

REF: PLL/DHJ/HSE/MoEF/2020/03

Date: 08th Jan, 2020

To,

The Director (Environment)
Forests & Environment Department,
Government of Gujarat,
Block No. 14, 8th Floor, Sachivalaya,
Gandhinagar – 382 010
(Fax No.: 079-23252156)

Kind Attn.: Shri S M Saiyad

Sub : Half-yearly Compliance Report with respect to conditions stipulated by Ministry of Environment & Forests, Govt. of India and Department of Forests, Govt. of Gujarat for Setting up of Standby LNG jetty at Dahej, District Bharuch in Gulf of Khambhat, Gujarat as on 31st December, 2019

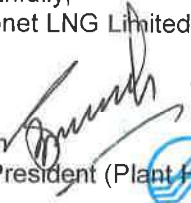

Ref : (a) J-17011/11/2000-IA-III dated 14th Nov, 2008
(b) ENV-10-2004-117-E dated 05th Sep, 2008

Dear Sir,

The half yearly compliance report as on 31st December, 2019 with respect to conditions stipulated by Ministry of Environment & Forests, Govt. of India and Department of Forests, Govt. of Gujarat for Setting up of Standby LNG jetty at Dahej, District Bharuch in Gulf of Khambhat, Gujarat by M/s Petronet LNG Ltd. is enclosed.

Thanking you,
Yours faithfully,
For Petronet LNG Limited

S B Singh
GGM & President (Plant Head)
Encl.: As above



S . B. Singh
Plant Head
Petronet LNG Limited
Dahej 392130

Copy to:-
Director,
Ministry of Environment & Forest,
Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi – 110 003

Joint Director (S)
Ministry of Environment & Forests,
Regional Office, Western Region,
Kendriya Paryavaran Bhawan, Link Road No. 3,
Bhopal – 462 016

Unit Head - Bharuch Division
Gujarat Pollution Control Board
Paryavaran Bhawan, Sector-10 A
GANDHINAGAR – 382 010 (Gujarat)

Regional Officer
Gujarat Pollution Control Board
C-1\119\3, GIDC, Phase – 2 , Narmadanagar
Bharuch – 392015 (Gujarat)

CC to: Director (Technical)
President (BD & Projects)

HALF YEARLY COMPLIANCE REPORT TO THE CONDITION MENTIONED IN MOE&F
LETTER NO. J-17011/11/2000-IA-III, DATED: 14th NOVEMBER, 2008 (STAND BY JETTY)

AS ON 31.12.2019

(A) Specific Conditions:

- i) Adequate safety measures for the offshore structure and ship navigation shall be taken in view of the high current in the area.

All safety measures taken during Design Stage.

- ii) The shore line changes in the area shall be monitored periodically.

Periodically monitoring is being done.

- iii) The recommendation of the Scour study shall be incorporated in the design.

Incorporated in Design.

- iv) The recommendations of the risk assessment shall be implemented. Any change in the design of the project shall come before the committee for seeking necessary approval.

Noted. Construction works completed without any change in the design of the Project.

- v) Mangrove plantation to be done in consultations with the GEER/GEC of Forest Department, a detailed plan shall be submitted within six months from the date of receipt of this letter.

Following Mangrove Plantation Completed along the Gujarat Coast in consultation with GEC & Forest Dept.:

**Completed : 1150 Hectares (2009-10, 2010-11, 2011-12, 2012-13,
2013-14, 2014-15 & 2016-17)**

- vi) It shall be ensured that during construction and post construction of the proposed jetty the movement fishermen vessels of the local communities are not interfered with.

Complied.

- vii) Relocation of the fishermen community shall be done strictly in accordance with the norms prescribed by the State Government. The relocated fishermen community shall be provided with all facilities including health care, education, sanitation and livelihood.

Noted.

- viii) Marine ecology monitoring shall be done regularly during construction of Breakwater and dredging operation.

Noted.

- ix) Regular monitoring of air quality shall be done in the settlement areas around the project site and appropriate safeguard measures shall be taken to ensure that the population is not subjected to higher levels of air pollution.

Construction activities completed and Jetty is Operational since April, 2014. Air quality monitoring is being done and its report is attached as Annexure-I to this report.

- x) Sewage arising in the port area shall be disposed off after adequate treatment to conform to the standards stipulated by Gujarat State Pollution Control Board and shall be utilized/re-cycled for gardening, plantation and irrigation.

Sewage treatment plant is installed in Port Area.

- xi) Adequate plantation shall be carried out along the roads of the Port premises and a green belt shall be developed.

Plantation is carried out along the roads of the Port premises and green belt development is in progress.

- xii) There shall be no withdrawal of ground water in CRZ area, for this project.

Noted & complied.

