	S.No	Detail Description	Amount (Rs)	1	Afforestation	3,852,148	2	Environment Monitoring	3,174,998	3	General Environment Management	33,022,790		<b>Total</b>	<b>40,049,936</b>
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(xxi)	The project authorities shall inform the Regional Office as well as the Ministry	Complied with															

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	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	
(xxii)	Full cooperation shall be extended to the Scientists / Officers from the Ministry / Regional Office of the Ministry at Bangalore / CPCB / SPCB who would be monitoring the compliance of environmental status	Noted. Full co-operation shall be extended to mentioned authority always.
(5)	The Ministry of Environment and Forests reserves the right to revoke the clearance if conditions stipulated are not implemented to the satisfaction of the Ministry. The Ministry may also impose additional environmental conditions or modify the existing ones, if necessary.	Noted & agreed
(6)	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
(7)	In case of any deviation or alteration in the project 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	Noted
(8)	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 and Handling) Rules, 2008 and its amendments, the Public Liability Insurance Act, 1991 and its amendments.	Noted & being complied.

## Udupi Power Corporation Limited

### Compliance Status Report of CRZ Clearance for Sea Water Pipeline of 2x600 MW Udupi Thermal Power Plant vide letter no. 11-14/2010-IA-III dated 18.05.2010

S.NO	Conditions	Compliance
<b>5</b>	<b>Specific Conditions</b>	
<b>I</b>	<b>Construction phase:</b>	
(i)	All the conditions stipulated by the Karnataka State Coastal Zone Management Authority vide letter No. FEE 25 CRZ 2009, dated 16.02.2010 and the commitments/details submitted to KSCZMA shall be strictly complied with.	Noted & complied.
(ii)	Regular monitoring shall be carried out before discharging into sea.	Used water is directed to Guard pond and regular monitoring is done and reports are submitted on monthly basis to KSPCB also.
(iii)	A joint meeting of both the monitoring groups every year shall be carried out and send the report to MoEF.	Complied Regular joint meeting of UPCL monitoring team and third party MoEF&CC and NABL approved lab is conducted and monitoring reports are submitted to MoEF&CC on six monthly basis.
(iv)	It should be ensured that there shall not be any disturbance to fishing activity.	Noted & being complied.
(v)	All safety precautionary measures viz. stability of the pipe line, signal for fishing boats etc. shall be installed.	Sea water Pipe line is in fenced area and Emergency contact number is displayed in critical areas like Road Crossing, Village areas. 3 No's of Safety buoys are provided in the underwater pipeline area for safety of fishing boats.
(vi)	There shall be display boards at critical locations along the pipe line giving emergency instructions. Emergency information board shall contain emergency instructions in additions to contact details	Sea water Pipe line is in fenced area and caution boards provided with Emergency contact number is displayed in critical areas like Road Crossing, Village areas. Photos of display boards are enclosed as <b><i>Annexure-XVI</i></b>
(vii)	The project shall be implemented in such a manner that there is no damage to the mangroves/other sensitive coastal ecosystems	The pipeline area does not include any mangroves/other sensitive coastal eco systems.
(viii)	A continuous and comprehensive post-project marine quality monitoring program shall be taken up. This shall include monitoring of water quality, sediment quality and biological	Monitoring is carried for sea water quality at intake and outfall points by Fisheries college, Mangalore. Reports are regularly submitted. Monitoring Reports for the period of April 2020 to September 2020 is enclosed as

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	characteristics and the report shall be submitted every six month to Ministry's Regional Office at Bangalore.	<i>Annexure-XIV</i>
(ix)	It shall be ensured that there is no displacement of people and the houses as a result of the project.	Noted & complied.
(x)	There shall be no withdrawal of ground water in CRZ area, for the project.	Noted & complied.
(xi)	Provision shall be made for the housing of construction labor 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.	All the arrangements were made during the construction phase.
(xii)	A First Aid Room will be provided in the project both during construction and operation of the project	Complied All the arrangements are made during the construction phase.
(xiii)	Soil and ground water samples will be tested to ascertain that there is no threat to ground water quality	Complied All the construction activities are completed.
(xiv)	Any hazardous waste generated during construction phase, should be disposed off as per applicable rules and norms with necessary approvals of the KSPCB.	Complied No hazardous waste is generated during construction phase.
(xv)	The diesel generator sets to be used during construction phase should be low Sulphur diesel type and should confirm to Environment (Protection) Rules prescribed for air and noise emission standards.	Construction work involves only excavation and pipe laying work, so DG sets were not used.
(xvi)	The diesel required for operating DG sets shall be stored in underground tanks and if required, clearance from Chief Controller of Explosives shall be taken.	Construction work involves only excavation and pipe laying work, so DG sets were not used.
(xvii)	Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should confirm to applicable air and noise emission standards and should be operated only during non-peak hours.	Complied
(xviii)	Ambient noise levels should confirm to	Noted & complied.

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	residential standards both during day and night. Incremental pollution loads on the ambient air and noise quality should be closely monitored during construction phase. Adequate measures should be made to reduce ambient air and noise level during construction phase, so as to confirm to the stipulated standards by CPCB/KSPCB	
(xix)	Storm water control and its re-use as per CGWB and BIS standards for various applications.	Noted & agreed
(xx)	Regular supervision of the above and other measures for monitoring should be in place all through the construction phase, so as to avoid disturbance to the surroundings	Noted & complied.
<b>(II)</b>	<b>OPERATION PHASE</b>	
(i)	Noise should be controlled to ensure that it does not exceed the prescribed standards. During night time the noise levels measured shall be restricted to the permissible levels to comply with the prevalent regulations	Noise level are maintained well within the prescribed limit of industrial zone. Moreover, no noise impacts are envisaged as there are no structures available in the vicinity area.
(ii)	The green belt of the adequate width and density preferably with local species along the periphery of the power plant shall be raised so as to provide protection against particulates and noise as suggested by KSCZMA.	Green belt is developed in the power plant area in accordance with environmental clearance.
(iii)	Project proponent shall support afforestation activities by way of raising and supply of required seedling by the locals within 5KM radius of the plant as suggested by KSCZMA	Noted & complied.
(iv)	The ground water level and its quality should be monitored regularly	The work involves only laying of pipeline and no other industrial activities are involved. However regular water monitoring is being carried in the test wells constructed in the pipeline area. Monitoring reports for the period of April 2020 to September 2020 is enclosed as <b><i>Annexure-XVIII</i></b>
(v)	The mangroves, if any, on the site should not be disturbed in anyway	Complied with at the time of pipe line construction.

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(vi)	The environmental safeguards contained in the application should be implemented in letter and spirit	Complied																		
(vii)	A separate Environment management Cell with suitably qualified staff to carry out various environment related functions shall be set up under the charge of a Senior Executive who will report directly to the Chief Executive of the Company.	Well qualified environment cell is established which is headed by HOD-Environment who is directly reporting to station head.																		
(viii)	The funds earmarked for environment protection measures shall be maintained in a separate account and there shall be no diversion of these funds for any purpose. A year wise expenditure on environmental safeguards shall be reported to this Ministry's Regional Office at Bangalore.	Noted and Complied. Funds for Environmental protection measures were earmarked at the time of project as per EIA report and measures have been implemented. Yearly environmental budget is part of the yearly operating cost of the project. The Environment Expenditure for the period of April 2020 to September 2020 included the following:																		
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(ix)	In case of deviation or alteration in the project including the implementing agency, a fresh reference shall be made to this Ministry for modification in the clearance conditions or imposition of new one for ensuring environmental protection. The project proponents shall be responsible for implementing the suggested safeguard measures.	Noted & agreed.																		
(x)	This Ministry reserves the right to revoke this clearance, if any of the conditions stipulated are not complied with to the satisfaction of this Ministry	Noted & agreed																		
<b>(6)</b>	<b>GENERAL CONDITIONS</b>																			
(i)	Adequate provision for infrastructure facilities including water supply, fuel and sanitation must be ensured for construction workers during the construction phase of the project to avoid any damage to the environment.	Complied All the arrangements are made during the construction phase.																		
(ii)	Appropriate measures must be taken	Noted & complied.																		

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	while undertaking digging activities to avoid any likely degradation of water quality.	
(iii)	Borrow sites for each quarry sites for road construction material and dump sites must be identified keeping in view the following	Not Applicable since no road construction work involved in the CRZ area.
(a)	No excavation or dumping on private property is carried out without written consent of the owner	Complied.
(b)	No excavation or dumping shall be allowed on wetlands, forest areas or other ecologically valuable or sensitive locations.	Noted & complied.
(c)	Excavation work shall be done in close consultation with the Soil Conservation and Watershed Development Agencies working in the area, and	Noted & complied.
(d)	Construction spoils including bituminous material and other hazardous materials must not be allowed to contaminate water courses and the dump sites for such materials and the dump sites for such materials must be secured so that they shall not leach into the ground water	Complied.
(iv)	Adequate precautions shall be taken during transportation of the construction material so that it does not affect the environment adversely	Complied.
(v)	Borrow pits and other scars created during the laying of cable shall be properly leveled and treated	Not applicable.
(vi)	Adequate financial provision must be made in the project to implement the aforesaid safeguards.	Complied
(vii)	The project proponent will set up separate environmental management cell for effective implementation of the stipulated environmental safeguards under the supervision of a Senior Executive.	Well qualified Environment cell is established which is headed by HOD-Environment who is directly reporting to Station Head.
(viii)	Full support shall be extended to the officers of this Ministry/Regional Office at Bangalore by the project proponent during inspection of the project for	Noted. Full co-operation shall be extended to mentioned authority always



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	monitoring purposes by furnishing full details and action plan including action taken reports in respect of mitigation measures and other environmental protection activities.	
(ix)	MoEF or any other competent authority may stipulate any additional conditions or modify the existing ones, if necessary in the interest of environment and the same shall be complied with.	Noted
(x)	The Ministry reserves the right to revoke this clearance if any of the conditions stipulated are not complied with the satisfaction of the Ministry	Noted
(xi)	In the event of a change in the project profile or change in the implementation agency, a fresh reference shall be made to the MoEF	Noted
(xii)	The project proponents shall inform the Regional office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of land development work	The pipeline activity is a part of the total power project. The date of financial closure for the total project was 13.06.2007. The MOEF clearance was originally received on 20.03.1997 and the clearance for augmented capacity (from 2 x 507.5 to 2 x 600 MW) was received on 09.09.2009. Consolidated Environmental clearance received on 01.09.2011. The land development work for the pipeline activity was commenced in March 2009.
(xiii)	KSPCB shall display a copy of the clearance letter at the Regional Office, District Industries Center and Collector's office/Tahsildar's office for 30 days.	Related to KSPCB.
7	These stipulations would be enforced among others under the provisions of Water Act, 1974, Air Act, 1981, Environment Act, 1986, Public Liability Act, 1991 and EIA Notification 2006, including the amendments and rules made thereafter.	Noted
8	All other statutory clearances such as the approvals for storage of diesel from CCE, Fire Department, Civil Aviation Dept, Forest Conservation Act, 1980	Noted. These clearances were not applicable for sea water pipe line work.

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	and Wild life Act, 1972, etc shall be obtained, as applicable by project proponents from the respective competent authorities	
9	The project proponent shall advertise in at least two local newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded EC and copies of clearance letters are available with the KSPCB and may also be seen on the website of MoEF at <a href="http://www.envfor.nic.in">http://www.envfor.nic.in</a> . The advertisement should be made within 10 days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the Regional Office of this Ministry at Bangalore.	Complied A copy of advertisement in local newspaper is submitted to RO-MoEF&CC vide ref letter No: UPCL/B04/2010/1990 dated: 29.05.2010.
10	EC is subject to final order of the Honorable Supreme Court of India in the matter of Goa Foundation Vs Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.	Noted
11	Any appeal against this EC shall lie with National Environment Appellate Authority, if preferred, within a period of 30 days as prescribed under Section 11 of the National Environment Appellate Act, 1997.	Noted & agreed
12	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parishad/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.	This is to clarify that the pipeline activity is a part of the main plant for which there was no separate need for public hearing as mentioned in MoEF&CC letter.113011/23/96-IA-II (T) Part dated 31.01.2005. The pipeline project was considered as part of whole project during the public hearing.
13	The proponent shall upload the status of compliance of stipulated EC conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the	Compliance status of the stipulated conditions uploaded on the website. However, results of monitoring data is not applicable since the activity involved is only laying of the water pipeline and no industrial activity involved in the area under discussion (CRZ).

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	Regional Office of MoEF at Bangalore, the respective Zonal Office of CPCB and the KSPCB. The criteria pollutant levels namely; SPM, RSPM, SO <sub>2</sub> , NO <sub>x</sub> (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	The monitoring data of the main plant is uploaded on the website and displayed near the main gate of the project.  Reports are displayed in company website.  <a href="http://www.adanipower.com/downloads">http://www.adanipower.com/downloads</a>
14	The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF, the respective Zonal Office of CPCB and SPCB	Complied Six Monthly reports are regularly submitted to RO-MoEF&CC, RO-KSPCB and ZO-CPCB.
15	The Environmental Statement for each financial year ending 31 <sup>st</sup> March in Form-V as is mandated to be submitted by the project proponent to the concerned KSPCB 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 EC conditions and shall also be sent to the respective Regional Office of MoEF at Bangalore by email.	Complied Copy of Environmental statement for the Financial Year 2019-20 is submitted to RO-MoEF&CC and RO-KSPCB is enclosed as <b>Annexure-XV</b> The copy of the same is displayed through company website as part of the six monthly EC compliance report.  <a href="http://www.adanipower.com/downloads">http://www.adanipower.com/downloads</a>

# Annexure-I

**METEOROLOGICAL DATA****Annexure-I**

UPCL is having own Continuous Meteorological Observatory Station at site to observe below parameters:

- Temperature
- Humidity
- Wind Speed
- Wind Direction
- Rain fall

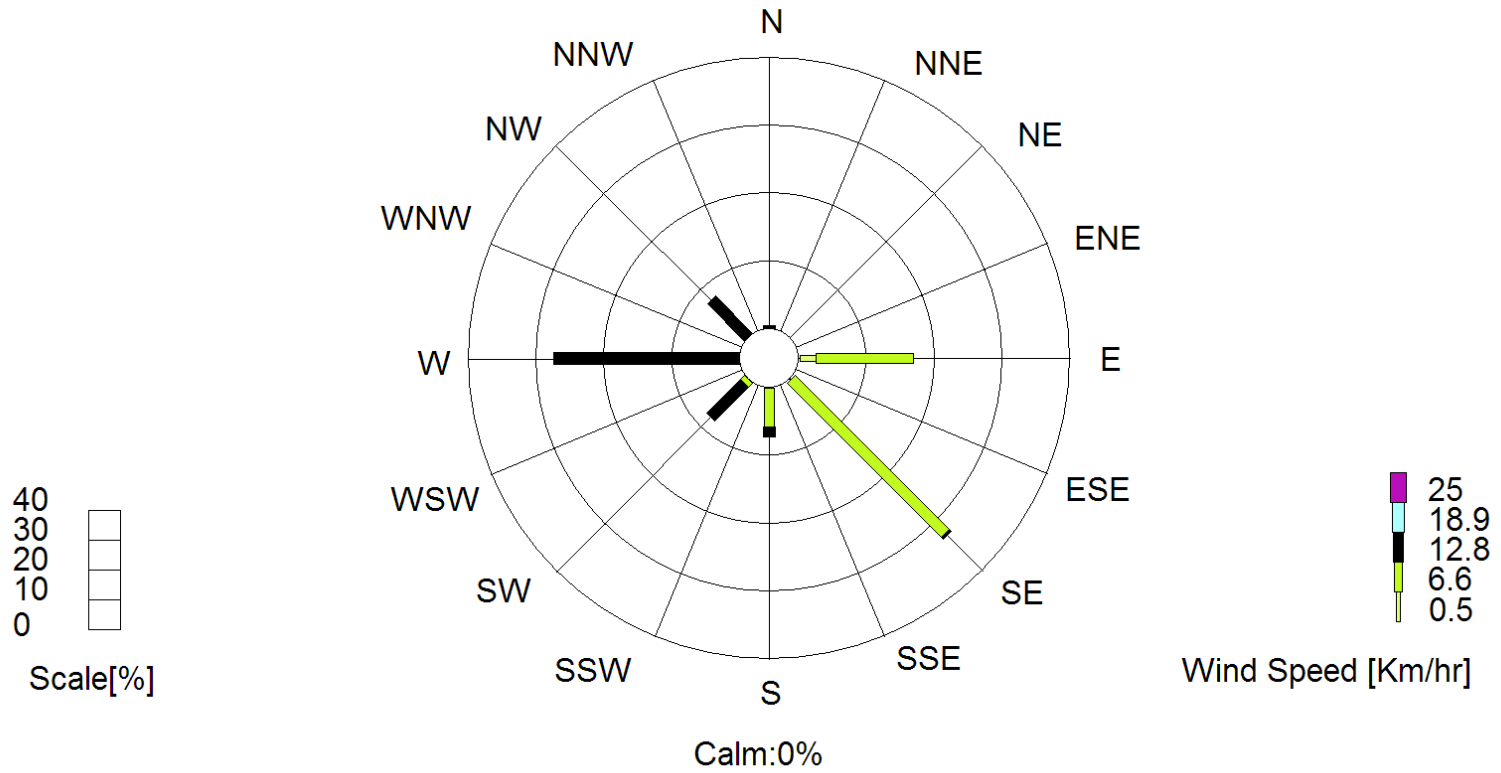
**Table-1: AVERAGE DAILY METEOROLOGICAL DATA of April 2020**

Date	Temperature (°C)		Relative Humidity (%)		Rain Fall (mm)
	Min	Max	Min	Max	
1/Apr/2020	26.7	34.6	60.1	88.5	0
2/Apr/2020	27.1	35	57.9	90.1	0
3/Apr/2020	27.5	34	58.9	88	0
4/Apr/2020	28.3	34.7	58.5	84.2	0
5/Apr/2020	27.2	35.1	56.9	86.3	0
6/Apr/2020	27.1	35.3	50.5	80.5	0
7/Apr/2020	25	34	55.7	91.1	20.1
8/Apr/2020	25	33.6	58.3	90.1	0
9/Apr/2020	25.3	33.9	50.5	89	0
10/Apr/2020	26	33.8	54	82.2	0
11/Apr/2020	24.7	36	42.8	80.8	0
12/Apr/2020	26.6	34.5	49.9	83.4	0
13/Apr/2020	25.4	34.9	56.9	81.9	0
14/Apr/2020	26.1	34.4	60.4	88.7	0
15/Apr/2020	27.9	34.6	62.5	88.5	0
16/Apr/2020	27.2	34.5	57.7	83.4	0
17/Apr/2020	27.6	34.8	54.1	87	0
18/Apr/2020	27.2	34.7	56.1	86.8	0
19/Apr/2020	26.8	35.2	58.4	85.1	0
20/Apr/2020	28.4	36.9	52.3	87.2	0
21/Apr/2020	28.2	35.2	57.6	82.9	0
22/Apr/2020	27.2	35.2	56.1	77.5	0
23/Apr/2020	28.5	35.3	50.8	84.2	0
24/Apr/2020	28.2	35.7	50.2	80.2	0
25/Apr/2020	28.7	35.3	54.1	82.4	0
26/Apr/2020	25.8	34.9	59.3	84	0
27/Apr/2020	25.9	35.1	49.4	83.4	0
28/Apr/2020	27.1	34.6	55.9	84.7	0
29/Apr/2020	27	35.1	50.6	84.3	0
30/Apr/2020	27.6	35.2	53.3	82.1	0
<b>Min</b>	<b>24.7</b>	<b>33.6</b>	<b>42.8</b>	<b>77.5</b>	<b>20.1</b>
<b>Max</b>	<b>28.7</b>	<b>36.9</b>	<b>62.5</b>	<b>91.1</b>	
<b>Average</b>	<b>26.9</b>	<b>34.9</b>	<b>55.0</b>	<b>85.0</b>	

Periodic Wind Rose Met Station 4/1/2020 01:00-4/30/2020 24:00

Station:Met Station

AVG:1 Hour



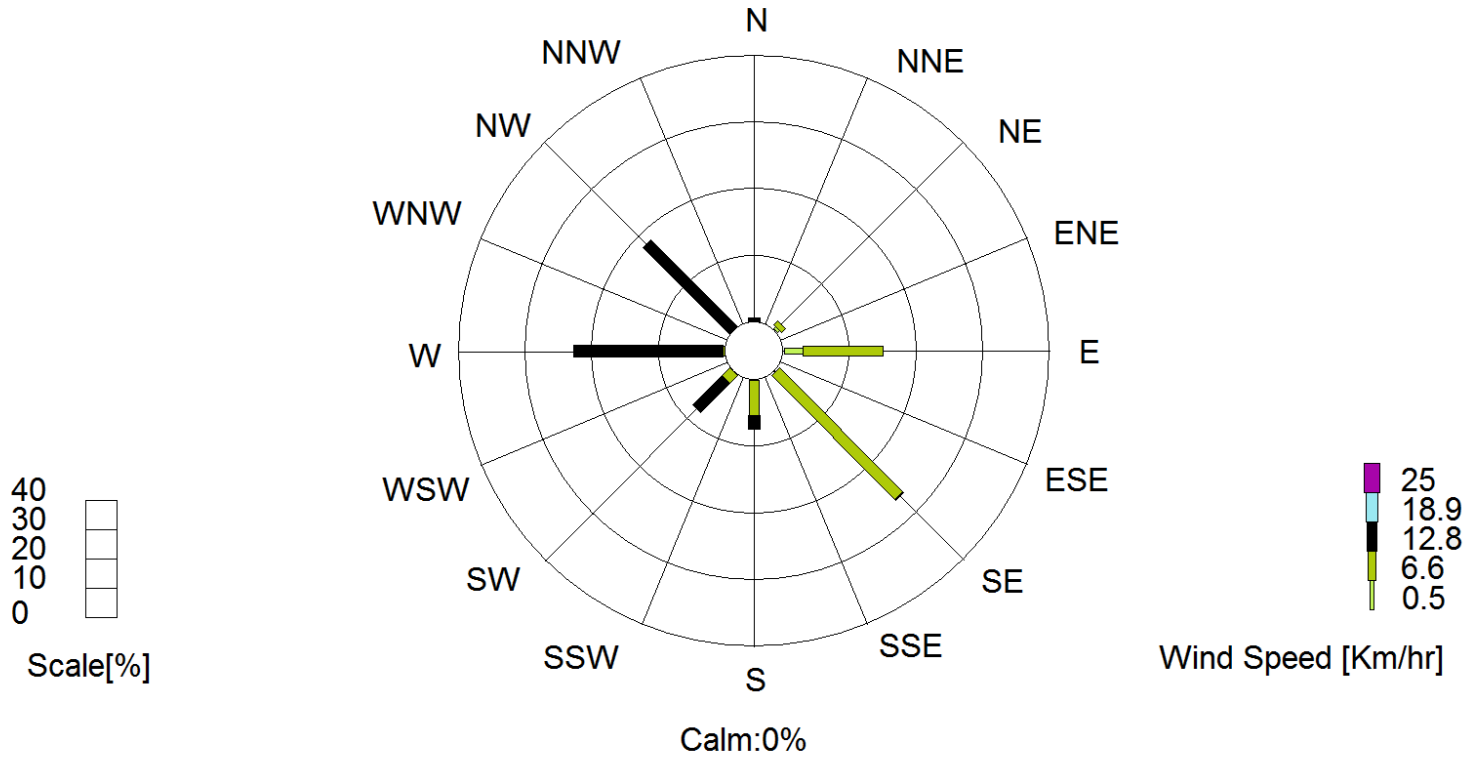
**Table-2: AVERAGE DAILY METEOROLOGICAL DATA OF May 2020**