- xiii) Specific arrangements for rain water harvesting shall be made in the project design and the rain water so harvested shall be optimally utilized. Details in this regard shall be furnished to this Ministry's Regional Office at Bhopal within 3 months.

The LNG Jetty is being set up very near to the coast line at Dahej where water table is very high. Moreover the sea water is brackish in that area. Preliminary investigation indicates that it might not be feasible to carry out rain water harvesting in this area. The process water requirement in LNG terminal at Dahej is NIL.

- xiv) Land reclamation shall be carried out only to the extent that it is essential for this project.

Noted and complied.

- xv) No product other than those permissible in the Coastal Regulation Zone Notification, 1991 shall be stored in the Coastal Regulation Zone area.

Noted and complied.



B. General Conditions:

- (i) Construction of the proposed structures, if any in the Coastal Regulation Zone area shall be undertaken meticulously conforming to the existing Central/local rules and regulations including Coastal Regulation Zone Notification 1991 & its amendments. All the construction designs / drawings relating to the proposed construction activities must have approvals of the concerned State Government Departments / Agencies.

Complied.

The construction and commissioning of the facilities at Dahej completed and jetty is operational since April, 2014.

- (ii) Adequate provisions for infrastructure facilities such as water supply, fuel, sanitation etc. shall be ensured for construction workers during the construction phase of the project so as to avoid falling of trees/mangroves and pollution of water and the surroundings.

Complied as per statutory requirement.

- (iii) The project authorities must make necessary arrangements for disposal of solid wastes and for the treatment of effluents by providing a proper wastewater treatment plant outside the CRZ area. The quality of treated effluents, solid wastes and noise level etc. must conform to the standards laid down by the competent authorities including the Central/State Pollution Control Board and the Union Ministry of Environment and Forests under the Environment (Protection) Act, 1986, whichever are more stringent.

No effluent treatment plant in CRZ area. Noise level and Ground water monitoring is being done and its report is attached as Annexure-II to this report.

- (iv) The proponent shall obtain the requisite consents for discharge of effluents and emissions under the Water (Prevention and Control of Pollution) Act, 1974 and the Air (prevention and Control of Pollution) Act, 1981 from the Gujarat Pollution Control Board before commissioning of the project and a copy of each of these shall be sent to this Ministry.

Necessary approval has been taken for existing terminal. Copy was submitted vide our letter no. PLL/DHJ/MoEF/009 dated 21.01.2014.

- (v) The sand dunes, corals and mangroves, if any, on the site shall not be disturbed in any way.

Agreed.

- (vi) A copy of the clearance letter will be marked to the concerned Panchayat / local NGO, if any, from whom any suggestion/representation has been received while processing the proposal.

Noted.



- (vii) 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 other purpose. A year-wise expenditure on environmental safeguards shall be reported to this Ministry's Regional Office at Bhopal and the State Pollution Control Board.

Complied.

Rs 33.22 Lacs spent for development of green belt and mangrove plantation during the year 2009-2010.

Rs 50 Lacs spent for development of Green belt and Mangrove plantation during the year 2010-2011

Rs 93.31 Lacs spent for development of Green belt and Mangrove plantation during the year 2011-2012

Rs 109.57 Lacs spent for development of Green belt and Mangrove plantation during the year 2012-2013

Rs 95.20 Lacs spent for development of Green belt and Mangrove plantation during the year 2013-2014.

Rs 81.68 Lacs spent for development of Green belt and Mangrove plantation during the year 2014-15.

Rs 42.20 Lacs spent for development of Green belt and Mangrove plantation during the year 2015-16.

Rs. 77.96 Lacs spent for development of Green Belt and Mangrove Plantation during the year 2016-17.

Rs. 71.08 Lacs spent for development of Green Belt and Mangrove Plantation during the year 2017-18.

Rs. 60.93 Lacs spent for development of Green Belt and Mangrove Plantation during the year 2018-19.

Budgeted Rs. 57.70 Lacs for development & maintenance of Green Belt during the year 2019-20, of which Rs. 31.80 lakh spent till 31.12.2019.

- (viii) Full support shall be extended to the officers of this Ministry's Regional Office at Bhopal and the officers of the Central and State Pollution Control Boards by the project proponents during their inspection for monitoring purposes by furnishing full details and action plans including the action taken reports in respect of mitigate measures and other environmental protection activities.

Agreed.

- (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 ones for ensuring environmental protection.

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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.

- (xi) This Ministry or any other competent authority may stipulate any other additional conditions subsequently, if deemed necessary, for environmental protection, which shall be complied with.

Noted & Agreed.

- (xii) The project proponent shall advertise at least in two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned informing that the project has been accorded environmental clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen at Website of the Ministry of Environment & Forests at <http://www.envfor.nic.in>. The advertisement shall be made within 7 days from the date of issue of the clearance letter and a copy of the same shall be forwarded to the Regional Office of this Ministry at Bhopal.

Noted and Complied.

- (xiii) The Project proponents shall inform the Regional Office at Bhopal 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.

Complied. Project is completed. Jetty is under operation since April-2014.

- (xiv) Any appeal against this environmental clearance shall lie with the 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.

ANNEXURE - I

Compliance to conditions as conveyed by Department of Forests & Environment, Govt. of Gujarat, Letter No. ENV-10-2004-117-E, dated: September 5, 2008.

1. The provisions of CRZ notification of 1991 and subsequent amendments issued from time to time shall be strictly adhered to by PLL.

Noted.

2. All necessary permissions from different Government Departments / Agencies shall be obtained by PLL before commencing the expansion activities.

All approvals from different Government Departments were taken before commissioning.

3. No effluent or sewage shall be discharged into the sea / creek or in the CRZ area and shall be treated to confirm the norms prescribed by the Gujarat Pollution Control Board and would be reused / recycled within the plant premises.

Noted and complied.

4. All the recommendations and suggestion given by the NIOT and WAPCOS in their Environment Impact Assessment reports shall be implemented strictly.


Noted.

5. The cost of the external agency that may be appointed by this department for supervision / monitoring of the project activities during construction / operational phases shall be paid by PLL.

Noted and agreed.

6. The PLL shall have to contribute financially for any common study or project that may be proposed by this Department for environmental management / conservation / improvement for the Gulf of Khambhat or for Dahej region.

Agreed.



7. The construction debris and any other type of waste shall not be discharged into the sea / creek or in CRZ areas. The debris shall be removed from construction site immediately after construction is over.

Agreed.

8. The construction camps shall be located outside the CRZ area and the construction labor shall be provided with necessary amenities, including sanitation, water supply and fuel and it shall be ensured that the environmental conditions are not deteriorated by construction labor.

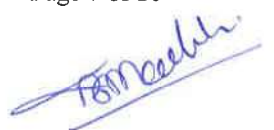
Noted & complied.

9. The PLL shall prepare and regularly update its local oil Spill Contingency plan and Disaster Management Plan in consonance with National Oil Spill and Disaster Contingency Plan

Complied for operation of Existing LNG Terminal facilities.

10. The Gujarat Maritime Board shall initiate for the Vessel Traffic Management System for the Gulf of Khambhat and would work out the modus operandi for cost sharing by different players in the Gulf including PLL. The PLL shall contribute for the same as may be decided by Gujarat Maritime Board.

Gujarat Maritime Board has established VTS System and PLL is complying all norms as per Gujarat Maritime Board.



General Conditions:

11. The ground water shall not be tapped to meet with the water requirements in any case.

Complied.

12. The PLL shall take up massive mangrove plantation activities in 100 ha. of area on Gujarat Coast line as well as greenbelt development activities in consultation with the Gujarat Institute of Desert Ecology / Forest department.

Following Mangrove Plantation Completed along the Gujarat Coast in consultation with GEC & Forest Dept.:

Completed : 1150 Hectares (2009-10, 2010-11, 2011-12, 2012-13, 2013-14, 2014-15 & 2016-17)

13. The PLL shall have to contribute financially for taking up the socio-economic upliftment activities in this region in consultation with the Forest and Environment Department and the District Collector / District Development Officer.

PLL is taking active part in consultation with District Collector in CSR projects. Some of the recent CSR project in which PLL participated are:

Primary health services to Luvara village, Gynec health and Pulse Polio campaign (Pakhajan PHC). PLL supported noble cause of Construction of Storm water drainage at Shravan Chokdi to Jambusar by pass (over bridge) in Bharuch. This project is executed under District Collector office.

Request from CDHO (Chief District Health Officer) was received to participate in various health initiatives. PLL agreed during meeting with DM to provide the ambulance for PHC, Pakhajan Village of Vagra Taluka. PLL is supporting Luvara School for reference books, uniform, school picnic and creating awareness on environment, health, safety and security aspects through various programs regularly, rewarding bright students etc. PLL celebrated Shala Pravesh Utsav at Luvara School and distributed tool box to children.

Bharuch has problem of solid waste management and garbage disposal. To improve on cleanliness of the town, PLL is supporting initiative of GREEN BHARUCH CLEAN BHARUCH by donating two dumper placer worth Rs. 23.94 Lakh.

Due to delay in recruitment of teachers, primary schools in and around Dahej has 40% teaching staff. To support education by deploying young educated teachers, PLL sponsored 14 teachers in 4 schools of villages of Dahej, Lakhigam and Luvara.

PLL constructed 11 houses of homeless tribes in Luvara village at a cost of 25 Lakh. PLL initiated drive to make Luvara open defecation free by sponsoring toilets for 172 houses at a cost of Rs. 17.2 Lakh.