Date	Temperature (°C)		Relative Humidity (%)		Rain Fall (mm)
	Min	Max	Min	Max	
1/May/2020	27.7	35.3	57.7	76.8	0
2/May/2020	24.7	34.9	58.1	88.6	5.3
3/May/2020	24.5	35.7	57.8	87.2	19.2
4/May/2020	25.5	36	57.2	86.6	0
5/May/2020	28.2	35.4	57.3	88.6	0
6/May/2020	26.9	35.9	54.6	82.3	0
7/May/2020	29.4	35.8	53.9	85.8	11.1
8/May/2020	25.7	33.8	62.1	88.7	0
9/May/2020	27.8	35.1	55.9	88.2	0
10/May/2020	28	35.1	61.6	87.4	0
11/May/2020	26.4	36.1	50.6	84.8	15.2
12/May/2020	25	35	53	89.7	0
13/May/2020	28.6	35	64	87.5	0
14/May/2020	27.1	34.9	63.1	85.5	3.6
15/May/2020	26.4	34.7	59.7	89.1	15.2
16/May/2020	26.9	33.9	62.6	90.8	0
17/May/2020	24.5	35.1	59.1	92.3	58.5
18/May/2020	25.1	30.9	75.1	92	26.4
19/May/2020	27.9	34	57.7	82.9	0
20/May/2020	26.3	34.4	54.3	88.5	0
21/May/2020	27.7	34.6	56.9	87.6	0
22/May/2020	28.1	34.8	55.4	87.1	0
23/May/2020	27.9	34.3	63.6	86.1	0
24/May/2020	28.1	35	55.6	87.5	0
25/May/2020	29	35.6	55.7	86.8	0
26/May/2020	28.8	35.2	60.2	86	0
27/May/2020	30.2	34.8	61.7	82.1	0
28/May/2020	28.6	34.6	59.2	85.6	0
29/May/2020	28	34.7	59.4	87.9	0
30/May/2020	27.7	34.9	59	85.5	0
31/May/2020	26.6	33.8	62.7	91.4	24.8
<b>Min</b>	<b>24.5</b>	<b>30.9</b>	<b>50.6</b>	<b>76.8</b>	<b>179.3</b>
<b>Max</b>	<b>30.2</b>	<b>36.1</b>	<b>75.1</b>	<b>92.3</b>	
<b>Average</b>	<b>27.2</b>	<b>34.8</b>	<b>58.9</b>	<b>87.0</b>	

Periodic Wind Rose Met Station 5/1/2020 01:00-5/31/2020 24:00

Station:Met Station

AVG:1 Hour





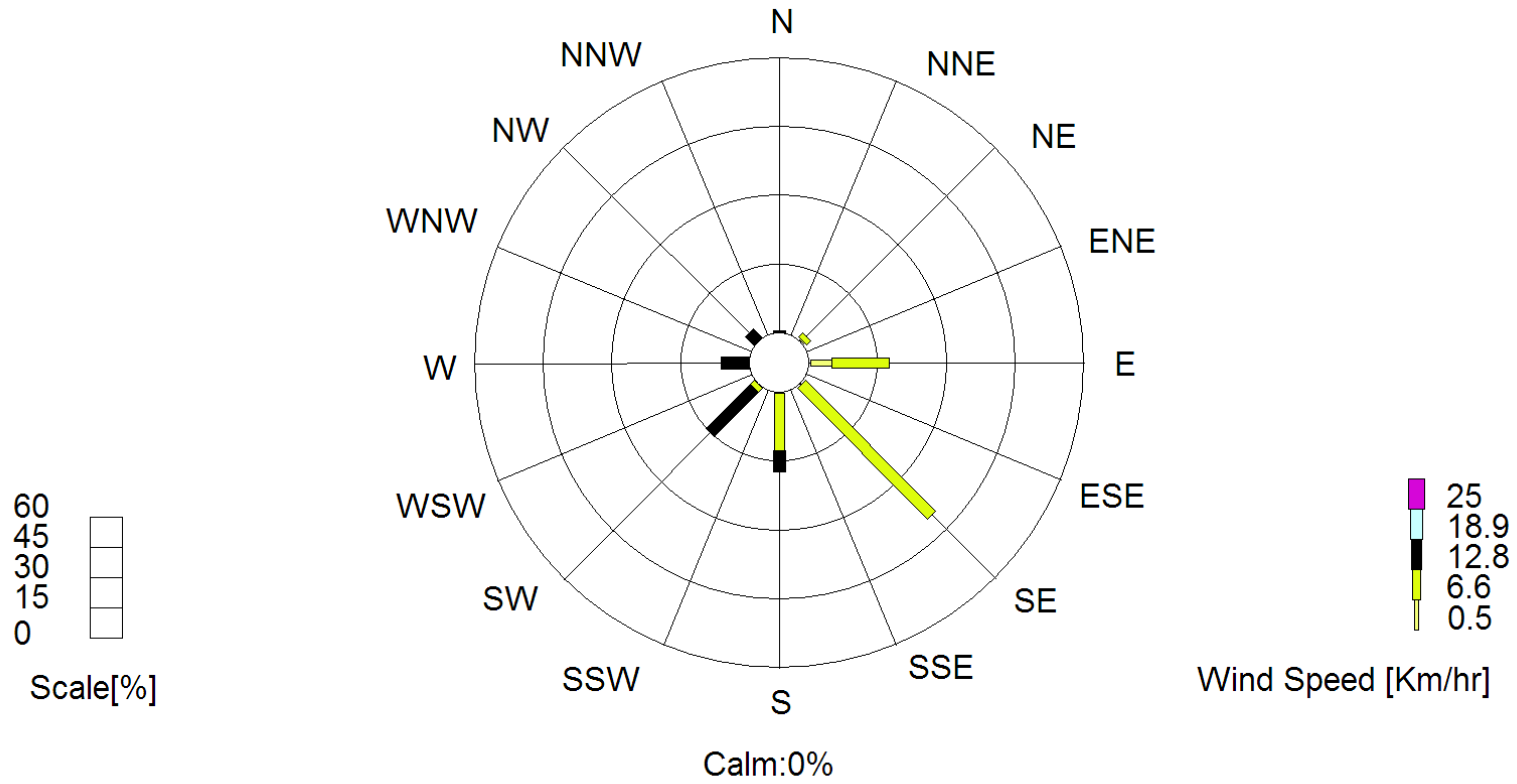
**Table-3: AVERAGE DAILY METEOROLOGICAL DATA OF June 2020**

Date	Temperature (°C)		Relative Humidity (%)		Rain Fall (mm)
	Min	Max	Min	Max	
1/Jun/2020	26	32.6	64.7	91.5	23.2
2/Jun/2020	25.8	29.6	73.3	90	31.9
3/Jun/2020	26.2	31.7	72	91.9	3.8
4/Jun/2020	26.1	32.1	67.1	91.4	9.4
5/Jun/2020	25.4	33.7	59.9	91.1	13.9
6/Jun/2020	25.4	33.2	62.2	91.5	5.6
7/Jun/2020	23.9	33.6	60.1	91	28.3
8/Jun/2020	25.2	33.3	59.1	89.3	12.5
9/Jun/2020	25.4	33	63.5	91.6	11.8
10/Jun/2020	24.5	31.9	74.4	92.7	63.8
11/Jun/2020	24.1	31.6	66.1	93.2	10.8
12/Jun/2020	23.7	30	69	92.7	38.7
13/Jun/2020	24.4	31.3	67.6	92.2	50.7
14/Jun/2020	24.9	29.9	79.1	93.1	90.1
15/Jun/2020	25.1	31.5	72.6	93.2	73.7
16/Jun/2020	25	27.8	87.5	92.8	128.3
17/Jun/2020	24.6	31.1	71.8	93.5	37.9
18/Jun/2020	24.3	31.7	71.8	93.2	30.5
19/Jun/2020	24.8	31.5	71.7	92.3	53.2
20/Jun/2020	24.8	32.8	65.9	91.3	46.3
21/Jun/2020	25.7	31.3	69.9	93.2	11.3
22/Jun/2020	24.7	29.8	72.8	91.7	5.8
23/Jun/2020	24.5	33.5	61.9	89.8	20.8
24/Jun/2020	24.1	32.7	57.8	93	1.7
25/Jun/2020	25.8	32	65.2	90.8	8.5
26/Jun/2020	26.1	31.5	68.3	91.4	12.1
27/Jun/2020	25.7	31.6	66.6	92.6	11.4
28/Jun/2020	26	31	72	92.5	13.4
29/Jun/2020	25.4	29.9	77.3	92.8	49.8
30/Jun/2020	25.2	30.4	68.5	93.2	32.6
<b>Min</b>	<b>23.7</b>	<b>27.8</b>	<b>57.8</b>	<b>89.3</b>	<b>931.8</b>
<b>Max</b>	<b>26.2</b>	<b>33.7</b>	<b>87.5</b>	<b>93.5</b>	
<b>Average</b>	<b>25.1</b>	<b>31.6</b>	<b>68.7</b>	<b>92.0</b>	

Periodic Wind Rose Met Station 6/1/2020 01:00-6/30/2020 24:00

Station:Met Station

AVG:1 Hour



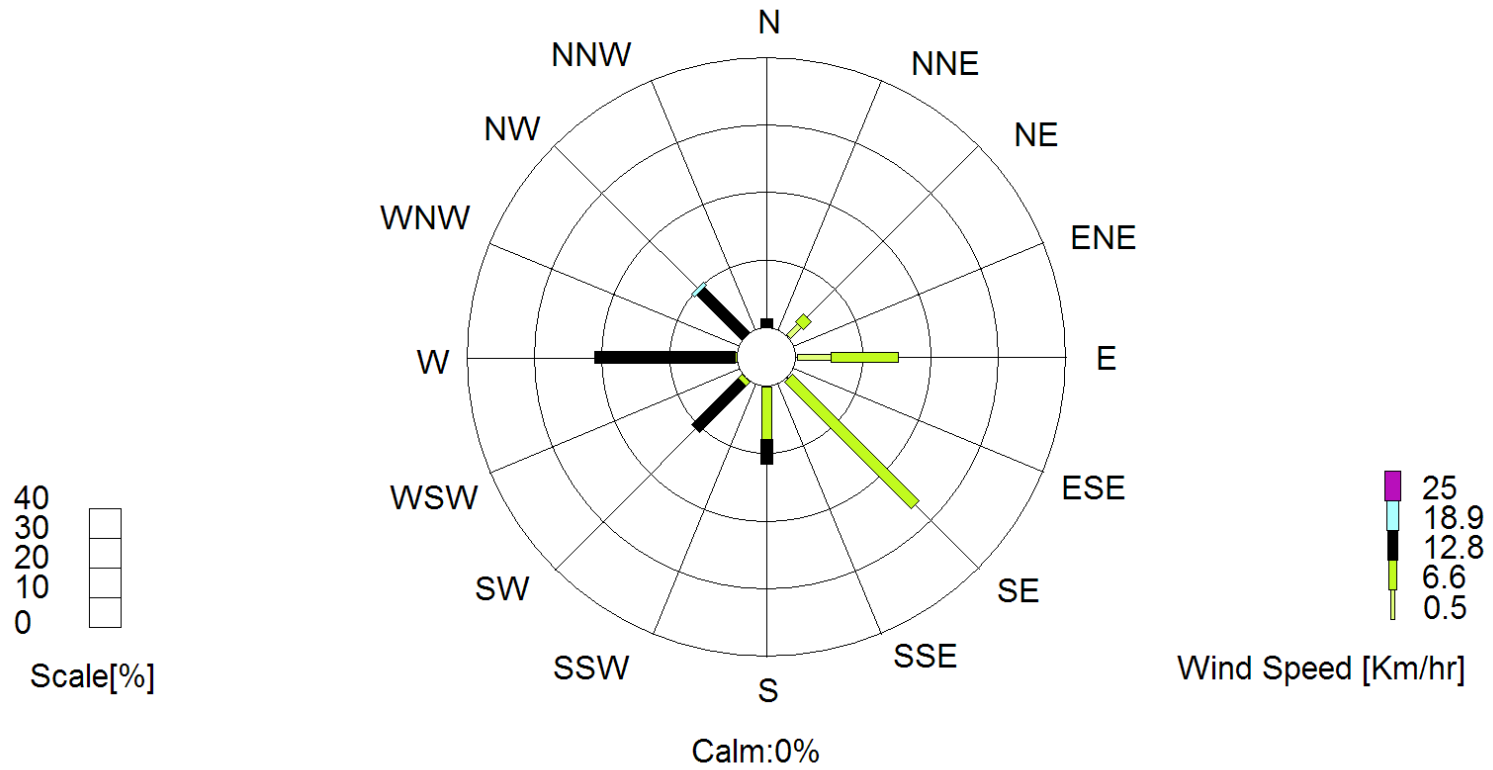
**Table-4: AVERAGE DAILY METEOROLOGICAL DATA OF July 2020**

Date	Temperature (°C)		Relative Humidity (%)		Rain Fall (mm)
	Min	Max	Min	Max	
1/Jul/2020	24.3	32.2	64.3	93.1	19.9
2/Jul/2020	25.1	29.9	77.9	93.1	101.6
3/Jul/2020	24.2	30.4	73.7	93.5	113.9
4/Jul/2020	25	27.1	89.5	93.7	111.7
5/Jul/2020	25.6	31.7	73.4	92.8	2.8
6/Jul/2020	28.3	32.3	70.1	82.5	5.1
7/Jul/2020	25.1	31.9	72.2	92.3	97.9
8/Jul/2020	25.2	31	73.7	93.4	70.9
9/Jul/2020	25.5	29.6	77.1	93.5	27.2
10/Jul/2020	24.8	30.5	69.2	92.7	5.5
11/Jul/2020	25.7	31.8	67.9	91.6	50.7
12/Jul/2020	24.8	30.8	67	92.8	19.6
13/Jul/2020	24.8	31.1	67.3	92.2	45.3
14/Jul/2020	24.7	29.9	73.8	93.5	11.8
15/Jul/2020	25.3	27.5	85.7	93.4	67.2
16/Jul/2020	24.5	30.7	73.7	93.5	67.6
17/Jul/2020	24.6	26.9	88.3	93.6	68.6
18/Jul/2020	24.6	27.2	86.3	93	83.1
19/Jul/2020	24.8	31.8	67.1	92.5	0
20/Jul/2020	26.5	32.9	65.8	92.3	9.5
21/Jul/2020	26.3	32	65.3	91.6	1
22/Jul/2020	26.2	33	62.1	91	0
23/Jul/2020	27	32.6	67.6	91.9	4.7
24/Jul/2020	25.8	32.5	62.2	91.2	1.6
25/Jul/2020	25.5	31.2	65.4	90.9	26.2
26/Jul/2020	25.6	31.8	64.4	91.6	10.1
27/Jul/2020	25.7	31.7	67.2	91.2	20.7
28/Jul/2020	24.9	31.7	68.3	92.9	23.2
29/Jul/2020	25.6	29.7	74.2	92.9	41.3
30/Jul/2020	24.7	30.4	73.8	92.7	43.8
31/Jul/2020	25.5	29.2	75.9	93.1	22.6
<b>Min</b>	<b>24.2</b>	<b>26.9</b>	<b>62.1</b>	<b>82.5</b>	<b>1175.1</b>
<b>Max</b>	<b>28.3</b>	<b>33.0</b>	<b>89.5</b>	<b>93.7</b>	
<b>Average</b>	<b>25.4</b>	<b>30.7</b>	<b>71.9</b>	<b>92.3</b>	

Periodic Wind Rose Met Station 7/1/2020 01:00-7/31/2020 24:00

Station:Met Station

AVG:1 Hour



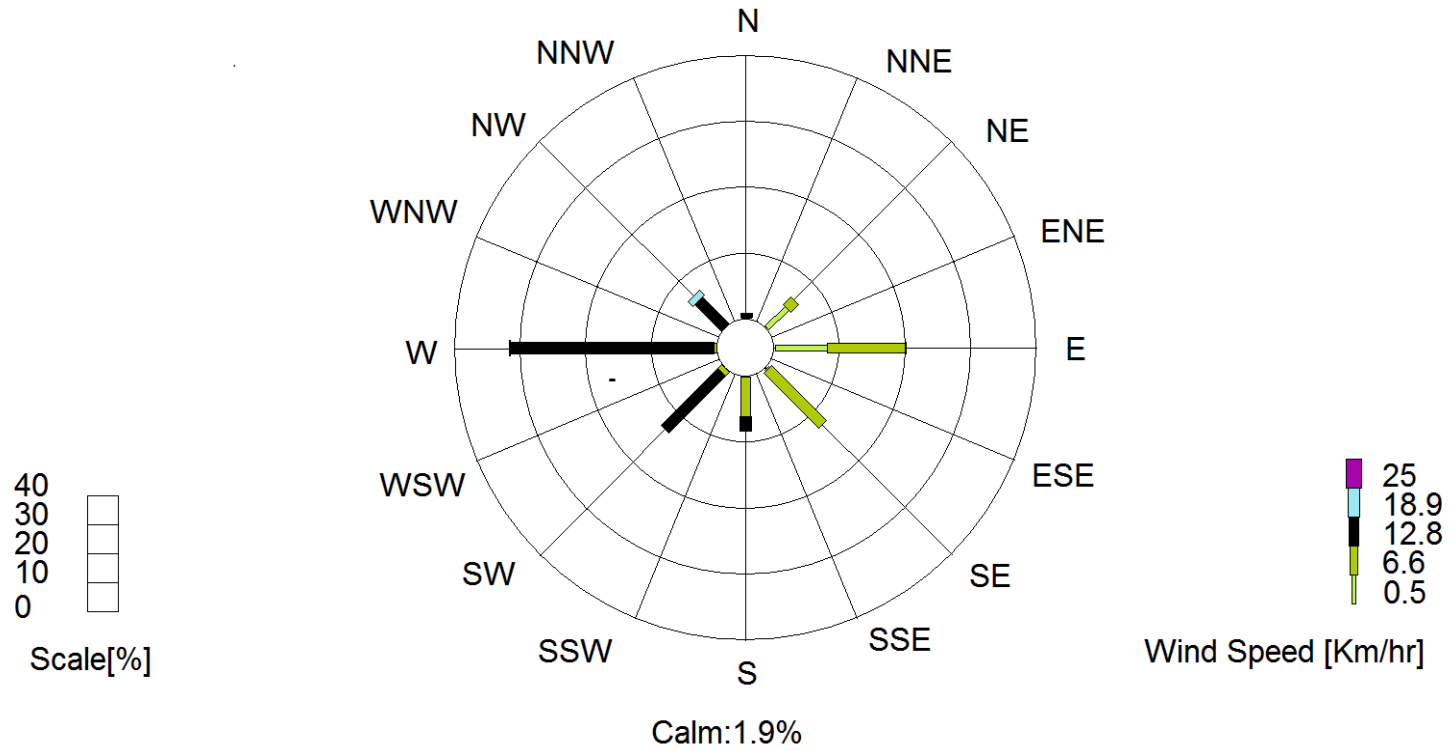
**Table-5: AVERAGE DAILY METEOROLOGICAL DATA OF Aug 2020**

Date	Temperature (°C)		Relative Humidity (%)		Rain Fall (mm)
	Min	Max	Min	Max	
1/Aug/2020	24.5	29.4	73.8	93.1	63.7
2/Aug/2020	24.3	27.8	83.7	93.5	61.2
3/Aug/2020	24.8	31.2	76.5	93.4	63.1
4/Aug/2020	25.5	29.4	78.6	91.2	27.7
5/Aug/2020	26.5	29.3	79.5	90.9	30.7
6/Aug/2020	26	30.6	76.9	91.4	31.8
7/Aug/2020	26	30.6	77.8	92.5	54.5
8/Aug/2020	25.1	27.5	88.2	92.9	107.8
9/Aug/2020	24.1	27.5	87.3	93.5	98.3
10/Aug/2020	23.9	25.8	89.6	93.3	87.2
11/Aug/2020	25.2	30.6	77.8	93.3	35.9
12/Aug/2020	25.5	30.7	74.8	92.2	10.2
13/Aug/2020	25.9	30.6	73.8	91.7	19.6
14/Aug/2020	25.5	31	72	91.9	0
15/Aug/2020	27.7	31.4	69.9	86.2	0
16/Aug/2020	25.1	29.8	75.2	92.8	72.8
17/Aug/2020	25.9	30.6	75	91.2	28.9
18/Aug/2020	25.2	29	81.3	93.3	20.7
19/Aug/2020	25.5	30.1	70.8	92.2	20.4
20/Aug/2020	25.7	30.4	76.5	92.3	29.7
21/Aug/2020	25.8	29.8	77.3	92.8	29.6
22/Aug/2020	25.3	31	71.6	92.7	44.7
23/Aug/2020	25.4	31.6	67.6	93	5.5
24/Aug/2020	25.7	31.2	70.1	92.2	1.8
25/Aug/2020	24.9	31.7	63.9	93.1	2.1
26/Aug/2020	24.8	31.4	64.3	92.7	0
27/Aug/2020	25	31.1	69	91.1	1.4
28/Aug/2020	25	31.8	64.8	92.1	7.5
29/Aug/2020	25.8	31.1	66.2	91.8	13.8
30/Aug/2020	25.1	32.4	63.1	92	2.1
31/Aug/2020	25.8	32.6	63	91.3	5.1
<b>Min</b>	<b>23.9</b>	<b>25.8</b>	<b>63.0</b>	<b>86.2</b>	<b>977.80</b>
<b>Max</b>	<b>27.7</b>	<b>32.6</b>	<b>89.6</b>	<b>93.5</b>	
<b>Average</b>	<b>25.4</b>	<b>30.3</b>	<b>74.2</b>	<b>92.2</b>	

Periodic Wind Rose Met Station 8/1/2020 01:00-8/31/2020 24:00

Station:Met Station

AVG:1 Hour

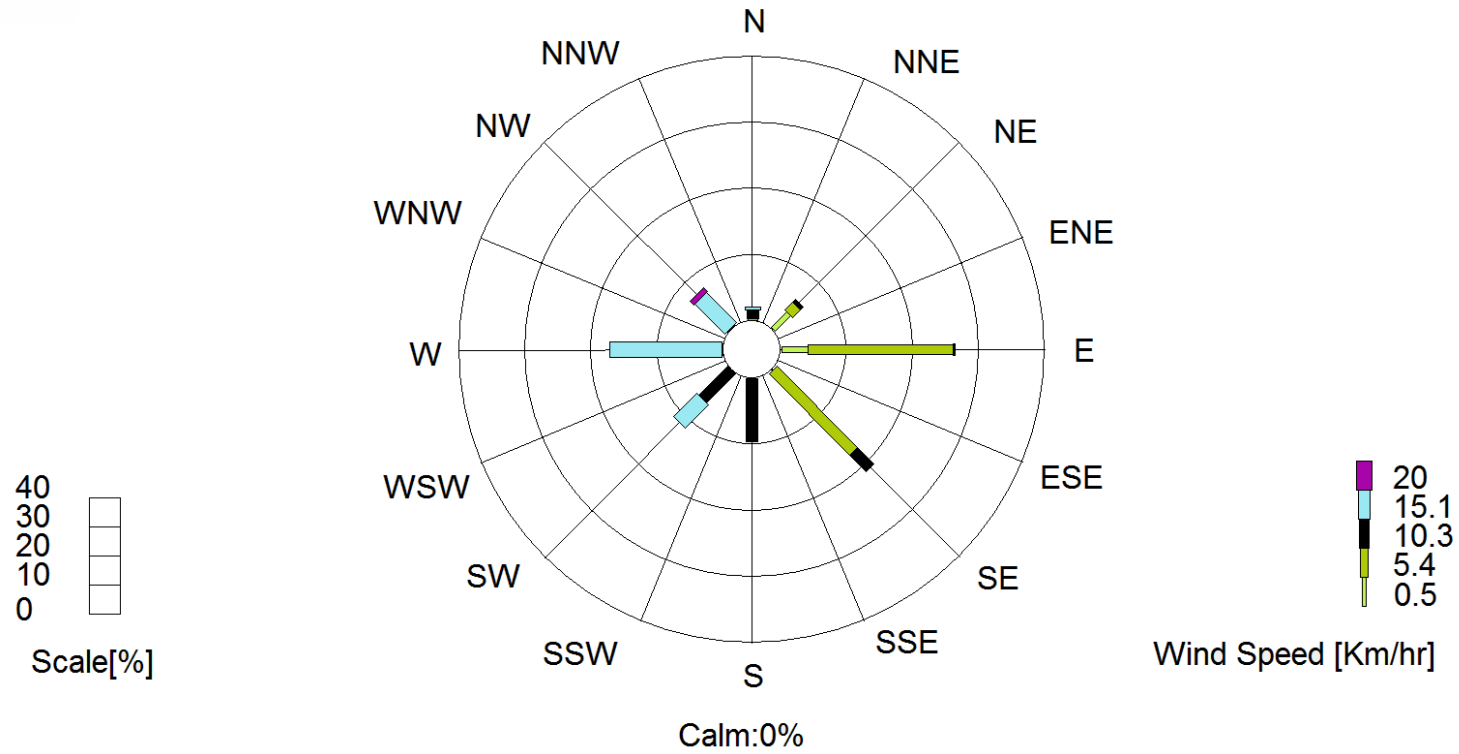


**Table-6: AVERAGE DAILY METEOROLOGICAL DATA OF Sep 2020**

Date	Temperature (°C)		Relative Humidity (%)		Rain Fall (mm)
	Min	Max	Min	Max	
1/Sep/2020	26	32.2	68.7	91.9	3.6
2/Sep/2020	24.7	32.7	63.1	92.6	29.5
3/Sep/2020	24.9	32.1	62.5	92.6	0
4/Sep/2020	25.3	32.4	63.7	92.4	0
5/Sep/2020	26.6	33.6	60.3	91.4	22.3
6/Sep/2020	25.9	33	65.8	92.8	10.2
7/Sep/2020	25.8	31.6	66	90.9	0
8/Sep/2020	26.5	32.7	64	89.6	3.8
9/Sep/2020	25.7	32.2	61.5	92.5	29.7
10/Sep/2020	24.9	28.5	80.3	93.4	211.6
11/Sep/2020	24.4	26.5	85.5	93.8	85.3
12/Sep/2020	24.9	26.4	88	93.1	55.6
13/Sep/2020	24.6	27	82.2	93.4	35.5
14/Sep/2020	24.9	31.3	68.8	93.1	12.4
15/Sep/2020	25.2	30.8	71.6	92.8	54.3
16/Sep/2020	24.8	30.3	71.6	93.6	1.8
17/Sep/2020	24.7	31.3	65.6	92	74.5
18/Sep/2020	24.8	29.8	73	93.7	43.1
19/Sep/2020	25	27.1	86.4	93.5	268.4
20/Sep/2020	24.8	26.1	84.9	93.5	141.9
21/Sep/2020	25.1	29.2	76.1	92.5	23.9
22/Sep/2020	10.3	25.8	75.6	89.2	9.3
23/Sep/2020	24.8	30.2	71.7	92.4	10.8
24/Sep/2020	23.7	31.8	68	91.6	2.7
25/Sep/2020	24.1	32.4	64.9	90.8	0
26/Sep/2020	23.5	30.7	85.7	90.7	7.9
27/Sep/2020	22.8	29.7	66.8	92.4	1.9
28/Sep/2020	23.1	30.6	66.6	92.5	0
29/Sep/2020	25.6	27.7	66.7	91.2	0
30/Sep/2020	25.6	31.6	66.2	91.8	1.2
<b>Min</b>	<b>10.3</b>	<b>25.8</b>	<b>60.3</b>	<b>89.2</b>	<b>1141.20</b>
<b>Max</b>	<b>93.8</b>	<b>33.6</b>	<b>88.0</b>	<b>93.8</b>	
<b>Average</b>	<b>54.6</b>	<b>30.2</b>	<b>71.4</b>	<b>92.3</b>	



Periodic Wind Rose Met Station 9/1/2020 01:00-9/30/2020 24:00  
Station:Met Station AVG:15 Min.





# Annexure-III

## STACK MONITORING

*Annexure-II*

Stack Monitoring has been carried out by NABL accredited laboratory in the frequency of once in fifteen days per month. The monitoring reports for both the units during the period of April 2020 to Sep 2020 are as Table-1 below.

**Table-1: Stack monitoring report for the period of April 2020 to Sep 2020**

Unit	Parameters	April-2020		May-2020		June-2020		July-2020		Aug-2020		Sep-2020		Average
			29.04.2020					10.07.2020	22.07.2020			09.09.2020	29.09.2020	
Boiler -I	Particulate Matter (mg/Nm <sup>3</sup> )	SD	43.7	SD	SD	SD	SD	SD	23.4	SD	SD	35.4	SD	34.2
	SO <sub>2</sub> (mg/Nm <sup>3</sup> )	SD	570.2	SD	SD	SD	SD	SD	829.75	SD	SD	1644.2	SD	1014.7
	NO <sub>x</sub> (mg/Nm <sup>3</sup> )	SD	162.1	SD	SD	SD	SD	SD	116.42	SD	SD	217.7	SD	165.4
	Mercury mg/Nm <sup>3</sup> )	SD	BDL	SD	SD	SD	SD	SD	BDL	SD	SD	BDL	SD	BDL
	Flue Gas Velocity (m/s)	SD	25.2	SD	SD	SD	SD	SD	24.1	SD	SD	24.8	SD	24.7
	Flow Rate (Nm <sup>3</sup> /hr)	SD	2140176	SD	SD	SD	SD	SD	2140240	SD	SD	2450654	SD	2243690.0
Boiler -II	Particulate Matter (mg/Nm <sup>3</sup> )	SD	36.9	32.42	SD	SD	SD	27.0	SD	SD	SD	17.6	10.5	24.9
	SO <sub>2</sub> (mg/Nm <sup>3</sup> )	SD	548.4	570.5	SD	SD	SD	948.6	SD	SD	SD	1564.8	1218.4	970.1
	NO <sub>x</sub> (mg/Nm <sup>3</sup> )	SD	150.2	145.4	SD	SD	SD	137.5	SD	SD	SD	167.8	167.7	153.7
	Mercury (mg/Nm <sup>3</sup> )	SD	BDL	BDL	SD	SD	SD	BDL	SD	SD	SD	BDL	BDL	BDL
	Flue Gas Velocity (m/s)	SD	24.9	23.7	SD	SD	SD	22.7	SD	SD	SD	25.9	25.2	24.5
	Flow Rate (Nm <sup>3</sup> /hr)	SD	2139989	2140214	SD	SD	SD	2140507	SD	SD	SD	2320152	2427318	2233636.0

**Note: SD= Shut down**

# Annexure-III

**CHP Wind Shield**

*Annexure - III*



# Annexure-IV

## Fly Ash Generation &amp; Utilization for the period of Apr 2020 to Sep 2020

Month	Ash Generation			Ash Utilization		
	Fly Ash (MT)	Bottom Ash (MT)	Total Ash Generation (MT)	Fly Ash (MT)	Bottom Ash (MT)	Total Ash Utilization (MT)
Apr-2020	11092	1185	12277	2503	762.6	3266
May-2020	2440	277	2717	4075	525.2	4600
June-2020	141	38	179	291	842.3	1133
July-2020	2700	345	3045	2365	350.6	2716
Aug-2020	503	88	591	946	88	1034
Sep-2020	5045	551	5596	4734	551	5285
<b>Total</b>	<b>21921</b>	<b>2484</b>	<b>24405</b>	<b>14914</b>	<b>3120</b>	<b>18034</b>

# Annexure-V

## **TEST WELLS MONITORING AROUND ASH POND**

*Annexure-V*

Ash pond is lined with LDPE film of 500  $\mu$  thickness as an impervious layer to avoid ground water leachate contamination.

Water samples from Test wells (4 No's) around the ash pond area are analyzed for Ground water monitoring. Monitoring reports for the period of April 2020 to Sep 2020 is presented in the Table-1 to Table-4 as shown in below:

The nomenclature for test wells are as below:

1. Test well constructed on North Side of the Ash Pond
2. Test well constructed on South side of the Ash Pond
3. Test well constructed on East Side of the Ash Pond
4. Test well constructed on West Side of the Ash Pond



**Table-1: Results of Water Sample from Test Well constructed in North side of Ash Pond sampling period of April 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	3	1	1	1	1	2	1	3	1.50
2	pH	-	6.5 - 8.5	No Relaxation	6.6	6.56	6.55	6.57	6.92	6.86	6.55	6.92	6.68
3	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
4	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
5	Turbidity	NTU	1	5	4.3	0.9	3.2	3.8	1	0.7	0.7	4.3	2.32
6	TDS	mg/l	500	2000	187	120	94	93.2	140	87	87	187	120.20
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	60.3	70.5	56.4	45.98	87.78	48.3	45.98	87.78	61.54
8	Total Hardness	mg/l	200	600	47.3	49	34.3	27.86	99.5	31.84	27.86	99.5	48.30
9	Calcium as Ca	mg/l	75	200	14.6	15.17	7.85	6.38	28.71	9.57	6.38	28.71	13.71
10	Magnesium as Mg	mg/l	30	100	4.9	2.38	3.57	2.9	6.77	BDL	2.38	6.77	4.10
11	Iron as Fe	mg/l	0.3	No relaxation	0.34	0.23	0.18	0.24	0.18	0.21	0.18	0.34	0.23
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	46.5	34.8	28.6	8.4	8.4	6.55	6.55	46.5	22.21
13	Chloride as Cl	mg/l	250	1000	25.4	16.02	24.04	13.59	13.59	15.41	13.59	25.4	18.01
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.01	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	E.Coli	MPN/100 ml	Should Not be Detectable		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

**Table-2: Results of Water Sample from Test Well constructed in South side of Ash Pond sampling period of April 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	4	1	1	1	2	2	1	4	1.83
2	pH	-	6.5 - 8.5	No Relaxation	7.3	7.11	6.82	6.62	6.93	6.97	6.62	7.3	6.96
3	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
4	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
5	Turbidity	NTU	1	5	3.4	1.7	3.5	3.5	0.8	0.6	0.6	3.5	2.25
6	TDS	mg/l	500	2000	134	140	140	160	79	150	79	160	133.83
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	43.1	103.4	112.8	112.86	49.6	85.46	43.1	112.86	84.54
8	Total Hardness	mg/l	200	600	52.4	107.8	112.7	107.46	31.8	111.44	31.8	112.7	87.27
9	Calcium as Ca	mg/l	75	200	17.3	31.4	29.4	41.47	12.7	31.9	12.7	41.47	27.36
10	Magnesium as Mg	mg/l	30	100	10	7.14	9.52	8.5	BDL	7.73	7.14	10	8.58
11	Iron as Fe	mg/l	0.3	No relaxation	0.26	0.22	0.18	0.23	0.22	0.2	0.18	0.26	0.22
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	35.2	28.9	23.7	4.08	4.02	14.36	4.02	35.2	18.38
13	Chloride as Cl	mg/l	250	1000	13.4	16	10	15.54	13.5	17.34	10	17.34	14.30
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.01	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	1.6	1.4	1.29	1.29	1.6	1.43
29	E.Coli	MPN/100 ml	Should Not be Detectable		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

**Table-3: Results of Water Sample from Test Well constructed in East side of Ash Pond sampling period of April 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	4.6	1	1	1	1	2	1	4.6	1.77
2	pH	-	6.5 - 8.5	No Relaxation	7.6	6.53	6.66	6.58	6.58	7.1	6.53	7.6	6.84
3	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
4	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
5	Turbidity	NTU	1	5	4.4	1.3	0.2	3.2	BDL	0.5	0.2	4.4	1.92
6	TDS	mg/l	500	2000	135	140	460	420	470	81	81	470	284.33
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	49.4	9.4	4.7	4.1	4.14	40.87	4.1	49.4	18.77
8	Total Hardness	mg/l	200	600	26.7	205.8	185.8	163.1	167.16	27.86	26.7	205.8	129.40
9	Calcium as Ca	mg/l	75	200	13.2	51.06	49.09	51	49.45	6.38	6.38	51.06	36.70
10	Magnesium as Mg	mg/l	30	100	4.8	19.05	20.24	8.7	10.63	2.9	2.9	20.24	11.05
11	Iron as Fe	mg/l	0.3	No relaxation	0.24	0.22	0.18	0.14	0.12	0.19	0.12	0.24	0.18
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	25.3	24.6	20.5	165.4	146.2	13.61	13.61	165.4	65.94
13	Chloride as Cl	mg/l	250	1000	16.7	70.12	66.11	67.9	69.93	15.41	15.41	70.12	51.03
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.01	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	1.6	1.4	1.29	1.29	1.6	1.43
29	E.Coli	MPN/100 ml	Should Not be Detectable		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

**Table-4: Results of Water Sample from Test Well constructed in West side of Ash Pond sampling period of April 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	2	1	1	1	1	2	1	2	1.33
2	pH	-	6.5 - 8.5	No Relaxation	6.6	6.62	6.58	6.63	7.12	7.3	6.58	7.3	6.81
3	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
4	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
5	Turbidity	NTU	1	5	5.4	0.5	3.8	4.5	0.9	0.8	0.5	5.4	2.65
6	TDS	mg/l	500	2000	145	90	88	87	90	82	82	145	97.00
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	40.7	4.7	47	50.16	50.16	44.59	4.7	50.16	39.55
8	Total Hardness	mg/l	200	600	48.6	34.3	29.4	43.78	35.82	31.84	29.4	48.6	37.29
9	Calcium as Ca	mg/l	75	200	19.7	9.81	5.8	11.16	9.57	9.57	5.8	19.7	10.94
10	Magnesium as Mg	mg/l	30	100	6.8	2.3	3.5	3.86	2.9	BDL	2.3	6.8	3.87
11	Iron as Fe	mg/l	0.3	No relaxation	0.5	0.2	0.15	0.23	0.21	0.22	0.15	0.5	0.25
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	27.4	26.7	22.3	3.86	3.64	5.07	3.64	27.4	14.83
13	Chloride as Cl	mg/l	250	1000	28.7	34	16	15.54	15.54	15.41	15.41	34	20.87
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.01	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	1.07	1.03	1.10	1.03	1.1	1.07
29	E.Coli	MPN/100 ml	Should Not be Detectable		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

# Annexure-VI

**AMBIENT AIR QUALITY MONITORING**

*Annexure-VI*

The Ambient Air Quality samples were collected by representative from NABL accredited laboratory.

**Method of Analysis**

Pollutants	Method of Measurement
Particulate Matter (PM <sub>10</sub> ), µg/m <sup>3</sup>	Gravimetric
Particulate Matter (PM <sub>2.5</sub> ), µg/m <sup>3</sup>	Gravimetric
Sulphur dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	Improved west and Geake method
Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	Modified Jacob & Hochheiser
Carbon Monoxide (CO), mg/m <sup>3</sup>	Non Dispersive Infra-Red

**AMBIENT AIR QUALITY MONITORING LOCATIONS**

Ambient Air Quality Monitoring (PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub> & CO) was done twice a week at following locations:

1. Near DM Plant (Inside Plant)
2. Near Admar Village
3. Near Inna Village
4. Near Hejmady Village
5. Near Baikampady Village
6. Near Paradka Village
7. Near Mudarangadi Village
8. Near Adani Pump House
9. Near Ash Pond

The Monitoring values for the period from April 2020 to Sep 2020 in the above said locations are presented in Table-1 to Table-9 as below.

**Table-1: Ambient Air Quality Monitoring in Plant Site (Near DM Plant) for the period of April 2020 to Sep 2020**

Location	Month	PM <sub>10</sub> (100 µg/m <sup>3</sup> )			PM <sub>2.5</sub> (60 µg/m <sup>3</sup> )			SO <sub>2</sub> (80 µg/m <sup>3</sup> )			NO <sub>x</sub> (80 µg/m <sup>3</sup> )			CO (2.0 mg/m <sup>3</sup> )		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Near DM Plant (A1)	Apr 2020	38.7	40.2	39.6	20.2	21.1	20.6	7.1	7.8	7.5	8.5	9.2	8.8	BDL	BDL	BDL
	May 2020	38.9	40.5	39.8	20.4	21.3	20.8	7.3	7.9	7.6	8.4	9.5	9	BDL	BDL	BDL
	Jun 2020	38.1	39.7	39.1	19.5	20.4	20	7.1	7.6	7.3	8.1	9.1	8.6	BDL	BDL	BDL
	Jul 2020	23.3	24.9	24.2	13.3	14.6	13.9	6.1	6.9	6.5	8.1	8.9	8.4	BDL	BDL	BDL
	Aug 2020	25.3	27.3	26.3	14.9	15.7	15.3	6.5	7.2	6.8	8.5	9.2	8.8	BDL	BDL	BDL
	Sep 2020	27.8	29.9	28.8	17.1	18.1	17.6	6.9	7.7	7.2	8.8	9.6	9.1	BDL	BDL	BDL
	<b>Avg</b>	<b>32.0</b>	<b>33.8</b>	<b>33.0</b>	<b>17.6</b>	<b>18.5</b>	<b>18.0</b>	<b>6.8</b>	<b>7.5</b>	<b>7.2</b>	<b>8.4</b>	<b>9.3</b>	<b>8.8</b>	<b>BDL</b>	<b>BDL</b>	<b>BDL</b>

[BDL-Below Detection Limit]

**Table-2: Ambient Air Quality Monitoring at Admar village for the period of April 2020 to Sep 2020**

Location	Month	PM <sub>10</sub> (100 µg/m <sup>3</sup> )			PM <sub>2.5</sub> (60 µg/m <sup>3</sup> )			SO <sub>2</sub> (80 µg/m <sup>3</sup> )			NO <sub>x</sub> (80 µg/m <sup>3</sup> )			CO (2.0 mg/m <sup>3</sup> )		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Near Admar Village (A2)	Apr 2020	40.4	41.6	41	21.6	22.9	22.3	7.4	8.3	7.8	9.2	9.7	9.5	BDL	BDL	BDL
	May 2020	40.2	41.9	41.2	21.6	22.7	22.3	7.5	8.6	8	9.4	9.8	9.6	BDL	BDL	BDL
	Jun 2020	38.2	39.7	39	20.4	21.6	21.2	6.8	7.8	7.2	8.7	9.1	8.9	BDL	BDL	BDL
	Jul 2020	27.2	28.5	28	15.2	16.2	15.7	6.4	7.3	6.8	8.3	8.9	8.6	BDL	BDL	BDL
	Aug 2020	28.6	29.8	29.2	16.1	16.9	16.4	6.3	7.5	7	8.6	9.3	8.9	BDL	BDL	BDL
	Sep 2020	31.2	33.7	32.6	18.2	18.9	18.5	6.7	7.8	7.3	8.9	9.7	9.2	BDL	BDL	BDL
	<b>Avg</b>	<b>34.3</b>	<b>35.9</b>	<b>35.2</b>	<b>18.9</b>	<b>19.9</b>	<b>19.4</b>	<b>6.9</b>	<b>7.9</b>	<b>7.4</b>	<b>8.9</b>	<b>9.4</b>	<b>9.1</b>	<b>BDL</b>	<b>BDL</b>	<b>BDL</b>

[BDL-Below Detection Limit]

**Table-3: Ambient Air Quality Monitoring at Inna village for the period of April 2020 to Sep 2020**

Location	Month	PM <sub>10</sub> (100 µg/m <sup>3</sup> )			PM <sub>2.5</sub> (60 µg/m <sup>3</sup> )			SO <sub>2</sub> (80 µg/m <sup>3</sup> )			NO <sub>x</sub> (80 µg/m <sup>3</sup> )			CO (2.0 mg/m <sup>3</sup> )		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Near Inna Village (A3)	Apr 2020	33.9	35.3	34.5	22.1	23.5	22.5	7.6	8.2	7.9	9.6	10.2	9.9	BDL	BDL	BDL
	May 2020	34.1	35.6	34.7	22.3	23.7	22.7	7.6	8.5	8	9.8	10.4	10.1	BDL	BDL	BDL
	Jun 2020	32.5	33.8	33.2	21.1	22.5	21.6	7.3	8.1	7.7	9.2	9.9	9.6	BDL	BDL	BDL
	Jul 2020	23	24.2	23.6	11.1	12.6	11.6	6	6.8	6.3	10.1	10.9	10.4	BDL	BDL	BDL
	Aug 2020	24.3	25.4	24.8	11.8	13.1	12.2	6.5	7.2	6.8	10.4	11.4	10.8	BDL	BDL	BDL
	Sep 2020	26.3	27.8	26.9	12.7	14.4	13.4	6.9	7.6	7.3	10.8	11.9	11.2	BDL	BDL	BDL
	<b>Avg</b>	<b>29.0</b>	<b>30.4</b>	<b>29.6</b>	<b>16.9</b>	<b>18.3</b>	<b>17.3</b>	<b>7.0</b>	<b>7.7</b>	<b>7.3</b>	<b>10.0</b>	<b>10.8</b>	<b>10.3</b>	<b>BDL</b>	<b>BDL</b>	<b>BDL</b>

[BDL-Below Detection Limit]

**Table-4: Ambient Air Quality Monitoring at Hejmady Village for the period of April 2020 to Sep 2020**

Location	Month	PM <sub>10</sub> (100 µg/m <sup>3</sup> )			PM <sub>2.5</sub> (60 µg/m <sup>3</sup> )			SO <sub>2</sub> (80 µg/m <sup>3</sup> )			NO <sub>x</sub> (80 µg/m <sup>3</sup> )			CO (2.0 mg/m <sup>3</sup> )		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Near Hejamady Village (A4)	Apr 2020	33.6	35.2	34.7	21.5	23.1	22.5	6.6	7.6	7.2	9.4	10.1	9.7	BDL	BDL	BDL
	May 2020	33.9	35.6	35	21.7	23.4	22.7	6.9	7.9	7.4	9.6	10.4	9.9	BDL	BDL	BDL
	Jun 2020	31.8	33.7	32.9	20.5	22.5	21.3	6.4	7.5	7	9.3	9.9	9.5	BDL	BDL	BDL
	Jul 2020	20.3	22.5	21.6	12.4	13.6	12.9	7.1	8.2	7.6	9.1	9.9	9.5	BDL	BDL	BDL
	Aug 2020	21.8	24.3	23.2	13.3	14.8	14.1	7.5	8.5	8	9.5	10.2	9.8	BDL	BDL	BDL
	Sep 2020	23.8	27.8	25.8	15.8	16.7	16.2	7.9	8.9	8.4	9.9	10.7	10.3	BDL	BDL	BDL
	<b>Avg</b>	<b>27.5</b>	<b>29.9</b>	<b>28.9</b>	<b>17.5</b>	<b>19.0</b>	<b>18.3</b>	<b>7.1</b>	<b>8.1</b>	<b>7.6</b>	<b>9.5</b>	<b>10.2</b>	<b>9.8</b>	<b>BDL</b>	<b>BDL</b>	<b>BDL</b>

[BDL-Below Detection Limit]

**Table-5: Ambient Air Quality Monitoring at Baikampady Village for the period of April 2020 to Sep 2020**

Location	Month	PM <sub>10</sub> (100 µg/m <sup>3</sup> )			PM <sub>2.5</sub> (60 µg/m <sup>3</sup> )			SO <sub>2</sub> (80 µg/m <sup>3</sup> )			NO <sub>x</sub> (80 µg/m <sup>3</sup> )			CO (2.0 mg/m <sup>3</sup> )		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Near Baikampady Village (A5)	Apr 2020	33.6	35.6	34.8	20.6	22.3	21.8	6.5	7.2	6.8	7.8	8.9	8.7	BDL	BDL	BDL
	May 2020	33.8	35.8	35	21.5	22.6	22.1	6.6	7.5	7	7.2	9.1	8.5	BDL	BDL	BDL
	Jun 2020	32.3	33.7	33	20.1	21.6	20.8	6.2	7.1	6.6	6.9	8.7	8	BDL	BDL	BDL
	Jul 2020	38.3	41.9	39.7	19.3	21.2	20.2	11.2	13.8	12.4	16.3	17.9	17	BDL	BDL	BDL
	Aug 2020	39.5	42.6	40.8	20.2	22.4	21.1	12.1	14.5	13.1	16.7	18.4	17.5	BDL	BDL	BDL
	Sep 2020	41.2	44.9	42.9	22.4	24.2	23.2	12.6	14.9	13.5	17.3	18.9	18	BDL	BDL	BDL
	<b>Avg</b>	<b>36.5</b>	<b>39.1</b>	<b>37.7</b>	<b>20.7</b>	<b>22.4</b>	<b>21.5</b>	<b>9.2</b>	<b>10.8</b>	<b>9.9</b>	<b>12.0</b>	<b>13.7</b>	<b>13.0</b>	<b>BDL</b>	<b>BDL</b>	<b>BDL</b>

[BDL-Below Detection Limit]



**Table-6: Ambient Air Quality Monitoring at Paradka Village for the period of April 2020 to Sep 2020**

Location	Month	PM <sub>10</sub> (100 µg/m <sup>3</sup> )			PM <sub>2.5</sub> (60 µg/m <sup>3</sup> )			SO <sub>2</sub> (80 µg/m <sup>3</sup> )			NO <sub>x</sub> (80 µg/m <sup>3</sup> )			CO (2.0 mg/m <sup>3</sup> )		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Near Paradka Village (A6)	Apr 2020	34.7	36.1	35.7	20.5	22.4	21.6	6.8	7.2	7	8.6	9.1	8.9	BDL	BDL	BDL
	May 2020	35.1	36.3	35.9	20.8	22.7	21.8	6.6	7.5	7.2	8.8	9.4	9.2	BDL	BDL	BDL
	Jun 2020	32.3	34.7	33.9	19.9	21.4	20.4	6.3	7.2	6.8	7.9	8.5	8.2	BDL	BDL	BDL
	Jul 2020	18.4	21.1	19.7	10.2	11.8	10.7	6.2	7.1	6.6	7.1	8.1	7.8	BDL	BDL	BDL
	Aug 2020	18.9	21.5	20.4	10.4	12.3	11.1	6.5	7.4	6.9	7.6	8.4	8	BDL	BDL	BDL
	Sep 2020	20.5	22.8	22	11.9	13.4	12.6	6.8	7.9	7.3	8.1	8.9	8.5	BDL	BDL	BDL
	<b>Avg</b>	<b>26.7</b>	<b>28.8</b>	<b>27.9</b>	<b>15.6</b>	<b>17.3</b>	<b>16.4</b>	<b>6.5</b>	<b>7.4</b>	<b>7.0</b>	<b>8.0</b>	<b>8.7</b>	<b>8.4</b>	<b>BDL</b>	<b>BDL</b>	<b>BDL</b>

[BDL-Below Detection Limit]

**Table-7: Ambient Air Quality Monitoring at Mudarangadi Village for the period of April 2020 to Sep 2020**

Location	Month	PM <sub>10</sub> (100 µg/m <sup>3</sup> )			PM <sub>2.5</sub> (60 µg/m <sup>3</sup> )			SO <sub>2</sub> (80 µg/m <sup>3</sup> )			NO <sub>x</sub> (80 µg/m <sup>3</sup> )			CO (2.0 mg/m <sup>3</sup> )		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Near Mudarangadi Village (A7)	Apr 2020	34.5	35.9	35.3	20.4	22.4	21.7	7.8	8.2	8	8.7	9.3	9	BDL	BDL	BDL
	May 2020	34.7	36.2	35.6	20.6	22.6	22	8.1	8.4	8.3	8.9	9.5	9.2	BDL	BDL	BDL
	Jun 2020	32.3	33.8	33.3	19.5	20.9	20.3	7.8	8.1	7.9	8.3	8.9	8.7	BDL	BDL	BDL
	Jul 2020	24.1	26.1	25.1	14.1	15.2	14.8	7.3	7.8	7.5	8	8.6	8.3	BDL	BDL	BDL
	Aug 2020	24.9	27.3	25.9	14.9	16.1	15.6	7.7	8.1	7.8	8.4	8.9	8.7	BDL	BDL	BDL
	Sep 2020	26.5	29.4	27.9	16.5	17.8	17.3	8.1	8.5	8.3	8.8	9.3	9.1	BDL	BDL	BDL
	<b>Avg</b>	<b>29.5</b>	<b>31.5</b>	<b>30.5</b>	<b>17.7</b>	<b>19.2</b>	<b>18.6</b>	<b>7.8</b>	<b>8.2</b>	<b>8.0</b>	<b>8.5</b>	<b>9.1</b>	<b>8.8</b>	<b>BDL</b>	<b>BDL</b>	<b>BDL</b>

[BDL-Below Detection Limit]

**Table-8: Ambient Air Quality Monitoring at Adani Pump House for the period of April 2020 to Sep 2020**

Location	Month	PM <sub>10</sub> (100 µg/m <sup>3</sup> )			PM <sub>2.5</sub> (60 µg/m <sup>3</sup> )			SO <sub>2</sub> (80 µg/m <sup>3</sup> )			NO <sub>x</sub> (80 µg/m <sup>3</sup> )			CO (2.0 mg/m <sup>3</sup> )		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Near Adani Pump House (A8)	Apr 2020	35.2	36.2	35.7	21.5	22.8	22.2	7.8	8.4	8.1	9.9	10.6	10.2	BDL	BDL	BDL
	May 2020	35.5	36.6	36	21.7	22.9	22.4	8	8.6	8.4	10.2	10.8	10.5	BDL	BDL	BDL
	Jun 2020	32.6	34.6	33.5	20.3	21.8	21.2	7.7	8.3	8	9.6	10.3	9.9	BDL	BDL	BDL
	Jul 2020	19.1	21.1	20.1	12	13.9	13.2	6	7	6.7	8.1	8.9	8.5	BDL	BDL	BDL
	Aug 2020	20.3	21.8	20.9	13.1	14.5	13.8	6.7	7.3	7	8.4	9.3	8.9	BDL	BDL	BDL
	Sep 2020	22.4	23.8	23.1	14.6	15.8	15.3	7.2	7.7	7.5	8.8	9.7	9.3	BDL	BDL	BDL
	<b>Avg</b>	<b>27.5</b>	<b>29.0</b>	<b>28.2</b>	<b>17.2</b>	<b>18.6</b>	<b>18.0</b>	<b>7.2</b>	<b>7.9</b>	<b>7.6</b>	<b>9.2</b>	<b>9.9</b>	<b>9.6</b>	<b>BDL</b>	<b>BDL</b>	<b>BDL</b>

[BDL-Below Detection Limit]

**Table-9: Ambient Air Quality Monitoring at Near Ash Pond for the period of April 2020 to Sep 2020**

Location	Month	PM <sub>10</sub> (100 µg/m <sup>3</sup> )			PM <sub>2.5</sub> (60 µg/m <sup>3</sup> )			SO <sub>2</sub> (80 µg/m <sup>3</sup> )			NO <sub>x</sub> (80 µg/m <sup>3</sup> )			CO (2.0 mg/m <sup>3</sup> )		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Near Ash Pond (A9)	Apr 2020	35.6	38.8	37.6	20.8	23.7	22.1	7.7	8.9	8.2	9.9	12.2	11	BDL	BDL	BDL
	May 2020	35.8	39.2	37.8	21.1	23.9	22.3	7.9	9.1	8.4	10.1	12.4	11.2	BDL	BDL	BDL
	Jun 2020	33.6	37.4	35.4	19.2	21.5	20.2	7.4	8.7	8	8.5	10.2	9.5	BDL	BDL	BDL
	Jul 2020	31.9	36.2	34.1	18.7	20.7	19.6	7.1	8.5	7.7	8.1	9.8	9.1	BDL	BDL	BDL
	Aug 2020	32.7	37.1	35.1	19.4	21.6	20.5	7.5	8.9	8	8.4	9.9	9.4	BDL	BDL	BDL
	Sep 2020	35.2	38.6	36.6	21	23.9	22.4	7.9	9.2	8.4	8.9	10.5	9.9	BDL	BDL	BDL
	<b>Avg</b>	<b>34.1</b>	<b>37.9</b>	<b>36.1</b>	<b>20.0</b>	<b>22.6</b>	<b>21.2</b>	<b>7.6</b>	<b>8.9</b>	<b>8.1</b>	<b>9.0</b>	<b>10.8</b>	<b>10.0</b>	<b>BDL</b>	<b>BDL</b>	<b>BDL</b>

[BDL-Below Detection Limit]

# Annexure-VIII

## GUARD POND EFFLUENT WATER MONITORING

*Annexure-VII*

All the effluents like condenser cooling water, cooling tower blow down and brine discharge from desalination plant is directly discharged to Guard pond, from where the water is going back to the Sea through Coro-coated MS Pipeline. Final discharge point is through guard pond.

Boiler Blowdown, Coal Settling Pond water and Floor washings are treated in ETP and reused in the areas including greenbelt development/ dust suppression.

Continuous Online Monitoring setup is installed in the Guard pond & ETP discharge line to monitor Temp, pH, DO and TSS.

Ash Pond is covered with green belt and the runoff due to rain is collected in the adjacent pond and used for dust suppression within ash pond area. There is no provision of any outlet from Ash pond, Hence there is no effluent generated from the Ash Pond.

Samples are collected weekly and the monitoring values for the period of April 2020 to Sep 2020 are presented in Table-1 to Table-3 as below:

**Table-1: Guard Pond Effluent sample monitoring for the period of April 2020 to Sep 2020**

S.No	Parameters	Limits	Units	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Avg
1	Temperature	Not more than 5°C higher than intake sea water	°C	34.00	34.75	26.00	28.00	29.50	29.25	30.25
2	pH (at 25 °C)	5.5 – 9.0	-	8.25	8.04	7.06	7.67	7.76	8.22	7.83
3	Colour	-	-	<1	<1	<1	<1	<1	<1	<1
4	Odour	-	-	A	A	A	A	A	A	A
5	Total Suspended Solids	Not more than 10% higher than intake sea water	mg/l	34.00	34.75	26.00	28.00	29.50	29.25	20.94
6	Oil and Grease	20	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	Total Residual Chlorine	1	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	BOD	100	mg/l	5.55	3.22	BDL	2.20	BDL	BDL	3.66
9	COD	250	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	Total Chromium	2	mg/l	BDL	BDL	BDL	BDL	BDL	0.03	BDL
11	Hexavalent Chromium	1	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Phenolic Compounds	5	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Mercury as Hg	0.01	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Lead as Pb	2	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Arsenic as As	0.2	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Iron	3	mg/l	0.57	0.70	0.56	1.72	1.03	0.57	0.86

**Note: A- Agreeable, BDL- Below Detectable Level**

**Table-2: Cooling Tower Blow down Effluent monitoring for the period of April 2020 to Sep 2020**

S.No	Parameters	Limits	Units	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	AVG
1	Available Free Chlorine	0.5	mg/l	BDL	BDL	SD	BDL	SD	BDL	BDL
2	Zinc	1	mg/l	0.28	0.30		0.14		0.23	7.66
3	Chromium	0.2	mg/l	BDL	BDL		BDL		BDL	BDL
4	Phosphate	5	mg/l	BDL	BDL		BDL		BDL	BDL

**Note: BDL- Below Detectable Level, SD- Unit under Shut down**

**Table-3: Boiler Blow down Effluent sample monitoring for the period of April 2020 to Sep 2020**

S.No	Parameters	Limits	Units	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	AVG
1	Oil & Grease	20	mg/l	BDL	BDL	SD	BDL	SD	BDL	BDL
2	Copper	1	mg/l	BDL	BDL		BDL		BDL	BDL
3	Suspended Solids	100	mg/l	BDL	BDL		BDL		BDL	BDL
4	Iron	1	mg/l	0.16	0.16		0.50		0.26	0.27

**Note: BDL- Below Detectable Level, SD- Unit under Shut down**

# Annexure VIII

## WATER QUALITY MONITORING

## Annexure-VIII

Water quality monitoring is carried in the eleven locations which are finalized in consultation with KSPCB and monitoring carried for the period of Apr 2020 to Sep 2020 is presented in the Table-1 to Table-11 as below:

### Water Quality Sampling Location- Ground/Surface:

S.No	Name of the Location	Code	Source
1	Karnire River near Palimar village	SW-1	River
2	Pangala River Water	SW -2	River
3	Santhoor village	GW-1	Open well
4	Nandikur Village	GW-2	Open well
5	Palimar Village	GW-3	Open well
6	Simanthoor Village	GW-4	Open well
7	Admar Village	GW-5	Open well
8	Bappanadu Village	GW-6	Open well
9	Hejamady Village	GW-7	Open well
10	North Side of the UPCL Plant	GW-8	Open well
11	South Side of the UPCL plant	GW-9	Open well

### Water Sample Analysis Parameters:

S.No	Parameters	S.No	Parameters
1	Color	16	Fluoride
2	pH	17	Phenolic Compounds
4	Taste	18	manganese
5	Turbidity	19	zinc
6	TDs	20	Arsenic
7	Alkalinity	21	cyanide
8	Total Hardness as CaCO <sub>3</sub>	22	cadmium
9	Calcium as Ca	23	chromium
10	Magnesium	24	Aluminium
11	Iron	25	Selenium
12	Sulphate as SO <sub>4</sub>	26	Lead
13	Chloride	27	Mercury
14	Boron	28	Nitrate nitrogen
15	Residual Free Chlorine	29	E-coli

The Water Quality test results for the period of Apr 2020 to Sep 2020 is presented in the Table-1 to Table-11 as below.

**Table-1: Water Quality Monitoring carried out in Karnire River (Back Water) (SW-1) for the period of October 2019 to March 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	1	1	1	1	1	<1	<1	<1
2	pH	-	6.5 - 8.5	No Relaxation	6.6	7.21	7.49	6.57	6.85	6.94	6.57	7.49	6.94
3	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
4	Taste	-	Agreeable	Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable
5	Turbidity	NTU	1	5	47	4	2.8	3.2	1.0	0.4	0.4	47.0	9.7
6	TDS	mg/l	500	2000	195	520	470	53.0	48.0	55.0	48.0	520.0	223.5
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	21.4	28.2	27.9	12.54	9.21	11.1	9.2	28.2	18.4
8	Total Hardness	mg/l	200	600	16.3	88.2	80.2	15.92	11.98	19.9	12.0	88.2	38.8
9	Calcium as Ca	mg/l	75	200	6.9	17.6	19.27	3.19	3.20	6.3	3.2	19.3	9.9
10	Magnesium as Mg	mg/l	30	100	BDL	10.7	11.07	BDL	BDL	BDL	0.2	11.1	7.3
11	Iron as Fe	mg/l	0.3	No relaxation	0.24	0.23	0.22	0.18	0.16	0.2	0.16	0.24	0.21
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	40.5	13.7	15.6	5.8	5.4	8.3	5.4	40.5	14.9
13	Chloride as Cl	mg/l	250	1000	BDL	198.3	182.4	23.31	9.67	17.3	9.7	198.3	86.2
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	1.4	1.2	BDL	1.2	1.4	1.3
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

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**Table-2: Water Quality Monitoring carried out in Pangala River (SW-2) for the period of Apr 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	<1	<1	<1	<1	<1	<1	<1	<1	<1
2	pH	-	6.5 - 8.5	No Relaxation	6.78	7.84	6.89	6.78	6.59	6.80	6.59	7.84	6.95
3	Odour	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
4	Taste	-	Agreeable	Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable	Non-Agreeable
5	Turbidity	NTU	1	5	4.00	4.00	3.50	3.70	0.30	0.40	0.30	4.00	2.65
6	TDS	mg/l	500	2000	55.00	36.00	42.00	60.00	66.00	80.00	36.00	80.00	56.50
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	7.69	12.42	12.66	15.20	19.30	25.80	7.69	25.80	15.51
8	Total Hardness	mg/l	200	600	16.00	9.70	16.00	20.40	20.20	24.50	9.70	24.50	17.80
9	Calcium as Ca	mg/l	75	200	2.40	2.72	BDL	3.30	8.09	16.40	2.40	16.40	6.58
10	Magnesium as Mg	mg/l	30	100	2.40	BDL	2.91	2.97	BDL	5.70	2.40	5.70	3.50
11	Iron as Fe	mg/l	0.3	No relaxation	BDL	0.27	0.24	0.26	0.26	0.22	0.22	0.27	0.25
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	5.70	BDL	BDL	BDL	6.56	6.40	5.70	6.56	6.22
13	Chloride as Cl	mg/l	250	1000	12.9	14.9	10.2	12.08	15.65	16.9	10.2	16.9	13.77
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

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**Table-3: Water Quality Monitoring Carried out at Open well in Santhoor Village (GW-1) for the period of Apr 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	1	1	1	1	1	<1	<1	<1
2	pH	-	6.5 - 8.5	No Relaxation	6.8	6.58	6.57	6.69	6.96	7.3	6.57	7.30	6.82
3	Odour	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
4	Taste	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
5	Turbidity	NTU	1	5	0.7	2.3	0.5	0.9	BDL	BDL	0.50	2.30	1.10
6	TDS	mg/l	500	2000	66.5	88	75.2	42	38	35	35.00	88.00	57.45
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	11.8	30.55	23.5	16.72	12.4	11.14	11.14	30.55	17.69
8	Total Hardness	mg/l	200	600	14.8	24.5	29.4	15.92	15.9	7.9	7.90	29.40	18.07
9	Calcium as Ca	mg/l	75	200	4.8	7.85	5.89	4.78	3.1	3.19	3.10	7.85	4.94
10	Magnesium as Mg	mg/l	30	100	BDL	BDL	3.57	BDL	BDL	BDL	3.57	3.57	3.57
11	Iron as Fe	mg/l	0.3	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	7.8	7.3	6.5	3.7	3.2	2.64	2.64	7.80	5.19
13	Chloride as Cl	mg/l	250	1000	18.1	23.04	18	13.59	21.3	11.56	11.56	23.04	17.60
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	0.05	BDL	0.05	0.05	0.05
20	Arsenic as As	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	2.6	2.6	BDL	2.60	2.60	2.60
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

**Table-4: Water Quality Monitoring Carried out at Open well in Nandikur Village (GW-2) for the period of Apr 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	1	1	1	1	1	<1	<1	<1
2	pH	-	6.5 - 8.5	No Relaxation	7.1	6.75	6.69	6.58	7.01	6.83	6.58	7.10	6.83
3	Odour	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
4	Taste	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
5	Turbidity	NTU	1	5	BDL	0.5	1.9	1.8	0.9	BDL	0.5	1.9	1.28
6	TDS	mg/l	500	2000	88	400	130	43	127	52.0	43.0	400.0	140.00
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	BDL	61.1	37.6	8.36	73.72	7.4	7.4	73.7	37.64
8	Total Hardness	mg/l	200	600	14.8	83.3	78.4	7.96	59.94	16.0	8.0	83.3	43.40
9	Calcium as Ca	mg/l	75	200	4.9	17.6	15.71	3.19	11.2	3.2	3.2	17.6	9.30
10	Magnesium as Mg	mg/l	30	100	BDL	9.52	9.52	BDL	7.76	BDL	7.8	9.5	8.93
11	Iron as Fe	mg/l	0.3	No relaxation	0.02	0.05	BDL	0.24	BDL	BDL	BDL	BDL	BDL
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	BDL	BDL	BDL	3.6	3.4	3.6	3.4	3.6	3.53
13	Chloride as Cl	mg/l	250	1000	47.1	104.1	16.02	15.54	15.48	15.42	15.4	104.1	35.61
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	2.8	2.4	1.24	1.2	2.8	2.15
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

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**Table-5: Water Quality Monitoring carried out at Open well in Palimar Village (GW-3) for the period of Apr 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	1	1	1	1	1	<1	<1	<1
2	pH	-	6.5 - 8.5	No Relaxation	7.5	7.16	7.42	6.84	6.85	6.87	6.84	7.50	7.11
3	Odour	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
4	Taste	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
5	Turbidity	NTU	1	5	BDL	0.6	0.3	0.72	0.2	0.7	0.2	0.7	0.50
6	TDS	mg/l	500	2000	157	380	137.2	200	210	220.0	137.2	380.0	217.37
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	37.4	56.4	51.7	58.52	78.3	66.88	37.4	78.3	58.20
8	Total Hardness	mg/l	200	600	75.2	88.2	78.4	91.54	99.9	103.48	75.2	103.5	89.45
9	Calcium as Ca	mg/l	75	200	22.7	11.78	23.5	27.11	33.6	36.68	11.8	36.7	25.90
10	Magnesium as Mg	mg/l	30	100	4.1	14.28	4.76	5.8	3.8	2.9	2.9	14.3	5.94
11	Iron as Fe	mg/l	0.3	No relaxation	BDL	BDL	BDL	BDL	BDL	0.21	0.2	0.2	0.21
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	15.8	13.7	12.5	15.7	15.4	29.97	12.5	30.0	17.18
13	Chloride as Cl	mg/l	250	1000	37.5	36.06	26	42.73	42.5	40.46	26.0	42.7	37.54
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> .N	mg/l	45	No relaxation	BDL	BDL	BDL	3.5	3.7	BDL	3.5	3.7	3.60
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

**Table-6: Water Quality Monitoring carried out at Open well in Simanthoor Village (GW-4) for the period of Apr 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	1	1	1	1	1	<1	<1	<1
2	pH	-	6.5 - 8.5	No Relaxation	6.8	7.27	7.39	6.68	6.92	6.95	6.54	7.39	7.00
3	Odour	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
4	Taste	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
5	Turbidity	NTU	1	5	0.3	0.4	0.1	0.6	1.0	BDL	0.1	1.00	0.48
6	TDS	mg/l	500	2000	68.4	150	129.6	49.2	31	52.00	31.0	150.00	80.03
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	22.1	84.6	51.7	12.54	9.21	11.14	9.2	84.60	31.88
8	Total Hardness	mg/l	200	600	14.6	78.4	73.5	15.9	3.99	19.90	4.0	78.40	34.38
9	Calcium as Ca	mg/l	75	200	7.8	15.7	27.49	4.7	BDL	3.10	3.1	27.49	11.76
10	Magnesium as Mg	mg/l	30	100	BDL	9.52	BDL	BDL	BDL	2.90	2.9	9.52	6.21
11	Iron as Fe	mg/l	0.3	No relaxation	0.16	0.11	0.13	0.21	0.22	BDL	0.1	0.22	0.17
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	BDL	BDL	BDL	3.5	3.7	15.86	3.5	15.86	7.69
13	Chloride as Cl	mg/l	250	1000	17.2	14	26.04	13.5	15.48	15.40	13.5	26.04	16.94
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> .N	mg/l	45	No relaxation	BDL	BDL	BDL	1.2	1.3	1.31	1.2	1.31	1.27
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

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**Table-7: Water Quality Monitoring carried out at Open well in Admar Village (GW-5) for the period of October 2019 to March 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	1	1	1	1	1	<1	<1	<1
2	pH	-	6.5 - 8.5	No Relaxation	6.6	6.88	6.86	6.55	6.97	6.90	6.55	6.97	6.79
3	Odour	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
4	Taste	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
5	Turbidity	NTU	1	5	BDL	0.6	0.7	0.1	0.1	BDL	0.10	0.70	0.38
6	TDS	mg/l	500	2000	64	50	54	36	38	35.00	35.00	64.00	46.17
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	21.3	23.5	32.9	16.72	12.42	11.14	11.14	32.90	19.66
8	Total Hardness	mg/l	200	600	39.8	39.2	14.7	11.94	11.94	15.92	11.94	39.80	22.25
9	Calcium as Ca	mg/l	75	200	7.6	7.85	3.92	3.19	3.19	4.78	3.19	7.85	5.09
10	Magnesium as Mg	mg/l	30	100	BDL	0.6	0.7	0.1	0.1	BDL	0.10	0.70	0.38
11	Iron as Fe	mg/l	0.3	No relaxation	BDL	BDL	BDL	3.76	4.12	2.28	2.28	4.12	3.39
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	10.3	16	12	13.59	11.65	15.41	10.30	16.00	13.16
13	Chloride as Cl	mg/l	250	1000	10.3	16	12	13.59	11.65	15.41	10.30	16.00	13.16
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	1.04	1.04	BDL	1.04	1.04	1.04
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

Six Monthly Environmental Compliance Report for the period from Apr 2020 to Sep 2020 for UPCL

**Table-8: Water Quality Monitoring carried out at Open well in Bappanadu Village (GW-6) for the period of Apr 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	1	1	1	1	1	<1	<1	<1
2	pH	-	6.5 - 8.5	No Relaxation	6.8	6.85	6.58	6.64	7.07	6.87	6.58	7.07	6.80
3	Odour	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
4	Taste	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
5	Turbidity	NTU	1	5	BDL	0.8	2.7	2.3	BDL	BDL	0.80	2.70	1.93
6	TDS	mg/l	500	2000	53	390	49.2	170	212	51.00	49.20	390.00	154.20
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	7.3	75.2	70.5	58.52	73.72	3.71	3.71	75.20	48.16
8	Total Hardness	mg/l	200	600	18.8	73.5	9.8	83.58	99.9	11.94	9.80	99.90	49.59
9	Calcium as Ca	mg/l	75	200	4.2	15.17	3.92	28.71	36.83	4.78	3.92	36.83	15.60
10	Magnesium as Mg	mg/l	30	100	BDL	8.33	BDL	2.9	BDL	BDL	2.90	8.33	5.62
11	Iron as Fe	mg/l	0.3	No relaxation	0.13	0.12	0.21	0.23	0.21	BDL	0.12	0.23	0.18
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	BDL	BDL	BDL	24.09	20.5	4.78	4.78	24.09	16.46
13	Chloride as Cl	mg/l	250	1000	12.4	20.03	14.02	21.36	38.71	17.34	12.40	38.71	20.64
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> .N	mg/l	45	No relaxation	BDL	BDL	BDL	1.9	1.7	1.19	1.19	1.90	1.60
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

Six Monthly Environmental Compliance Report for the period from Apr 2020 to Sep 2020 for UPCL

**Table-9: Water Quality Monitoring carried out at Open well in Hejmady Village (GW-7) for the period of Apr 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	1	1	1	1	1	<1	<1	<1
2	pH	-	6.5 - 8.5	No Relaxation	6.7	6.75	6.55	7.27	7.26	6.89	6.55	7.27	6.90
3	Odour	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
4	Taste	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
5	Turbidity	NTU	1	5	BDL	BDL	0.7	3.5	BDL	BDL	BDL	BDL	BDL
6	TDS	mg/l	500	2000	47.5	130	80.6	100	210	52.80	47.50	210.00	103.48
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	4.8	18.8	23.5	50.16	82.94	7.40	4.80	82.94	31.27
8	Total Hardness	mg/l	200	600	4.3	29.4	14.7	47.76	95.9	12.00	4.30	95.90	34.01
9	Calcium as Ca	mg/l	75	200	BDL	7.85	3.92	17.54	33.6	4.80	3.92	33.60	13.54
10	Magnesium as Mg	mg/l	30	100	BDL	2.38	BDL	BDL	2.9	BDL	2.38	2.90	2.64
11	Iron as Fe	mg/l	0.3	No relaxation	0.16	0.11	0.18	0.14	0.11	BDL	0.11	0.18	0.14
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	BDL	BDL	BDL	3.54	3.32	4.77	3.32	4.77	3.88
13	Chloride as Cl	mg/l	250	1000	18.3	40	14	13.59	38.7	19.30	13.59	40.00	23.98
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	3.2	2.9	1.28	1.28	3.20	2.46
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

Six Monthly Environmental Compliance Report for the period from Apr 2020 to Sep 2020 for UPCL



**Table-10: Water Quality Monitoring carried out at North Side of UPCL Plant site (GW-8) for the period of Apr 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	1	1	1	1	1	<1	<1	<1
2	pH	-	6.5 - 8.5	No Relaxation	7.3	6.55	6.63	6.6	6.84	6.92	6.55	7.30	6.81
3	Odour	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
4	Taste	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
5	Turbidity	NTU	1	5	BDL	0.9	1	0.3	BDL	BDL	0.30	1.00	0.73
6	TDS	mg/l	500	2000	47	71.2	60	390	43	37.00	37.00	390.00	108.03
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	5.2	23.5	32.9	BDL	8.36	3.71	3.71	32.90	14.73
8	Total Hardness	mg/l	200	600	4.3	19.6	19.6	75.62	3.98	15.92	3.98	75.62	23.17
9	Calcium as Ca	mg/l	75	200	BDL	3.92	5.89	15.95	BDL	3.19	3.19	15.95	7.24
10	Magnesium as Mg	mg/l	30	100	BDL	2.38	BDL	8.7	BDL	BDL	2.38	8.70	5.54
11	Iron as Fe	mg/l	0.3	No relaxation	0.10	0.13	0.15	0.11	0.14	BDL	0.10	0.15	0.13
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	BDL	BDL	BDL	12.4	11.2	2.16	2.16	12.40	8.59
13	Chloride as Cl	mg/l	250	1000	16.7	16.2	14	159.29	17.48	21.19	14.00	159.29	40.81
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	0.27	0.27	BDL	0.27	0.27	0.27
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	0.73	0.73	BDL	0.73	0.73	0.73
20	Arsenic as As	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	3.4	3.4	BDL	3.40	3.40	3.40
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	NIL	NIL	NIL	NIL	NIL	NIL	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

**Table-11: Water Quality Monitoring carried out at South Side of UPCL plant site (GW-9) for the period of Apr 2020 to Sep 2020**

S.No	Parameters	Unit	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	1	1	1	1	1	<1	<1	<1
2	pH	-	6.5 - 8.5	No Relaxation	6.6	7.37	6.60	6.79	7.22	7.1	6.60	7.37	6.95
3	Odour	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
4	Taste	-	Agreeable	Agreeable	A	A	A	A	A	A	A	A	A
5	Turbidity	NTU	1	5	BDL	0.4	0.4	3.5	0.8	0.40	0.40	3.50	1.10
6	TDS	mg/l	500	2000	53	360	750	240	136	27.20	27.20	750.00	261.03
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	7.4	75.2	9.4	12.5	78.33	7.40	7.40	78.33	31.71
8	Total Hardness	mg/l	200	600	6.3	78.4	156.8	31.8	63.93	7.96	6.30	156.80	57.53
9	Calcium as Ca	mg/l	75	200	4.9	17.53	35.35	6.3	19.21	BDL	4.90	35.35	16.66
10	Magnesium as Mg	mg/l	30	100	BDL	8.42	16.16	3.8	3.88	BDL	3.80	16.16	8.07
11	Iron as Fe	mg/l	0.3	No relaxation	0.27	0.2	0.12	0.21	0.19	0.04	0.04	0.27	0.17
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	BDL	BDL	BDL	11.7	10.5	3.39	3.39	11.70	8.53
13	Chloride as Cl	mg/l	250	1000	23.4	20.03	324	97.1	15.48	9.63	9.63	324.00	81.61
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> .N	mg/l	45	No relaxation	BDL	BDL	BDL	1.6	1.4	1.01	1.01	1.60	1.34
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**Note: A- Agreeable, BDL- Below Detectable Level, NIL- Zero**

# Annexure-IX

## Rain Water Harvesting Ponds

*Annexure - IX*



**Two No's of Rain Water Harvesting Ponds constructed to conserve Rain Water**

# Annexure-X

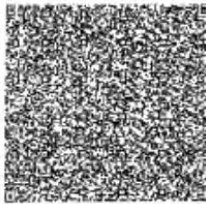


सत्यमेव जयते

## INDIA NON JUDICIAL Government of Karnataka

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Certificate No.	: IN-KA18483757771281M
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Purchased by	: UDUPI POWER CORPORATION LIMITED
Description of Document	: Article 12 Bond
Description	: AGREEMENT
Consideration Price (Rs.)	: 0 (Zero)
First Party	: GOVERNMENT OF KARNATAKA DEPARTMENT OF FISHERIES
Second Party	: UDUPI POWER CORPORATION LIMITED
Stamp Duty Paid By	: UDUPI POWER CORPORATION LIMITED
Stamp Duty Amount(Rs.)	: 200 (Two Hundred only)



For Karnataka State Co-operative Urban Banks Federation Ltd.  
Authorized Signatory.

.....Please write or type below this line.....

#### AMENDMENT TO AGREEMENT

This Amendment to the Agreement dated 9<sup>th</sup> March 2000 is made on 14<sup>th</sup> August 2014 by and between:

Government of Karnataka, Department of Fisheries, represented by the Deputy Director of Fisheries, Mangalore, hereinafter referred to as "Grantor" of the one part,

1



(SECOND COPY OF THE AGREEMENT)

#### Statutory Alert

1. The authenticity of this Stamp Certificate should be verified at "www.ahelstamps.com". Any discrepancy in the details on this Certificate void as available on the website renders it invalid.
2. The user of this certificate is responsible for the users of the certificate.

AND

Udupi Power Corporation Limited (formerly known as Nagarjuna Power Corporation Limited), a Company incorporated under the Companies Act, 1956 and having its Registered Office at 2<sup>nd</sup> Floor, 'Le-Parc Richmond', No. 51, Richmond Road, Bangalore – 560 025, hereinafter referred to as "Grantee" of the other part,

The terms "Grantor and Grantee", individually referred to as Party and collectively as Parties, which includes their successors and assignees

**WHEREAS:**

- (A) The Grantee was initially establishing 2 x 507.5MW coal fired thermal power station in Udupi District, Karnataka. Subsequently the capacity of the power project of the Grantee was augmented from 2 x 507.5MW to 2 x 600 MW with necessary approvals from Government of Karnataka, Ministry of Environment and Forests (Government of India) and Karnataka State Pollution Control Board.
- (B) The parties have entered into an Agreement dated 9<sup>th</sup> March 2000 (hereinafter referred to as **Agreement**)
- (C) Subsequent to entering of the Agreement, the Grantee had sought certain amendments to conditions imposed in the Agreement, for which, the Grantor, after examining the amendments sought, has approved the amendments vide its letter bearing No. ವಸಂಮೀ:24:ಮಿಇಇ 2010 dated 19.06.2014.
- (D) The parties have agreed to amend the Agreement to incorporate the amendments approved by the Grantor.



2

(SECOND COPY OF THE AGREEMENT)

**NOW THEREFORE IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:**

**Item No.4, page 2 of the Agreement be read as follows:**

"4. Sea water intake point shall be located at a depth of not less than 6.97 m and at a distance of 1430 m inside the sea from the coast."

**Item No.5, page 2 of the Agreement be read as follows:**

"5. The effluent from the power station shall be discharged at depth of minimum 4.99 m and 670 m inside the Sea from the coast."


All other terms and conditions in the Agreement that are not hereby amended are to remain in full force and effect.


IN WITNESS WHEREOF the parties herein have signed this Agreement on the day, month and year first above written, in the presence of:

  
**Deputy Director of Fisheries**  
Mangalore  
Deputy Director of Fisheries, Mangalore  
On behalf of Governor of Karnataka

UDUPI POWER CORPORATION LTD.  
  
**M. CHANDRASEKHAR REDDY**  
Director & COO  
Director & Chief Operating Officer for and on behalf of Udupi Power Corporation Ltd.,

**Witnesses:**

  
1. Sunil L. Naik  
504, 10th A Main,  
4th Block 3rd Stage  
Basaveshwara Nagar, B. Lorr-59

2.   
**SUSHMITHA RAO,**  
Asst Dir. of Fisheries,  
s/o Dy. Dir. of Fisheries,  
MANGALORE

( SECOND COPY OF THE AGREEMENT )



# Annexure-XI

**Green Belt development:**

Plantation was carried in and around plant premises with local species. Total plantation carried so far is around 366655 No's in 195 acres.

Plantation Details	Area (Acres)
<b>366655</b>	<b>195</b>
<b>200 Saplings were planted inside the plant in lieu of World Environment Day 2020 celebrations</b>	

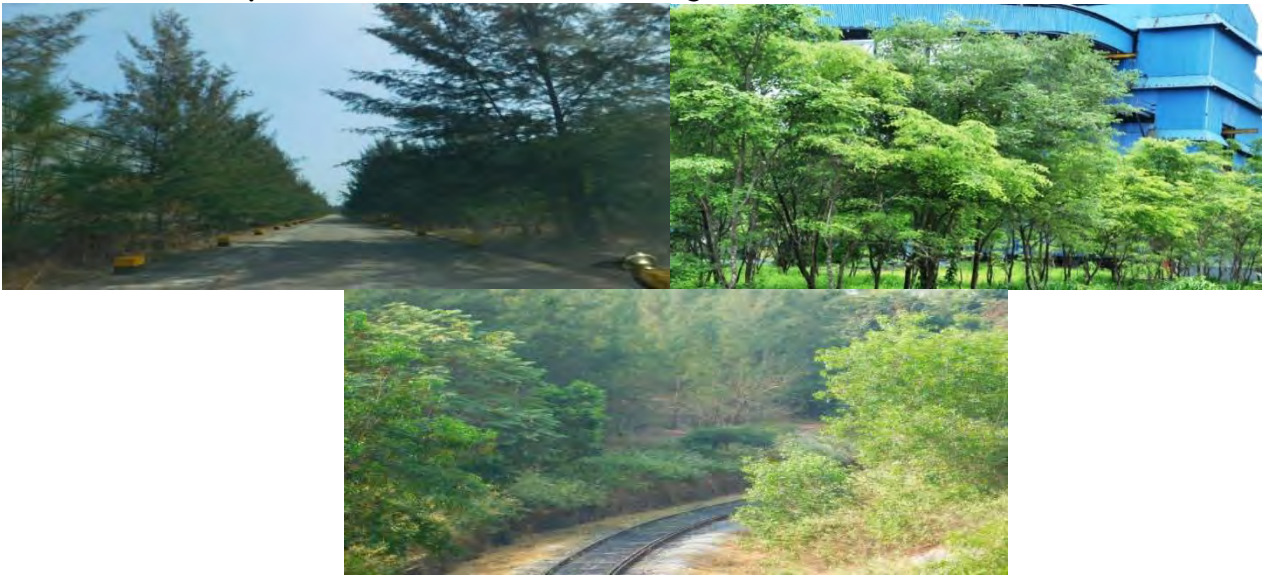
**List of the Plant Species planted in and around the UPCL plant premises**

S.No	Species
1	Honge
2	Neem
3	Mahagani
4	T. Rosea
5	Melengia
6	Seetha Ashoka
7	Alstonia
8	T. Arjuna
9	Honne
10	Kadu Badami
11	Lebeka
12	Legestonia
13	Nerale
14	Peltaform
15	Rain Tree
16	Gulmava
17	Beete
18	Cassurina
19	Holenandi
20	May Flower
21	Palaksha
22	Garige
23	Budubende
24	Surage
25	Dhupa
26	Basavanapada
27	Jack Fruit
28	Ramatre
29	Coconut Plant

### Road Side Plantation



### Thick plantation near Coal Handling Plant on both sides of the Road



### Plantation developed all along the Outside boundary



**Plantation developed all along the Inside boundary**



**Gardening Plantation developed**



### Vegetable & Fruit Plantation developed



### Plantation near Fly Ash silo



### Coconut Plantation developed Surrounding Guest House



# Annexure XIII

Udupi Power Corporation Limited

(Formerly Nagarjuna Power Corporation Limited)



Ref: UPCL/HR/R&R/2011/3298

dated 26<sup>th</sup> March, 2011

The Special Land Acquisition Officer  
Karnataka Industrial Area Development Board  
Baikampady Industrial Area  
MANGALORE.

Dear Sir,

**Subject:** Udupi Power Corporation Limited – 1200 MW Thermal Power Project-  
Providing of employment under Rehabilitation and Resettlement Policy  
of Government of Karnataka.

**References:** (i) Your Office Letter No. LAQ/SR 1/92-93/1157, dated 18.02.2008  
(ii) Your Office Letter No. LAQ/SR/1/2007-08/1294, dated 29.03.2008  
(iii) Your Office Letter No. LAQ/SR:1/08-09, dated 08.01.2010  
(iv) Your Office Letter No. LAQ/SR/1/2008-09/189, dated 27.04.2010  
(v) Your Office Letter No. LAQ/SR/1/2008-09/399, dated 17.06.2010

\*\*\*\*\*

This is with regard to above subject and with reference to your letters under references. Please note that, in terms of the Government of Karnataka Order bearing No. RD 118 REN 91 dated 30.04.1997 read with Government of Karnataka Order No. RD 118 REN 91, dated 18.12.1992 and as per the letters issued by you, action taken by Udupi Power Corporation Limited on the 36 applications cleared by your office is furnished in the list enclosed herewith as 'Annexure - A'. It may please be noted that since the nominees mentioned as against the Sl. Nos. 6 and 14 are pursuing Diploma and Engineering course respectively, they may take-up employment with us on completion of their studies i.e., by July, 2011. The issue of employment letters to the nominees mentioned against the Sl. Nos. 12, 15 and 34 are under process.

Contd...2

Registered Office : II Floor, Le-Parc Richmond, No.51, Richmond Road, Bangalore - 560 025.  
T +91-080-40254025, F +91-080-40254000

\*\*\* \*\*



Date: \_\_\_\_\_

Further it may please be noted that among the applications cleared by your office for providing employment under R&R policy, we found some discrepancies in four applications. The details of the discrepancies and also our observations are given in the 'Annexure-B', which is enclosed herewith. We, therefore, are returning these 4 applications to you along with this letter with a request to provide us necessary clarifications / confirmations so as to consider these applications for employment at the earliest.

We would also request you to inform us of any further applications pending with you for providing employment under R&R Policy and if there are any, the same may be please be forwarded to us with necessary supporting documents.

Thanking you

Yours faithfully  
for **UDUPI POWER CORPORATION LIMITED**

M.V. Ramana Rao  
Sr. General Manager – H.R



Encl:

- 1. Annexure – A
- 2. Annexure – B

ಶ್ರೀ ಮ.ವಿ. ರಾಮಣ್ಣ  
 ನಿರ್ದೇಶಕರು  
 ಮನವಿ ಸಂಖ್ಯೆ: \_\_\_\_\_  
 ದಿವೇಶ ಭವನದ ಮೇಲ್ಮಹಡಿ  
 6, ಸಿ.ಪಿ.ಎ. ರೋಡ್  
 ಬೈರಹಾಳ, ಬೆಂಗಳೂರು - 575 011



# Annexure XIII

UPCL is executing CSR activities in the following villages:

*Annexure - XIII*

Sl.No	Name of the Grama Panchayat	District	No. Of Households	Population	Villages
1.	Yellur	Udupi	1483	6404	Yellur, Ullur, Saje, Kemmendelu
2.	Mudarangadi	Udupi	1489	7476	Santhoor & Pilar
3.	Uchila/Bada	Udupi	2201	8770	Yermal, Bada, Bhaskara Nagara, Polya, Mullagudde, Kattinagara, Bada Guthu
4.	Tenka	Udupi	1109	3701	Tenka, Admar
5.	Padubidri	Udupi	5200	12694	Kanchinadka, Nadsal, Nadsal Budu, Nadipatna, Kadipatna, Padebettu
6.	Palimar	Udupi	1600	6761	Mudupalimar, Nandikoor, Avaralumattu.
7.	Belapu	Udupi	1211	4965	Belapu & Paniyuru
8.	Inna	Udupi	632	3864	Kanjarakatte, Inna
9.	Kutyar	Udupi	1376	5231	Kutyar
10.	Hejamadi	Udupi	1578	6630	Hejamadi

**CSR Focus Areas**



## Activity Head – OTHER SUPPORTS

### ❖ Programme – COVID-19 Relief Kits Distribution

The Corona Pandemic outbreak resulted in Nation-wide lock down impacting all the Industries and Service sector except the essential services and utilities.

- ❑ This has resulted in many migrated workers / daily-wage basis workers in a difficult situation, as neither can they go for any work to earn for their livelihood nor they could not go to their domicile place.
- ❑ Many migrated workers are located in the villages of Nandikuru, Padubidri, Sooda, Yelluru, Belapu and Uchila, in the vicinity of UPCL plant.
- ❑ Based on the authenticity provided by the Tahashildar and Taluk Magistrate of Kaup Taluk, the 200 identified migrated families were provided with Relief Kits.
- ❑ Similarly, based on the request provided by Udupi District Working Journalists Association, 175 free-lance journalists were provided with the Relief Kits.
- ❑ Each Relief Kit comprised of 10 Kgs. of Rice, 2 Kgs. of Toordhaal, 5 Kgs of Wheat Flour, 1 Kg of Cooking Oil, 1 Kg of Salt, 1 Washing Soap, 1 Bath Soap and Hand Sanitizer



## Activity Head – COMMUNITY HEALTH CARE

### ❖ Programme – MOBILE HEALTH CARE UNIT:

Visit Details from April, 2020 to September, 2020

SL.NO	Details	Cumulative Total
1	Beneficiary Details :	
1.1	No. of new registration	308
1.2	No. of old patient seen	4669
1.3	Total Beneficiaries	<b>4977</b>
1.4	No.of referrals made	66
2	<b>Camp Details :</b>	
2.1	No.of days camps run	101
2.2	No.of Camps run/organized	202
3	<b>Ambulance Usage:</b>	
3.1	No.of days vehicle used	101
3.2	No.of KMs covered (distance covered)	4591

❑ Average Number of Patients per day being visited is 50



## **Activity Head – COMMUNITY HEALTH CARE**

### **❖ Programme – HEALTH INSURANCE**

- The Adani Aarogya Card / Health Insurance for the villagers of Yellur and Mudarangadi were renewed through ICICI Lombard General Insurance Company Limited.
- The fresh Insurance Cards is being distributed to the respective family members through Grama Panchayats.
- Total Beneficiaries under the Scheme is 9,526 villagers.
- The Total sum assured for each family is Rs. 50,000/-
- Family means 7 members

## **Activity Head – COMMUNITY HEALTH**

❖ Programme – Medical Support

☐ Medical Support was extended as per the following:

<b>Sl. No.</b>	<b>Name of the Beneficiary</b>	<b>Support Amt. Rs.</b>
1	Medical Support to Mr Sandeep Kotian, resident of Kolachuru Village, Nandikooru	25,000
2	Medical Support to Mrs. Solma for Cancer treatment	5,000
3	Medical Support to Mr. Dheeraj Kotian for Seizure Disorder treatment	8,000
4	Medical Support to Mr. Mohammad Mohaseen Sabju, who is having thin skin in place of nails in all the fingers of hands and legs	25,000
<b>TOTAL</b>		<b>63,000</b>

## Activity Head – EDUCATION

❖ Programme – Education Support

Education Support was extended as per the following:

Sl. No.	Name of the Beneficiary	Support Amt. Rs.
1	Education Support to Mr. Nandan Bangera, S/o Lalita Kulal, for I Year B.E course	20,000
<b>TOTAL</b>		<b>20,000</b>

# Activity Head – COMMUNITY INFRASTRUCTURE DEVELOPMENT

## ❖ Programme – Safe Drinking Water:

- ❑ The Safe Drinking Water Plants, based on RO technology, have been installed at 5 villages viz., Yellur, Mudarangadi, Tenka, Bada and Belapu. These villages are in the vicinity of the UPCL plant.
- ❑ Each RO unit is having the capacity of purifying 1000 litres per hour. The tanks of 5000 litres capacity has been installed for storage of purified water.
- ❑ Total number of registered beneficiaries are 6,308





## Activity Head – Community engagement through social / cultural / sports event

❖ Programme –Support to local Associations / Institutions for organizing sports and cultural events

❑ Details of Supports:

Sl. No.	Beneficiary	Support Amt. Rs.
1	Support to Kanaka Samskruti Vedike, Udupi, for cultural programme on the occasion of Sri Krishna Janmashtami	25,000.00
2	Support to Sarvajanika Aacharana Samiti Parkala for Annual Ganesh Festival	25,000.00
3	Support to Tharangini Mithra Mandali ®, Padubidri for Yakshotsava program	25,000.00
4	Support to Sagar Vidya Mandir English Medium English Medium Primary & Highschool , for District Level Kabaddi Tournament	25,000.00
5	Support to Youth Club ® Yermal Bada for Volley Ball Tournament -Youth Trophy -2019	25,000.00
6	Support to Bhakta Vrunda and Rickshaw Chalakara Shree Ganeshotsava Samiti , Car Street, Udupi, for cultural programme on the occasion of Ganeshotsava celebration	15,000.00
7	Support to Sarvajanika Ganeshotsava Samiti, Uchila for cultural programme on the occasion of Ganesh Festival -2019	25,000.00
8	Support to Sarvajanika Shree Ganeshotsava Samiti, Kunjigudde for Ganesh Festival	25,000.00
9	Support to Santhuru Kodangala Garadi Bhakta Vrunda for Mosaru Kudike Event	20,000.00

10	Support to Sarvajanika Shree Ganeshotsava Samiti, Mudarangadi for Ganesh Festival	20,000.00
11	Support to Sarvajanika Shree Ganeshotsava Samiti, Belapu for Ganesh Festival	49,625.00
12	Support to Govt. Hr. Pry. School Mallar for Zonal level Kho-Kho Tournament	15,000.00

## Media Coverage

**Hosa Digantha  
(Kannada daily)**

• Covid-19 Relief Kits distribution



**Ujaya Karnataka  
(Kannada daily)**

• Covid-19 Relief Kits distribution



**The New Indian Express  
(English daily)**

• Covid-19 Relief Kits distribution



## Media Coverage

**Praja Vani  
(Kannada daily)**

- Covid-19 Relief Kits distribution

**Udaya Vani  
(Kannada daily)**

- Covid-19 Relief Kits distribution

**Kannada Prastha  
(Kannada daily)**

- Covid-19 Relief Kits distribution



# Annexure-XIV

**Comparison of Base Line Data with the analysis report of Sep 2020:**

*Annexure-XIV*

S.No	Parameters	Karnire (Surface water)		Nandikur Village		Santhoor Village		UNIT	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012
		As Per EIA-507.5 MU	Sep 2020	As Per EIA-507.5 MU	Sep 2020	As Per EIA-507.5 MU	Sep 2020			
1	Color	Colorless	<1	Colorless	BDL	Colorless	<1	Hz	5	15
2	Odour		A		A		A	-	Agreeable	Agreeable
3	Taste		A		A		A	-	Agreeable	Agreeable
4	Turbidity		0.4		BDL		BDL	NTU	1	5
5	TDS	17222	55.0	8	52.0	16	35.0	mg/l	500	2000
6	pH	7.1	6.94	6.2	6.83	6.8	7.30	-	6.5 - 8.5	No relaxation
7	Alkalinity		11.1		7.4		11.14	mg/l	200	600
8	Total Hardness as CaCO3		19.9		16.0		7.9	mg/l	200	600
9	Calcium as Ca		6.3		3.2		3.19	mg/l	75	200
10	Magnesium as Mg		BDL		BDL		BDL	mg/l	30	100
11	Iron as Fe	0.1	0.22	0.3	BDL	1.5	BDL	mg/l	0.3	No relaxation
12	Sulphate as SO4	1096	8.31	1.9	3.6	2.1	2.64	mg/l	200	400
13	Chloride as Cl	9264	17.3	8.6	15.4	9.6	11.56	mg/l	250	1000
14	Fluoride as F	0.5	BDL	0.05	BDL	0.1	BDL	mg/l	1	1.5
15	Phenolic Compounds	0.04	BDL	0.01	BDL	0.02	BDL	mg/l	0.001	0.002
16	Manganese as Mn		BDL		BDL		BDL	mg/l	0.1	0.3
17	Zinc as Zn	0.02	BDL	0.02	BDL	0.03	BDL	mg/l	5	15
18	Arsenic as As	ND	BDL	ND	BDL	ND	BDL	mg/l	0.05	No relaxation
19	Cyanide as CN		BDL	ND	BDL		BDL	mg/l	0.05	No relaxation
20	Cadmium as Cd	ND	BDL	ND	BDL	ND	BDL	mg/l	0.003	No relaxation
21	Chromium as Cr6+	ND	BDL	ND	BDL	ND	BDL	mg/l	0.05	No relaxation
22	Aluminium as Al		BDL	ND	BDL		BDL	mg/l	0.03	0.2
23	Selenium as Se	ND	BDL	ND	BDL	ND	BDL	mg/l	0.01	No relaxation
24	Lead as Pb	ND	BDL	ND	BDL	ND	BDL	mg/l	0.01	No relaxation
25	Mercury as Hg	ND	BDL	ND	BDL	ND	BDL	mg/l	0.001	No relaxation
26	Boron as B	ND	BDL	ND	BDL	ND	BDL	mg/l	0.5	1
27	Residual Free Chlorine	NT	BDL	ND	BDL	NT	BDL	mg/l	0.2	1
28	Nitrate as NO3-N		BDL	ND	1.24		BDL	mg/l	45	No relaxation
29	E.Coli	280	Nil	350	Nil	1800	Nil	MPN/100 ml	Shall not be detectable in any 100 ml sample	

**Note: A- Agreeable, BDL- Below Detectable Level, Nil- Zero**

Six Monthly Environmental Compliance Report for the Period from Apr 2020 to Sep 2020 for UPCL

# Annexure-XV

adani  
Power

REF: UPCL/PLANT/O&M/ENV/2020-21/ 346.

23.09.2020

To,  
The Environment Officer,  
Karnataka State pollution Control Board,  
Regional Office,  
Plot No-36-C, Shivalli Industrial Area,  
Manipal, Udupi-576104

**Sub:** Submission of Environment statement for Financial Year 2019-20 in Form-V for 2 X 600 MW coal based Subcritical Thermal Power Plant of Udupi Power Corporation Limited, reg...

**Ref:** 1) Consent for Operation No: - **AWH - 301645 dated: 15/12/2016.**  
2) Environmental Clearance No: - **J-13011/23/1996-IA.II (T) dated: 01.09.2011**

Dear Sir,

With reference to the above cited subject, please find the enclosed Environment Statement in Form-V for the financial year 2019-20 for 2X600 MW coal based Subcritical Thermal Power Plant of Udupi Power Corporation Limited.

Thanking you,

Yours faithfully

  
Authorized Signatory  
Udupi Power Corporation Limited.



Enclosure: Environment Statement in Form-V

Copy to:

Member Secretary, Karnataka State Pollution Control Board, "Parisara Bhavana", 1<sup>st</sup> to 5<sup>th</sup> Floor, #49 church street, Bengaluru-560001.

Udupi Power Corporation Ltd  
Yelluru Village  
Pilar Post Padubidri  
Udupi 574 113  
Karnataka, India  
CIN: U31909KA1996PLC019918

Tel +91 820 270 3500  
Fax +91 820 255 0854/ 2703345  
info@adani.com  
www.adanipower.com



## ANNEXURE

### ENVIRONMENTAL STATEMENT FORM-V

(See rule 14)

Environmental Statement for the financial year ending with 31<sup>st</sup> March 2020

#### PART-A

i	Name and address of the owner/occupier of the industry	Pravat Kishore Sundaray Station Head Udupi Power Corporation Limited Yelluru Village, Pillar Post Padubidri, Udupi District Karnataka-574113
ii	Industry category Primary-(STC code) Secondary- (STC Code)	Large scale Industry- Red Category
iii	Production category -Units	2X600 MW Imported Coal based Thermal Power Plant
iv	Year of establishment	Unit-I: 11 <sup>th</sup> Nov 2010 Unit-II: 19 <sup>th</sup> Aug 2012
v	Date of the last environmental statement submitted	Letter No: UPCL/Plant/O&M/ENV/2019-20/0766 dated: 25.09.2019

#### PART-B

Water and Raw Material Consumption:

- i. Water consumption in m<sup>3</sup>/day
- |                                |             |
|--------------------------------|-------------|
| Process                        | : 157138.01 |
| Cooling                        | : 800.52    |
| Domestic                       | : 70.29     |
| Total                          | : 158008.81 |
| Sea Water returned back to Sea | : 81692.02  |

Name of Products	Process water consumption per unit of products	
	During the previous financial year (2018-19)	During the current financial year (2019-20)
Power Generation (3277.941 MU)	0.00530 kl/kwh	0.00769 kl/kwh

- ii. Raw material consumption

Name of raw materials	Name of Products	Consumption of raw material per unit of output	
		During the previous financial year (2018-19)	During the current financial year (2019-20)
Coal	Power Generation	0.426 kg/kWh	0.430 kg/kWh
Heavy Fuel Oil (HFO)	Flame Stabilization during power	Nil	Nil
Light Diesel oil (LDO)	generation and start-up	0.000248 ml/kWh	0.000476 ml/kWh

\*Industry may use codes if disclosing details of raw material would violate contractual obligations, otherwise all industries have to name the raw materials used.



**PART-C**

*Pollution discharged to environment/unit of output  
(Parameter as specified in the consent issued)*

Pollutants	Quantity of Pollutants discharged (mass/day) i.e., (Kg/day)		Concentration of Pollutants discharged (Mass/Volume)		Percentage of variation from prescribed standards with reasons		
	Parameter	Results	Parameter	Results			
a) Water	Color & Odor	Agreeable	Color & Odor	Agreeable	No deviation		
	pH	Not Applicable	pH	7.75			
	TSS	5024.9	TSS, mg/l	61.51			
	BOD	3627	BOD, mg/l	44.40			
	COD	13467.6	COD, mg/l	164.86			
	Oil & grease	236.9	Oil & grease	2.90			
	Arsenic	BDL	Arsenic	BDL			
	Lead	BDL	Lead	BDL			
	Mercury	BDL	Mercury	BDL			
	Total Cr	27.9	Total Cr	0.34			
	Hexavalent Cr	BDL	Hexavalent Cr	BDL			
	Phenolic Compounds	BDL	Phenolic Compounds	BDL			
b) Air	Unit-I (kg/day)	Unit-II (kg/day)	Unit-I (mg/Nm <sup>3</sup> )	Unit-II (mg/Nm <sup>3</sup> )	No deviation		
	PM	252.98	656.44	PM		11.88	20.45
	SO <sub>x</sub>	6773.18	13419.09	SO <sub>x</sub>		318.05	418.13
	NO <sub>x</sub>	2593.57	4795.15	NO <sub>x</sub>		121.79	149.41

**PART-D**

**HAZARDOUS WASTE**

*{As specified under the Hazardous and Other wastes (Management and Transboundary Movement) Rules, 2016}*

Hazardous Wastes	Total Quantity (MT)			
	During the previous financial year (2018-19)		During the current financial year (2019-20)	
1) From Process	Used Oil	17.13 MT	Used Oil	20.52 MT
	Oil Soaked Cotton waste	1.53 MT	Oil Soaked Cotton waste	3.17 MT
	Discarded Containers	11.18 MT	Discarded Containers	14.36 MT
	Spent Ion exchange resins containing toxic metals	9.11 MT	Spent Ion exchange resins containing toxic metals	Nil
2) From Pollution Control Facilities	Not Applicable		Not Applicable	



**PART-E**  
**SOLID WASTES\***

Solid Wastes	Total Quantity (MT)			
	During the previous financial year (2018-19)		During the current financial year (2019-20)	
a) From Process (Generation)	Bottom Ash	12669.79	Bottom Ash	10748.87
b) From Pollution Control Facility (Generation)	Fly Ash	112781.69	Fly Ash	76637.11
	Gypsum	634.78	Gypsum	1678.23
c) Quantity recycled or reutilized (utilized for Cement/RMCs/Bricks/M-Sand)	Fly Ash	112506.28	Fly Ash	73919.95
	Bottom Ash	13749.30	Bottom Ash	14209.56
	Gypsum	573.43	Gypsum	1533.55

**PART-F**

**Please specify the characteristics (in terms of concentration and quantum) of hazardous as well as solid wastes and indicate disposal practice adopted for both these categories of wastes.**

- a) Hazardous waste: As per Hazardous and Other Wastes (Management & Transboundary Movement) Rules 2016, hazardous wastes generated in the industry are of five categories i.e., 5.1 Used Oil, 5.2 Oil soaked Cotton Waste, 21.1 Paint Sludge, 33.1 Discarded Containers and 35.2 Spent Ion Exchange resin. All these generated wastes are stored on the concrete platform in designated location and disposed to KSPCB/CPCB authorized vendors.
- b) Solid Waste: Solid waste in the industry is generated from process and pollution control facilities.
  - i. Bottom Ash is generated from the process of burning coal and is collected in the water impounding basin and the same is disposed to brick manufacturers & disposal to ash pond which is 3 km away from the plant.
  - ii. Fly Ash is generated from the process is trapped in the electro static precipitators (ESPs) in dry form and stored in silos. Fly ash is disposed to various end users like cement manufacturers, brick manufacturers and Ready Mix Concrete works.
  - iii. Gypsum is generated from the FGD (flue gas desulphurization) units when flue gas is passed through wet lime to remove Sulphur Di-oxides. Generated gypsum is disposed to end users like cement manufacturers, fertilizers industries and plasterboard manufacturers.
  - iv. Sludge generated from the STP was utilized as manure after drying and composting along with garden waste.

**PART-G**

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

- a) The Ambient Air Quality surrounding the coal handling facility is monitored through Online Continuous Ambient Air Quality Monitoring Stations and the Ambient Air Quality is within the prescribed limits throughout the year.
- b) The coal conveyor belts are fully covered and installed with Dust Suppression system at transfer points for arresting the fugitive emissions.
- c) The Units are equipped with Pollution Control Equipment such as Low NOx Burner, ESP & FGD (flue gas desulphurization) for controlling the Stack Emission.
- d) Fly Ash generated is conveyed in dry form through conduits and stored in silos. Fly Ash is utilized by cement manufacturers, brick manufacturers and RMC works.
- e) Gypsum generated is stored in closed yard and disposed to end users like cement manufacturers, fertilizers industries and plasterboard manufacturers.
- f) ETP of 7200 KLD is in operation and treated water is reused for green belt development/ gardening.
- g) Water Sprinkling is undertaken in the Ash Pond for suppression of dust.



**PART-H**

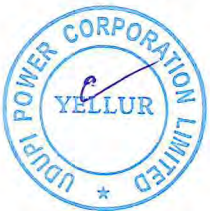
***Additional measures/investment proposal for environmental protection including abatement of pollution***

- a) Wind shield installed in the coal handling plant for controlling fugitive emissions.
- b) Rain Harvesting Ponds of capacities 70000 m<sup>3</sup> and 72000 m<sup>3</sup> are constructed for harvesting rain water during rainy season and utilization in Cooling Tower and other purposes.
- c) Organic Waste Converter is installed for converting food and green waste into compost and used in green belt/ gardening.
- d) Deployment of Road Sweeping machine to reduce fugitive dust emissions.

**PART-I**

***Any other particulars in respect of environmental protection and abatement of pollution***

- a) UPCL is certified with ISO 9001:2015 – Quality Management Systems, ISO 14001:2015 – Environment Management Systems, ISO 45001:2018 – Occupational Health and Safety Management Systems and ISO 50001:2018 – Energy Management Systems.
- b) World Environment Day celebration to create Environmental awareness among employees and community by conducting various environmental competitions, workshops & presentations.
- c) Joined hands with Karnataka State Pollution Control Board (KSPCB) for JAATHA (Walkathon) creating awareness on Air Pollution on World Environment Day on 05<sup>th</sup> June, 2019.
- d) Nearly 700 saplings were distributed to the villagers in Belapu to promote social forestry.
- e) Mass Plantation drive in the plant on the eve of World Environment day and also nearby villages like Belapu & Mudarangadi grama Panchayat.
- f) Nearly 13,000 Fruit Bearing Saplings distributed to 6,400 students of 77 Govt./ Govt. Aided Schools in and around the plant premises
- g) A pilot project taken for recharge of Bore wells of 10 Numbers in Mudarangadi Grama Panchayat through CSR activity.
- h) SWACHHAGRAHA program conducted across 61 government schools which aims to create awareness among the students for Hygiene & Cleanliness
- i) Installation of custom-made dust bins in neighboring villages to ensure hygiene and proper waste disposal
- j) As per the request from the Chief Conservator of Forest (CCF), Mangalore and Deputy Conservator of Forest (DCF), Kundapura Division, UPCL have engaged the water tanks for the purpose of watering of plants in vicinity of the plant during the peak summer period.



# Annexure-XVI

## SNAP SHOTS OF CAUTION BOARDS

*Annexure-XVI*

Caution Boards are installed at every 500 meters length throughout the 6 km pipe line corridor. Snapshots of the caution boards are placed below:



# Annexure XVII

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**Table 1. Data on water quality parameters off Padubidri during May 2020.**

Sl. No.	Parameters		Stations							
			1	2	3	4	5	6	7	8
1	Water Temperature (°C)	S	31.6	32.2	32.20	32.60	32.60	32.40	32.40	32.50
		SS	31.6	32.0	32.20	32.40	32.40	32.40	32.40	32.00
2	pH	S	7.89	7.98	7.92	7.99	7.97	7.96	7.98	7.89
		SS	7.93	7.98	8.00	7.99	7.98	7.98	7.98	7.93
3	Salinity (psu)	S	30.94	31.25	31.25	31.88	31.88	32.19	32.50	32.94
		SS	31.25	31.56	31.88	31.88	32.50	32.50	32.83	33.25
4	Dissolved Oxygen (mg/l)	S	6.93	7.13	6.73	7.13	7.34	6.93	6.52	6.52
		SS	6.32	6.93	5.91	6.52	5.91	6.52	6.11	4.48
5	BOD <sub>3</sub> at 27°C	S	-	1.83	-	-	2.45	-	1.63	-
		SS	-	1.22	-	-	0.20	-	0.82	-
6	COD (mg/l)	S	-	20	-	-	18	-	18	-
		SS	-	18	-	-	16	-	14	-
7	Transparency (m)		1.02	0.95	1.36	0.81	0.59	1.37	0.43	0.45
8	Total Suspended Solids (mg/l)		-	148	-	-	160	-	138	-
9	Total Dissolved Solids (mg/l)	S	-	20220	-	-	21420	-	21950	-
10	Ammonia (µg-at/l)	S	6.22	5.10	9.34	5.62	10.89	6.57	8.39	3.29
		SS	8.13	7.26	4.84	6.14	7.52	8.90	6.14	7.52
11	Nitrite (µg-at/l)	S	0.28	0.14	0.21	0.12	0.25	0.15	0.29	0.19
		SS	0.18	0.26	0.23	0.27	0.14	0.16	0.10	0.15
12	Nitrate (µg-at/l)	S	0.65	0.73	0.65	0.36	0.95	1.20	0.84	0.94
		SS	0.81	0.65	0.24	0.25	0.24	0.65	0.24	1.86
13	Phosphate (µg-at/l)	S	0.60	0.45	0.75	0.65	0.40	0.50	0.40	0.30
		SS	0.41	0.36	0.48	0.51	0.40	0.55	0.48	0.32
14	Silicate (µg-at/l)	S	9.56	9.77	8.59	9.45	8.11	9.08	7.99	8.47
		SS	9.32	8.71	9.50	10.9	8.52	8.88	9.65	9.57
15	Oil and Grease (mg/l)	S	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL: Below Detectable Level

**Table 2. Phytoplankton diversity (no/m<sup>3</sup>) and Biomass (mg/m<sup>3</sup>) in the coastal waters off Padubidri during May 2020**

Sl. No.	Flora	Depth (m)		
		5	10	15
<b>I</b>	<b>Diatoms</b>			
1	<i>Asterionella</i>			
	a. <i>A. japonica</i>	2000	1000	400
	b. Others	500	336	100
2	<i>Bacteriastrum</i>			
	a. <i>B. varians</i>	2000	1500	1000
	b. Others	500	504	100
3	<i>Biddulphia</i>			
	a. <i>Biddulphiaregia</i>	1000	700	200
	b. <i>B. sinensis</i>	500	500	100
	c. <i>Biddulphiamobiliensis</i>	-	302	100
	d. Others	-	-	-
4	<i>Cerataulina</i>			
	a. <i>C. perlagica</i>	-	-	-
	b. Others	-	-	-
5	<i>Chaetoceros</i>			
	a. <i>C. lorenzianus</i>	3000	3000	1000
	b. <i>C. decipiens</i>	2500	1500	600
	c. <i>C. compressus</i>	1500	1000	400
	d. <i>C. curvisetus</i>	1500	180	300
	e. Others	500	-	100
6	<i>Coscinodiscus</i>			
	a. <i>C. oculus iridis</i>	28000	12000	4000
	b. <i>C. lineatus</i>	15000	6000	2500
	c. <i>C. excentricus</i>	7000	4000	1500
	d. Others	500	1380	500
7	<i>Cyclotella</i>			
	a. <i>C. stelligera</i>	4500	102	200
	b. Others	500	167	100
8	<i>Dynobryonsetularia</i>	-	-	-
9	<i>Ditylum</i>			
	a. <i>D. brightwelli</i>	-	-	300
	b. Others	-	-	100
10	<i>Eucampia</i>			
	a. <i>E. zodiacus</i>	-	-	-
	b. Others	-	-	-

11	<i>Fragillaria</i>			
	a. <i>F. oceanica</i>	-	-	-
	b. Others	-	-	-
12	<i>Gyrosigma</i>			
	a. <i>G. balticum</i>	-	-	-
	b. Others	-	-	-
13	<i>Lauderia</i>			
	a. <i>L. borealis</i>	7000	2500	1000
	b. Others	2000	506	100
14	<i>Leptocylindricus</i>			
	a. <i>L. danicus</i>	-	-	800
	b. Others	-	-	200
15	<i>Melosira</i>			
	a. <i>M. moniliformas</i>	-	-	400
	b. Others	-	-	100
16	<i>Navicula</i>			
	a. <i>N. longa</i>	-	-	-
	b. Others	-	-	-
17	<i>Nitzschia</i>			
	a. <i>N. closterium</i>	-	-	-
	b. <i>N. striata</i>	-	-	-
	c. <i>N. longissima</i>	-	-	-
	d. Others	-	-	-
18	<i>Planktoniella</i>			
	a. <i>P. sol</i>	2000	-	300
	b. Others	500	-	100
19	<i>Pleurosigma</i>			
	a. <i>P. normanii</i>	-	501	200
	b. <i>P. elongatum</i>	-	-	-
	c. Others	-	-	-
20	<i>Rhizosolenia</i>			
	a. <i>R. stolterfothii</i>	1500	1000	400
	b. <i>R. shruvsolei</i>	500	503	200
	c. <i>R. stliformis</i>	500	-	100
	d. Others	-	-	-
21	<i>Skeletonema</i>			
	a. <i>S. costatum</i>	-	3000	-
	b. Others	-	841	-
22	<i>Staurastrum</i> sp.			
		-	-	-
23	<i>Streptothecca</i>			
	a. <i>S. thamensis</i>	-	-	-
	b. Others	-	-	-
24	<i>Thalassiothrix</i>			
	a. <i>T. decipiens</i>	3000	1400	400

	b. <i>T. longissima</i>	1500	600	300
	c. Others	500	171	200
25	<i>Triceratium</i>			
	a. <i>T. reticulate</i>	-	-	-
	b. <i>T. favus</i>	-	-	-
	c. Others	-	-	-
26	<i>Diatoma</i>			
	a. <i>Diatoma vulgare</i>	-	-	-
27	Other diatoms	-	-	-
<b>II</b>	<b>Dinoflagellates</b>			
1	<i>Ceratium</i>			
	a. <i>C. macroceros</i>	30000	5000	4000
	b. <i>C. fusus</i>	19000	2500	2500
	c. <i>C. longipes</i>	11000	1500	1500
	d. others	500	352	400
2	<i>Dinophysis</i>			
	a. <i>D. acuta</i>	-	-	-
	b. Others	-	-	-
3	<i>Gymnodinium</i>			
	a. <i>G. splendens</i>	-	-	-
	b. <i>G. rhombodes</i>	-	-	-
	c. Others	-	-	-
4	<i>Ornithocerosmagnificus</i>	-	-	-
5	<i>Peridinium</i>			
	a. <i>P. depressum</i>	1000	900	200
	b. <i>P. divergens</i>	500	400	100
	c. <i>P. granii</i>	500	300	-
	d. <i>P. excentricum</i>	500	237	-
	e. Others	-	-	-
6	<i>Preperidinium</i>	2500	1670	300
7	<i>Noctiluca</i>			
	a. <i>N. Scintillans</i>	-	1002	-
	b. Others	-	-	-
<b>III</b>	<b>Blue green algae</b>	-	-	-
1	Blue Green Algae	8000	8016	1400
<b>Biomass [wet weight - mg/m<sup>3</sup>]</b>		<b>984.00</b>	<b>530.37</b>	<b>419.00</b>

-: Absent

**Table 3. Zooplankton diversity (no/m<sup>3</sup>) and Biomass (mg/m<sup>3</sup>) in the coastal waters off Padubidri during May 2020**

Sl. No.	Fauna	Depth (m)		
		5	10	15
1	<b>Tintinids</b>			
	a. <i>Tintinopsis</i> sp.	-	1500	300
	b. <i>Rabdonella</i> sp.	-	705	100
	c. <i>Favella</i> sp.	-	300	-
2	<b>Radiolarians</b>	-	-	-
3	<b>Medusae</b>			
	a. <i>Obelia</i> sp.	2000	-	500
	b. <i>Octocostatum</i> sp.	1000	-	200
	c. <i>Quadrata</i> sp.	500	-	100
4	<b>Siphonophores</b>			
	a. <i>Lensia</i> sp.	3000	1503	400
	b. <i>Diphyssa</i> sp.	-	-	-
5	<b>Ctenophores</b>			
	a. <i>Plurobranchia</i> sp.	-	-	-
6	<b>Chaetognaths</b>			
	a. <i>Sagitta</i> enflata	-	-	-
	b. <i>Pterosagitta</i> draco	-	-	-
	c. <i>Krohnitta</i> subtilis	-	-	-
7	<b>Polychaetes</b>	-	-	-
8	<b>Cladocerans</b>			
	a. <i>Penilia</i> avirostris	14000	4	-
	b. <i>Evadna</i> nordmanni	2000	-	-
9	<b>Copepods</b>			
	a. <i>Calanus</i> finmarchicus	9000	3000	3000
	b. <i>Tamora</i> longicornis	5000	2500	2000
	c. <i>Parapontella</i> brevicornis	3000	1500	1100
	d. <i>Oithona</i> helgolandica	1000	682	400
10	<b>Copepod nauplius</b>	17000	5344	8500
11	<b>Lucifer</b>	-	-	404
12	<b>Planktonic Urochordates</b>			
	a. <i>Frillillaria</i> sp.	-	-	-
	b. <i>Oikopleura</i> sp.	1503	670	705
	c. <i>Doliola</i> sp.	3500	1503	500
13	<b>Fish Eggs</b>	3003	835	400
14	<b>Copepod egg</b>	-	-	400
15	<b>Echinoderm Larvae</b>	-	1002	300
16	<b>Decapod Larvae</b>	3500	-	300
17	<b>Bivalve Larvae</b>	-	-	200
18	<b>Fish Larvae</b>	-	502	-

19	<b>Polychaete Larvae</b>	3500	-	1000
20	<b>Chaetognath Larvae</b>	2505	1169	6
21	Others	-	5	2
<b>Biomass [wet weight - mg/m<sup>3</sup>]</b>		<b>1251.00</b>	<b>728.41</b>	<b>611.00</b>

-: Absent

**Table 4. Macrobenthos diversity (no/m<sup>2</sup>) in the coastal waters off Padubidri during May 2020**

Sl. No.	Fauna	Depth (m)		
		5	10	15
<b>I</b>	<b>Molluscs</b>			
<b>A</b>	<b>Bivalves</b>			
1	<i>Arcasp.</i>	-	-	80
2	<i>Anadora sp.</i>	-	-	-
3	Bivalve Spats	300	800	1200
4	<i>Cardium sp.</i>	-	-	-
5	<i>Donax sp.</i>	-	40	120
6	<i>Katalysia sp.</i>	-	-	-
7	<i>Meritrix sp.</i>	80	140	280
8	<i>Perna sp</i>	-	-	-
9	<i>Modiolus sp.</i>	-	-	-
10	<i>Pecten sp.</i>	-	20	40
<b>B</b>	<b>Gastropods</b>			
1	<i>Babylonia sp.</i>	-	-	-
2	<i>Cavolinia sp.</i>	-	-	-
3	<i>Cerithedia sp.</i>	-	180	280
4	<i>Conus sp.</i>	-	-	-
5	<i>Oliva sp.</i>	-	120	180
6	<i>Patella sp.</i>	-	40	40
7	<i>Surcula sp.</i>	-	40	80
8	<i>Telescopium sp.</i>	-	-	-
9	<i>Trochus sp.</i>	-	-	-
10	<i>Turitella sp.</i>	30	120	120
11	<i>Umbonium sp.</i>	-	-	120

<b>C</b>	<b>Scaphopods</b>			
1	<i>Dentalium</i> sp.	-	220	220
<b>D</b>	<b>Other Molluscs</b>	-	-	-
<b>II</b>	<b>Echinodermata</b>			
1	<i>Astropecten</i> sp.	-	-	-
2	<i>Ophiocoma</i> sp.	-	320	250
3	<i>Holothuria</i> sp.	-	-	-
<b>III</b>	<b>Echiuroids</b>	30	60	90
<b>IV</b>	<b>Sipunculids</b>	-	-	-
<b>V</b>	<b>Polychaetes</b>	40	180	200
<b>VI</b>	<b>Coelenterates</b>	40	80	90
<b>VII</b>	<b>Miscellaneous</b>			
1	Crabs	-	80	120
2	Shrimps	-	-	-
3	Fishes	-	-	-
4	Mud tubes	-	50	80
5	Sand tubes	20	50	60
6	Egg Cases	50	70	150
<b>Density (Individuals/m<sup>2</sup>)</b>		<b>630.00</b>	<b>2650.00</b>	<b>3820.00</b>

- : Absent



**Table 5. Results of Bioassay experiment for the coastal waters off Padubidri during May 2020**

1. Organism Used for the Test : *Perna viridis*(Green mussel)
2. Length of the Test Organism : 4.32cms (Average)
3. Weight of the Test Organism : 1.14gms (Average)
4. Test Medium : Sea water collected from the vicinity of effluent fallout from UPCL, Padubidri
5. Control : Filtered sea water
6. Container : Glass aquarium of 20ltr. capacity
7. Number of Organisms : 10 in each container
8. Number of Experiments : Two
9. Duration of the Test : 96 hrs.
10. Methodology : Static bioassay

**EXPERIMENT**

MEDIUM	HOUR / MORTALITY (%)			
	24	48	72	96
CONTROL	Nil	Nil	Nil	Nil
TEST MEDIUM	Nil	Nil	Nil	Nil

**Result:** No mortality

**Table 6. Heavy metals in sediment off Padubidri during May 2020.**

<b>Sl. No.</b>	<b>Heavy Metals</b>	<b>5m</b>	<b>10m</b>	<b>15m</b>
1	Cadmium as Cd (ppm)	0.039	0.082	0.045
2	Chromium as Cr (ppm)	0.321	0.215	0.214
3	Iron as Fe (ppm)	95.883	92.231	80.295
4	Manganese as Mn(ppm)	1.052	1.294	1.326
5	Lead as Pb(ppm)	BDL	0.031	BDL
6	Zinc as Zn (ppm)	0.362	0.375	0.224
7	Nickel as Ni (ppm)	0.345	0.462	0.321

**BDL = Below Detectable Level**

### Sediment characteristics of coastal waters off Padubidri in the month of May 2020

Sl no.	Parameters	Stations								
		1	2	3	4	5	6	7	8	
1.	Grain size (%)	Sand	1.22	1.42	2.20	2.23	1.52	1.25	1.82	2.10
		Silt	16.21	15.25	14.55	17.25	10.25	12.34	11.25	12.25
		Clay	79.55	82.25	65.25	72.25	81.22	75.25	81.25	75.25
2.	Total organic carbon (%)	2.95	3.25	2.14	2.18	1.99	2.05	1.89	1.55	

### Biological characteristics in the coastal waters off Padubidri in the month of May 2020

Sl No.	Parameter	Stations							
		1	2	3	4	5	6	7	8
1.	Primary productivity(mgC/m <sup>3</sup> /hr)	0.125	0.210	0.122	0.152	0.123	0.111	0.212	0.235
2.	Chlorophyll-a (mg/m <sup>3</sup> )	1.25	1.35	1.25	1.36	1.25	1.36	1.28	1.38
3.	Faecal coliforms(MPN/100ml)	<2	<2	<2	<2	<2	<2	<2	<2
4.	<i>E.coli</i> (MPN/100ml)	negative	negative	negative	negative	negative	negative	negative	negative

## **Inference:**

The inferences drawn on the various physical, chemical and biological parameters for the month of May 2020 are given below.

The water temperature varied from 29.70°C to 31.90°C. The pH values ranged between 7.92 and 8.00. The salinity varied from 30.94psu to 33.25psu. The dissolved oxygen (DO) varied between 4.48 mg/l and 7.34 mg/l. The biochemical oxygen demand (BOD<sub>3</sub>) is an empirical biological test in which the water conditions such as temperature; dissolved oxygen and microbial flora play a decisive role. The BOD<sub>3</sub> values ranged from 0.20 mg/l to 2.45 mg/l in the study region indicate that these values are within the primary water quality criteria and do not pose any threat to the environment under the present condition. The COD values ranged between 16.00 mg/l and 20.00 mg/l. The total suspended solids (TSS) ranged between 68.0 mg/l and 84.0 mg/l and the total dissolved solids (TDS) ranged between 20220 mg/l and 21590 mg/l. The transparency values varied from 0.43 m to 1.37 m.

Nutrients play a vital role in the biogeochemical cycles in the marine environment. The concentrations of nitrite (NO<sub>2</sub>-N) varied from 0.10 µg-at/l to 0.29 µg-at/l, while nitrate (NO<sub>3</sub>-N) varied between 0.24 µg-at/l and 1.86 µg-at/l, which are within the acceptable limits of coastal environment. Ammonia content (NH<sub>3</sub>-N) varied between 3.29 µg-at/l and 1.86 µg-at/l. Inorganic phosphate (PO<sub>4</sub>-P) was in the range of 0.30 µg-at/l and 0.75 µg-at/l. Silicate – Silicon (SiO<sub>2</sub>-Si), one of the major nutrients for phytoplankton growth ranged between 7.99 and 10.9 µg-at/l in the coastal waters off Padubidri.

The oil and grease content was below detectable limits.

### **Phytoplankton:**

The relative abundance of various forms of phytoplankton is depicted in Table 2. Phytoplanktons were dominant in the study area with 20 different genera with the abundance of *Coscinodiscus*, *Ceratium*, *Chaetoceros* and Blue green algae. The phytoplankton species recorded in this area are common types occurring along the west coast of India. The biomass varied from 419.00 mg/m<sup>3</sup> to 984.00 mg/m<sup>3</sup>.

### **Zooplankton:**

The qualitative analyses revealed the presence of 18 different groups of zooplankton. Among zooplankton, Copepods, Copepod nauplius and Cladocerans were dominant. The biomass ranged from 611.00 mg/m<sup>3</sup> to 1251.00 mg/m<sup>3</sup>.

### **Macrobenthos:**

The qualitative analyses revealed the presence of 20 different groups of macrobenthos. Bivalve spats dominated the macrobenthos, followed by Ophiocoma, Meritrix and Dentalium. The density ranged from 630 no/m<sup>2</sup> to 3820 no/m<sup>2</sup>.

### **Bioassay:**

The bioassay studies indicated no mortality of mussels in the seawater samples collected from effluent discharge location in the Padubidri region.

### **Heavy metals in Sediment:**

The heavy metal contents in the sediments at 5m, 10m and 15m depth contours off Padubidri revealed that the values were within the permissible limits.



**(Lakshmi M.T)**

PRINCIPAL INVESTIGATOR

DEPT. OF AQUATIC ENVIRONMENT & MANAGEMENT

Karnataka Veterinary, Animal and Fisheries

Sciences University

College of Fisheries, Manipal - 575 002

**REPORT ON**

**COASTAL WATER QUALITY MONITORING NEAR THE M/S UPCL  
SEAWATER INTAKE AND EFFLUENT DISCHARGE POINT OFF  
PADUBIDRI, UDUPI DISTRICT, KARNATAKA**

**Submitted to:**

**M/s UDUPI POWER CORPORATION LIMITED  
KOLACHURE, YELLURU VILLAGE  
PILAR POST, UDUPI DISTRICT-574 113**



**Prepared By:**

**DEPARTMENT OF AQUATIC ENVIRONMENT MANAGEMENT  
KARNATAKA VETERINARY, ANIMAL AND FISHERIES SCIENCES  
UNIVERSITY  
COLLEGE OF FISHERIES, MANGALURU – 575 002**

**September -2020**

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**Table1. Water Quality Parameters in the Beach Waters of Padubidri during September 2020.**

Sl. No	Parameters	Stations		
		1	2	3
1	Water Temperature ( $^{\circ}$ C)	31.00	31.10	31.10
2	pH	7.60	7.63	7.70
3	Salinity (psu)	28.44	28.75	28.44
4	Dissolved Oxygen (mg/l)	7.34	7.74	7.54
5	BOD <sub>3</sub> at 27 $^{\circ}$ C	2.45	2.65	3.06
6	COD (mg/l)	16	18	22
7	Turbidity (NTU)	10.5	11.6	10.9
8	Total Suspended Solids (mg/l)	128	116	120
9	Total Dissolved Solids (mg/l)	22440	23070	22130
10	Ammonia ( $\mu$ g-at/l)	7.78	9.25	10.23
11	Nitrite ( $\mu$ g-at/l)	3.00	2.54	2.27
12	Nitrate ( $\mu$ g-at/l)	10.85	10.29	8.51
13	Phosphate ( $\mu$ g-at/l)	0.90	1.05	0.95
14	Silicate ( $\mu$ g-at/l)	26.98	26.26	24.32
15	Oil and Grease (mg/l)	BDL	BDL	BDL

BDL: Below Detectable Level



**Table 2. Phytoplankton diversity (no/m<sup>3</sup>) and Biomass (mg/m<sup>3</sup>) in the Beach waters off Padubidri during September 2020**

Sl. No.	Flora	Stations		
		1	2	3
<b>I</b>	<b>Diatoms</b>			
1	<i>Asterionella</i>			
	a. <i>A. japonica</i>	-	-	500
	b. Others	-	-	100
2	<i>Bacteriastrum</i>			
	a. <i>B. varians</i>	-	-	-
	b. Others	-	-	-
3	<i>Biddulphia</i>			
	a. <i>B. regia</i>	1000	800	1400
	b. <i>B. sinensis</i>	500	400	600
	c. <i>B. mobiliensis</i>	300	200	100
	d. Others	100	100	100
4	<i>Cerataulina</i>			
	a. <i>C. perlagica</i>	-	-	-
	b. Others	-	-	-
5	<i>Chaetoceros</i>			
	a. <i>C. lorenzianus</i>	-	-	-
	b. <i>C. decipiens</i>	-	-	-
	c. <i>C. compressus</i>	-	-	-
	d. <i>C. curvisetus</i>	-	-	-
	e. Others	-	-	-
6	<i>Coscinodiscus</i>			
	a. <i>C. oculus iridis</i>	9000	8000	11000
	b. <i>C. lineatus</i>	6600	5000	4000
	c. <i>C. excentricus</i>	4000	2000	1000
	d. Others	1000	200	400
7	<i>Cyclotella</i>			
	a. <i>C. stelligera</i>	1000	600	1400
	b. Others	100	200	200
8	<i>Dynobryon setularia</i>	-	-	-
9	<i>Ditylum</i>			
	a. <i>D. brightwelli</i>	600	500	1200
	b. Others	200	100	300
10	<i>Eucamphia</i>			
	a. <i>E. zoodiacus</i>	-	-	-
	b. Others	-	-	-

11	<i>Fragillaria</i>			
	a. <i>F. oceanica</i>	2000	1800	2000
	b. Others	500	100	700
12	<i>Guinardia</i>			
	a. <i>G. striata</i>	-	-	-
	b. <i>G. cylindrus</i>	-	-	-
	c. Others	-	-	-
13	<i>Gyrosigma</i>			
	a. <i>G. balticum</i>	-	-	-
	b. Others	-	-	-
14	<i>Lauderia</i>			
	a. <i>L. borealis</i>	-	-	-
	b. Others	-	-	-
15	<i>Leptocylindricus</i>			
	a. <i>L. danicus</i>	-	-	-
	b. Others	-	-	-
16	<i>Melosira</i>			
	a. <i>M. moniliformis</i>	-	-	-
	b. Others	-	-	-
17	<i>Navicula</i>			
	a. <i>N. longa</i>	-	-	-
	b. Others	-	-	-
18	<i>Nitzschia</i>			
	a. <i>N. closterium</i>	2500	2000	2200
	b. <i>N. striata</i>	1500	1500	1400
	c. <i>N. longissima</i>	1000	900	800
	d. Others	200	100	200
19	<i>Planktoniella</i>			
	a. <i>P. sol</i>	-	300	500
	b. Others	-	100	100
20	<i>Pleurosigma</i>			
	a. <i>P. normanii</i>	1500	2000	1500
	b. <i>P. elongatum</i>	1000	400	1000
	c. Others	200	200	200
21	<i>Rhizosolenia</i>			
	a. <i>R. stolterfothii</i>	500	700	800
	b. <i>R. shrubsolei</i>	300	400	300
	c. <i>R. styliformis</i>	100	100	-
	d. Others	-	-	-
22	<i>Skeletonema</i>			
	a. <i>S. costatum</i>	-	-	-
	b. Others	-	-	-
23	<i>Staurastrum</i> sp.			
24	<i>Streptotheca</i>			
	a. <i>S. thamensis</i>	500	-	-

	b. Others	100	-	-
25	<i>Thalassiothrix</i>			
	a. <i>T. decipiens</i>	-	-	-
	b. <i>T. longissima</i>	-	-	-
	c. Others	-	-	-
26	<i>Triceratium</i>			
	a. <i>T. reticulate</i>	-	-	-
	b. <i>T. favus</i>	-	-	-
	c. Others	-	-	-
27	Other diatoms	-	-	-
<b>II</b>	<b>Dinoflagellates</b>			
1	<i>Ceratium</i>			
	a. <i>C. macroceros</i>	2000	1500	1500
	b. <i>C. fusus</i>	1000	1200	1000
	c. <i>C. longipes</i>	800	700	400
	d. Others	200	100	100
2	<i>Dinophysis</i>			
	a. <i>D. acuta</i>	-	-	-
	b. Others	-	-	-
3	<i>Gymnodinium</i>			
	a. <i>G. splendens</i>	-	-	-
	b. <i>G. rhombodes</i>	-	-	-
	c. Others	-	-	-
4	<i>Ornithoceros magnificus</i>	-	-	-
5	<i>Peridinium</i>			
	a. <i>P. depressum</i>	-	-	-
	b. <i>P. divergens</i>	-	-	-
	c. <i>P. granii</i>	-	-	-
	d. <i>P. excentricum</i>	-	-	-
	e. Others	-	-	-
6	<i>Preperidinium</i>	-	-	-
7	<i>Noctiluca</i>			
	a. <i>N. scintillans</i>	4000	5000	4000
	b. Others	700	800	500
<b>III</b>	<b>Blue green algae</b>			
1	Blue Green Algae	1300	1100	1700
	<b>Biomass [wet weight - mg/m<sup>3</sup>]</b>	<b>209.00</b>	<b>201.00</b>	<b>228.00</b>

-: Absent

**Table 3. Zooplankton diversity (no/m<sup>3</sup>) and Biomass (mg/m<sup>3</sup>) in the Beach waters off Padubidri during September 2020**

Sl. No.	Fauna	Stations		
		1	2	3
1	<b>Tintinids</b>			
	a. <i>Tintinopsis</i> sp.	1500	1600	300
	b. <i>Rabdonella</i> sp.	1000	900	200
	c. <i>Favella</i> sp.	400	500	
2	<b>Radiolarians</b>	-	-	100
3	<b>Medusae</b>			
	a. <i>Obelia</i> sp.	-	-	-
	b. <i>Octocostatum</i> sp.	-	-	-
	c. <i>Quadrata</i> sp.	-	-	-
4	<b>Siphonophores</b>			
	a. <i>Lensia</i> sp.	-	-	-
	b. <i>Diphysis</i> sp.	-	-	-
5	<b>Ctenophores</b>			
	a. <i>Plurobranchia</i> sp.	-	-	-
6	<b>Chaetognaths</b>			
	a. <i>Sagitta enflata</i>	-	-	-
	b. <i>Pterosagitta draco</i>	-	-	-
	c. <i>Krohnitta subtilis</i>	-	-	-
7	<b>Polychaetes</b>	-	-	-
8	<b>Cladocerans</b>			
	a. <i>Penilia avirostris</i>	1800	2000	1900
	b. <i>Evadnae nordmanni</i>	1400	700	800
9	<b>Copepods</b>			
	a. <i>Calanus finmarchicus</i>	3500	3000	5000
	b. <i>Tamora longicornis</i>	1500	2000	1500

	<i>c. Parapontella brevicornis</i>	1200	600	1000
	<i>d. Oithona helgolandica</i>	200	400	500
10	<b>Copepod nauplius</b>	7200	7900	6200
11	<b>Lucifer</b>			
12	<b>Planktonic Urochordates</b>			
	<i>a. Frillillaria sp.</i>	-	-	-
	<i>b. Oikopleura sp.</i>	200	400	600
	<i>c. Doliolum sp.</i>	-	-	-
13	<b>Fish Eggs</b>	202	1	3
14	<b>Copepod egg</b>	1000	800	1300
15	<b>Echinoderm Larvae</b>	-	-	-
16	<b>Decapod Larvae</b>	1205	800	1104
17	<b>Bivalve Larvae</b>	800	600	500
18	<b>Fish Larvae</b>	1	2	-
19	<b>Polychaete Larvae</b>	704	403	305
20	<b>Chaetognath Larvae</b>	-	-	-
21	<b>Others</b>	5	8	5
	<b>Biomass [wet weight - mg/m<sup>3</sup>]</b>	<b>309.00</b>	<b>312.00</b>	<b>288.00</b>

- : Absent

**Table 4. Macrobenthos diversity (no/m<sup>2</sup>) in the Beach waters off Padubidri during September 2020**

Sl. No.	Fauna	Stations		
		1	2	3
<b>I</b>	<b>Molluscs</b>			
<b>A</b>	<b>Bivalves</b>			
1	<i>Arca</i> sp.	20	20	12
2	<i>Anadora</i> sp.	-	-	-
3	Bivalve Spats	600	480	280
4	<i>Cardium</i> sp.	16	12	16
5	<i>Donax</i> sp.	12	20	24
6	<i>Katalysia</i> sp.	-	-	-
7	<i>Meritrix</i> sp.	12	8	8
8	<i>Modiolus</i> sp.	-	-	-
9	<i>Perna</i> sp.	4	8	4
<b>B</b>	<b>Gastropods</b>			
1	<i>Babylonia</i> sp.	-	-	-
2	<i>Cavolinia</i> sp.	-	-	-
3	<i>Cerithedia</i> sp.	20	16	-
4	<i>Conus</i> sp.	-	-	-
5	<i>Oliva</i> sp.	-	-	-
6	<i>Patella</i> sp.	-	-	-
7	<i>Surcula</i> sp.	-	-	-
8	<i>Telescopium</i> sp.	-	-	-

9	<i>Trochus</i> sp.	-	-	-
10	<i>Turitella</i> sp.	-	-	-
11	<i>Umbonium</i> sp.	-	-	-
<b>C</b>	<b>Scaphopods</b>			
1	<i>Dentalium</i> sp.	24	12	24
<b>D</b>	<b>Other Molluscs</b>	4		8
<b>II</b>	<b>Echinodermata</b>			
1	<i>Astropecten</i> sp.	-	-	-
2	<i>Ophiocoma</i> sp.	-	-	-
3	<i>Holothuria</i> sp.	-	-	-
<b>III</b>	<b>Echiuroids</b>	-	-	-
<b>IV</b>	<b>Sipunculids</b>	-	-	-
<b>V</b>	<b>Polychaetes</b>	8	4	8
<b>VI</b>	<b>Coelenterates</b>	-	-	-
<b>VII</b>	<b>Miscellaneous</b>			
1	Crabs	36	20	28
2	Shrimps	-	-	-
3	Fishes	-	-	-
4	Mud tubes	-	-	-
5	Sand tubes	4	8	4
6	Egg Cases	12	16	24
<b>Density (Individuals/m<sup>2</sup>)</b>		<b>772.00</b>	<b>604.00</b>	<b>456.00</b>

- : Absent

**Table 5. Results of Bioassay experiment for the Beach waters off Padubidri during September 2020**

1. Organism Used for the Test : *Perna viridis* (Green mussel)
2. Length of the Test Organism : 4.20 cms (Average)
3. Weight of the Test Organism : 1.28 gms (Average)
4. Test Medium : Seawater collected from Padubidri beach (at station 2).
5. Control : Filtered sea water
6. Container : Glass aquarium of 20 ltr. capacity
7. Number of Organisms : 10 in each container
8. Number of Experiments : Two
9. Duration of the Test : 96 hrs.
10. Methodology : Static bioassay

**EXPERIMENT**

MEDIUM	HOUR / MORTALITY (%)			
	24	48	72	96
CONTROL	Nil	Nil	Nil	Nil
TEST MEDIUM	Nil	Nil	Nil	Nil

**Result:** No mortality



## **Inference:**

The inferences drawn on the various physical, chemical and biological parameters in the beach waters of Padubidri for the month of September 2020 are given below.

The water temperature varied from 31.00°C to 31.10°C. The pH values ranged between 7.60 and 7.70. The salinity varied from 28.44 psu to 28.75 psu. The dissolved oxygen (DO) varied between 7.34 mg/l and 7.74 mg/l. The biochemical oxygen demand (BOD<sub>3</sub>) is an empirical biological test in which the water conditions such as temperature; dissolved oxygen and microbial flora play a decisive role. The BOD<sub>3</sub> values ranged from 2.45 mg/l to 3.06 mg/l in the study region indicate that these values are within the primary water quality criteria and do not pose any threat to the environment under the present condition. The COD values ranged between 16.00 mg/l to 22.00 mg/l, the total suspended solids (TSS) ranged between 116.00 mg/l to 128.00 mg/l and the total dissolved solids (TDS) ranged between 22130 mg/l to 23070 mg/l. The turbidity values were in the range of 10.5 NTU to 11.6 NTU.

Nutrients play a vital role in the biogeochemical cycles in the marine environment. The concentrations of nitrite (NO<sub>2</sub>-N) in beach waters varied from 2.27 µg-at/l to 3.00 µg-at/l, while nitrate (NO<sub>3</sub>-N) varied between 8.51 µg-at/l and 10.85 µg-at/l, which are within the acceptable limits of coastal environment. Ammonia content (NH<sub>3</sub>-N) varied between 7.78 µg-at/l and 10.23 µg-at/l. Inorganic phosphate (PO<sub>4</sub>-P) was in the range of 0.90 µg-at/l and 1.05 µg-at/l. Silicate – Silicon (SiO<sub>3</sub>-Si), one of the major nutrients for phytoplankton growth ranged between 24.32 and 26.98 µg-at/l in the beach waters.

The oil and grease content was below detectable limits.

## **Phytoplankton:**

The relative abundance of various forms of phytoplankton is depicted in Table 2. Phytoplankton study showed the presence of 13 different genera with the abundance of *Coscinodiscus*, *Noctiluca*, *Nitzchia* and *Ceratium*. The phytoplankton species recorded in this

area are common types occurring along the west coast of India. The biomass varied from 201.00 mg/m<sup>3</sup> to 228.00 mg/m<sup>3</sup>.

#### **Zooplankton:**

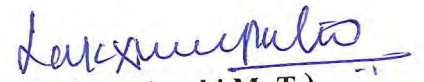
The qualitative analyses revealed the presence of 13 different groups of zooplankton. Among zooplankton, Copepod nauplius remained the most dominant group, followed by Copepods, Cladocerans and Tintinid. The biomass ranged between 288.00 mg/m<sup>3</sup> to 312.00 mg/m<sup>3</sup>.

#### **Macrobenthos:**

The qualitative analyses revealed the presence of 13 different groups of macrobenthos. Bivalve spats dominated the macrobenthos followed by Crabs, *Dentalium* and *Donax*. Macrofaunal density ranged from 456 no/m<sup>2</sup> to 772 no/m<sup>2</sup>.

#### **Bioassay:**

The bio assay studies indicated no mortality of mussels in the beach waters of Padubidri. The results indicated no environmental stress on aquatic life.

  
(Lakshmi M. T.)

PRINCIPAL INVESTIGATOR  
DEPT. OF AQUATIC ENVIRONMENT & MANAGEMENT  
Karnataka Veterinary, Animal and Fisheries  
Sciences University  
College of Fisheries, Mangalore - 575 007

# Annexure XVIII

**TEST WELL MONITORING:***Annexure-XVIII*

Test Wells are installed in the Sea Water Pipe line fenced area and the monitoring is carried for the period from April 2020 to September 2020 is presented in the Table-1 to Table-6 as below:

**The locations of test wells are:**

S.NO	Name of the Location	Code	Source
1	Pipe line Corridor test well	PC-1	Test Well
2	Pipe line Corridor test well	PC-2	Test Well
3	Pipe line Corridor test well	PC-3	Test Well
4	Pipe line Corridor test well	PC-4	Test Well
5	Pipe line Corridor test well	PC-5	Test Well
6	Pipe line Corridor test well	PC-6	Test Well

**Water Sample Analysis Parameters:**

S.No	Parameters	S.No	Parameters
1	Color	16	Fluoride
2	pH	17	Phenolic Compounds
3	Odor	18	manganese
4	Taste	19	zinc
5	Turbidity	20	Arsenic
6	TDs	21	cyanide
7	Alkalinity	22	cadmium
8	Total Hardness as CaCO <sub>3</sub>	23	chromium
9	Calcium as Ca	24	Aluminium
10	Magnesium	25	Selenium
11	Iron	26	Lead
12	Sulphate as SO <sub>4</sub>	27	Mercury
13	Chloride	28	Nitrate nitrogen
14	Boron	29	E.coli
15	Residual Free Chlorine		

**Table-1: Pipe line corridor test well (PC-1) for the period of Apr 2020 to Sep 2020**

S.No	PARAMETERS	UNIT	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	1	1	1	1	1	1.00	1.00	1.00
2	pH	-	6.5 - 8.5	No Relaxation	6.7	6.6	6.67	6.61	6.96	6.81	6.60	6.96	6.73
3	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
4	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
5	Turbidity	NTU	1	5	1.2	0.5	0.3	2	BDL	0.8	0.30	2.00	0.96
6	TDS	mg/l	500	2000	68	180	38.0	42	121	65.0	38.00	180.00	85.67
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	5.6	18.8	4.7	4.18	4.1	3.71	3.71	18.80	6.85
8	Total Hardness	mg/l	200	600	9.8	49	4.9	15.92	23.8	7.96	4.90	49.00	18.56
9	Calcium as Ca	mg/l	75	200	5.2	9.18	BDL	3.19	4.7	BDL	3.19	9.18	5.57
10	Magnesium as Mg	mg/l	30	100	BDL	BDL	BDL	BDL	2.9	BDL	BDL	BDL	BDL
11	Iron as Fe	mg/l	0.3	No relaxation	BDL	BDL	BDL	BDL	BDL	0.07	0.07	0.07	0.07
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	14.8	12.6	8.62	10.24	9.2	10.44	8.62	14.80	10.98
13	Chloride as Cl	mg/l	250	1000	16.5	44	14.02	9.71	40.7	11.56	9.71	44.00	22.75
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.01	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	1.14	1.12	BDL	1.12	1.14	1.13
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**A- Agreeable; BDL- Below Detectable Limit; Nil- Zero**

**Table-2: Pipe line corridor test well (PC-2) for the period of Apr 2020 to Sep 2020**

S.No	PARAMETERS	UNIT	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	4	1	3	7	1	1	7	2.83
2	pH	-	6.5 - 8.5	No Relaxation	6.60	6.56	7.0	6.79	7.04	6.94	6.56	7.04	6.82
3	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
4	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
5	Turbidity	NTU	1	5	1.7	80.8	0.3	3.00	BDL	0.5	0.3	80.8	17.26
6	TDS	mg/l	500	2000	176	180	160	180.00	119	35.2	35.2	180	141.70
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	7.6	18.8	14.1	16.72	4.14	3.7	3.7	18.8	10.84
8	Total Hardness	mg/l	200	600	8.8	44.1	39.2	55.72	23.88	7.9	7.9	55.72	29.93
9	Calcium as Ca	mg/l	75	200	BDL	7.85	9.81	11.60	3.19	BDL	3.19	11.6	8.11
10	Magnesium as Mg	mg/l	30	100	BDL	5.95	3.57	6.76	2.86	BDL	2.86	6.76	4.79
11	Iron as Fe	mg/l	0.3	No relaxation	0.3	0.20	0.15	0.12	0.13	0.05	0.05	0.3	0.16
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	12.9	12.8	9.5	19.20	20.5	11.29	9.5	20.5	14.37
13	Chloride as Cl	mg/l	250	1000	13.7	40.07	42	64.10	38.85	11.56	11.56	64.1	35.05
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.01	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	1.80	1.7	BDL	1.70	1.80	1.75
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**A- Agreeable; BDL- Below Detectable Limit; Nil- Zero**

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**Table-3: Pipe line corridor test well (PC-3) for the period of Apr 2020 to Sep 2020**

S.No	PARAMETERS	UNIT	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	1	1	1	3	1	1	<1	<1	<1
2	pH	-	6.5 - 8.5	No Relaxation	6.7	6.9	6.62	6.61	6.87	6.84	6.61	6.90	6.76
3	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
4	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
5	Turbidity	NTU	1	5	1.6	1.5	3.5	4.5	BDL	0.2	0.20	4.50	2.26
6	TDS	mg/l	500	2000	68	59	280	90	122	38.0	38.00	280.00	109.50
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	5.3	4.7	4.7	8.36	4.18	3.7	3.70	8.36	5.16
8	Total Hardness	mg/l	200	600	4.8	4.6	44.1	19.9	31.84	7.9	4.60	44.10	18.86
9	Calcium as Ca	mg/l	75	200	BDL	BDL	5.89	6.38	7.97	BDL	5.89	7.97	6.75
10	Magnesium as Mg	mg/l	30	100	BDL	BDL	7.14	BDL	2.97	BDL	2.97	7.14	5.06
11	Iron as Fe	mg/l	0.3	No relaxation	0.3	0.23	0.23	0.21	0.16	0.02	0.02	0.3	0.20
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	15.2	13.5	8.5	14.58	11.15	11.32	8.50	15.20	12.38
13	Chloride as Cl	mg/l	250	1000	12.4	8.5	74.13	29.1	40.79	11.50	8.50	74.13	29.40
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.01	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	5.8	5.6	BDL	5.60	5.80	5.70
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**A- Agreeable; BDL- Below Detectable Limit; Nil- Zero**

**Table-4: Pipe line corridor test well (PC-4) for the period of Apr 2020 to Sep 2020**

S.No	PARAMETERS	UNIT	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	3	3	2	4	1	1	1	5	2.17
2	pH	-	6.5 - 8.5	No Relaxation	7.5	7.6	7.3	7.42	7.39	6.90	6.56	7.94	7.37
3	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
4	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
5	Turbidity	NTU	1	5	2.1	2.9	2.4	4.2	1	0.30	2.00	4.00	3.17
6	TDS	mg/l	500	2000	122	143	138	410	460	37.00	120.00	808.00	493.34
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	20.1	22.8	24.5	121.22	115.9	3.71	8.44	115.92	61.92
8	Total Hardness	mg/l	200	600	31.2	35.6	31.5	171.14	157.1	7.96	34.50	179.52	105.20
9	Calcium as Ca	mg/l	75	200	7.2	9.1	8.7	55.83	52.2	BDL	6.48	53.17	30.18
10	Magnesium as Mg	mg/l	30	100	4.2	6.7	6.4	7.8	2.88	BDL	4.91	11.89	7.54
11	Iron as Fe	mg/l	0.3	No relaxation	BDL	BDL	BDL	0.24	0.19	0.09	0.23	0.26	0.30
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	51.3	60.1	54.6	68.2	48.5	13.46	30.03	69.13	51.28
13	Chloride as Cl	mg/l	250	1000	21.2	25.9	22.5	174.83	151.2	11.56	2.06	177.19	77.76
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	0.39	0.35	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	0.52	0.54	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.01	0.05	BDL	BDL	BDL	0.009	0.007	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> -N	mg/l	45	No relaxation	BDL	BDL	BDL	2.3	2.4	BDL	BDL	BDL	BDL
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	NIL	NIL

**A- Agreeable; BDL- Below Detectable Limit; Nil- Zero**



**Table-5: Pipe line corridor test well (PC-5) for the period of Apr 2019 to Sep 2020**

S.No	PARAMETERS	UNIT	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	3	4	1	3	1	1	1	4	2.17
2	pH	-	6.5 - 8.5	No Relaxation	6.6	6.55	6.6	6.66	6.86	7.20	6.55	7.20	6.75
3	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
4	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
5	Turbidity	NTU	1	5	4.9	0.4	0.4	4.8	BDL	0.80	0.40	4.90	2.26
6	TDS	mg/l	500	2000	497	170	160	150	123	110.00	110.00	497.00	201.67
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	32.8	18.8	14.1	91.96	4.14	48.30	4.14	91.96	35.02
8	Total Hardness	mg/l	200	600	193.5	39.2	44.1	103.48	23.88	47.76	23.88	193.50	75.32
9	Calcium as Ca	mg/l	75	200	46.4	7.85	7.85	38.2	7.97	17.54	7.85	46.40	20.97
10	Magnesium as Mg	mg/l	30	100	32.2	4.7	5.95	BDL	BDL	BDL	4.70	32.20	14.28
11	Iron as Fe	mg/l	0.3	No relaxation	0.3	0.18	0.14	0.24	0.21	0.18	0.14	0.3	0.21
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	15.5	12.6	8.6	4.02	3.72	9.12	3.72	15.50	8.93
13	Chloride as Cl	mg/l	250	1000	145.2	40	46	9.7	38.85	13.48	9.70	145.20	48.87
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	0.682	0.664	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.01	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> .N	mg/l	45	No relaxation	BDL	BDL	BDL	3.1	2.9	1.07	1.07	3.10	2.36
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**A- Agreeable; BDL- Below Detectable Limit; Nil- Zero**

**Table-6: Pipe line corridor test well (PC-6) for the period of Apr 2020 to Sep 2020**

S.No	PARAMETERS	UNIT	Acceptable Limits as per IS:10500:2012	Permissible Limits as per IS:10500:2012	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Min	Max	Average
1	Color	Hazen	5	15	4	3	2	2	1	BDL	1	4	2.40
2	pH	-	6.5 - 8.5	No Relaxation	6.7	7.2	7.5	7.2	7.3	6.85	6.70	7.50	7.13
3	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
4	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	A	A	A
5	Turbidity	NTU	1	5	4.9	4.8	3.5	3.8	1	0.80	0.80	4.90	3.13
6	TDS	mg/l	500	2000	494	468	448	380	360	140.00	140.00	494.00	381.67
7	Alkalinity as CaCO <sub>3</sub>	mg/l	200	600	32.3	29.4	27.5	25.4	23.5	52.60	23.50	52.60	31.78
8	Total Hardness	mg/l	200	600	174.6	156.2	152.4	130.8	124.6	51.70	51.70	174.60	131.72
9	Calcium as Ca	mg/l	75	200	27.4	23.7	21.5	20.2	18.4	19.50	18.40	27.40	21.78
10	Magnesium as Mg	mg/l	30	100	22.3	22.7	20.6	18.6	17.8	BDL	17.80	22.70	20.40
11	Iron as Fe	mg/l	0.3	No relaxation	0.27	0.22	0.24	0.21	0.19	0.24	0.19	0.27	0.23
12	Sulphate as SO <sub>4</sub>	mg/l	200	400	24.3	21.3	22.5	18.5	18.9	17.50	17.50	24.30	20.50
13	Chloride as Cl	mg/l	250	1000	164.3	152.6	148.2	138.5	126.43	15.30	15.30	164.30	124.22
14	Boron as B	mg/l	0.5	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Residual Free Chlorine	mg/l	0.2	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Fluoride as F	mg/l	1	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Phenolic Compounds	mg/l	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Manganese as Mn	mg/l	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Zinc as Zn	mg/l	5	15	BDL	BDL	BDL	0.47	0.49	BDL	BDL	BDL	BDL
20	Arsenic as As	mg/l	0.01	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Cyanide as CN	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Cadmium as Cd	mg/l	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Chromium as Cr	mg/l	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Aluminium	mg/l	0.03	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Selenium as Se	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Lead as Pb	mg/l	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Nitrate as NO <sub>3</sub> .N	mg/l	45	No relaxation	BDL	BDL	BDL	1.4	1.6	2.35	1.40	2.35	1.78
29	E.Coli	MPN/100 ml	Should Not be Detectable		NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

**A- Agreeable; BDL- Below Detectable Limit; Nil- Zero**