As a part of initiative for Swachh Bharat Abhiyan, PLL constructed five toilet blocks for school at Lakhigam, Luvara, Ambetha, Jageshwar & Dahej. Also, PLL has constructed 91 Toilet blocks at an estimated expenditure of Rs. 172 Lakhs for various schools in fifteen district of Assam in co-ordination with Rashtriya Madhiyamik Siksha Abhiyan (RMSA).

Cancer screening done (Pep and Breast) for female above 18 years at Luvara village. Establishment of equipment for Ultra Sonography Ward done at General/Civil Hospital, Bharuch. Motivational Awards (Academics and punctuality), School kit and reference books given for Luvara School students. Nutrition and clothing kit (105 nos.) was given to under nourished baby and mother.

PLL has sponsored Drawing competition, Educational tour and uniform distribution at Primary School Luvara. PLL sponsored Medical Equipment such as Eye sight testing, ECG Machine, Spirometer, Pulse Oxymeter etc. to Luvara Primary Health Centre. PLL also celebrated Swachh Bharat Pakhwada during 16th June, 2016 to 30th June, 2016 in co-ordination and consultation with neighboring villages, communities, schools etc.

The launch of Project Vidhyagam was organized in Luvara Primary School wherein a classroom library for std. 7 & 8 students is setup. About 130 books (syllabus and general reading including comics, biographies, story books, general knowledge, science fiction in Gujarati, Hindi and English language) has been kept in the library. The idea behind this project is that students develop interest in reading and thus studying. The PLL Disha Ladies Club organized for food and distribution of educational kits for 65 girls in the Orphanage in Bharuch on 11th Sept 2016. A focused group discussion on importance of hygiene and cleanliness was organized by Ladies club members as well.

Roofing item worth Rs. 2 Lacs was provided to the Gram Panchayat Office of Luvara Village for construction of house for 10 tribal families living below the poverty line. This material consisted of cement roof, channel, and hooks. It is expected that the construction of houses will be done by mid-January 2017.

Petronet LNG Limited celebrated the World Sight Day on 13th October 2016 by organizing the Eye Screening Camp for contractual labor at the company premises. The camp was organized in association with Wockhardt Foundation and about 200 labor and 60 employees participated in the same. During the camp; 125 specs and 60 unit of drops were distributed to beneficiaries based on assessment by Doctors.

On the occasion of 147th birth anniversary of Father of Nation Shri Mahatma Gandhi Health and Hygiene talk, Swachhta Selfie Campaign, Drawing Competition at Govt. High School, Lakhigam and other activities were organized as part of Swachh Bharat Abhiyaan.

It is observed that there is a shortage of regular teachers in local schools and severely hampering the quality of education of poor children in schools. To mitigate this problem, PLL has started supporting para teachers in local school and ensuring improvement in quality of education in local schools.

PLL CSR team participated in world school day celebration on 23 March, 2017. As a part of celebration PLL has distributed Uniforms to Std. 8th Students. It was decided to provide two pair of uniforms to all students in school. The uniforms were prepared by Sardar Mahila Vikas Mandal a group of tribal women for employment generation and livelihood opportunity. PLL provided work order worth of Rs. 2,23,980/-

As the students studying in primary schools are coming from BPL and poor families, most of the families are not able to afford educational tours for their children. Every year school is organizing such tour sponsored by PLL. Students will get exposures to various places and gain experience. About 150 students get benefit of this tour and places covered like

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Dwarka, Somnath, Porbandar, Smruti Mandir, Naheru Planetorium, Sasan Gir etc.

PLL had sponsored community mass marriage of weaker community, participated in Shala Pravesh Utsav 2017, planted 150 of trees in nearby villages, distributed food packages during water logging observed at nearby villages, supported empowerment of Special children, engaged contractor for repair and maintenance of Toilets in nearby School, arranged sessions for awareness on solid waste management at school.

PLL supported 10th Special Olympics, Bharuch in January, 2018, sponsored project "Kaushal Setu" Skill Development Program with CIPET, Ahmedabad and trained 100 underprivileged youth, supported educational tour for Primary School of Luvara Village, provided para-teachers at school of nearby villages, sponsored community mass marriage of weaker community, supported "Startup Village" project towards Rural Youth Entrepreneurship Development Program, Supporting Swachh Bharat Abhiyan by District Administration Bharuch (Heritage Walk).

PLL signed MoA with Samagra Shiksha Abhiyan, Department of Education, Govt. of Gujarat on 23rd Jan. 2019 at Govt. Primary School, Luvara village for the Development of Primary School at Luvara Village. PLL supported District Level Special Olympics Games which was organized on 23rd February 2019. Around 250 special children, 150 volunteers including PLL volunteers and coaches participated during the event.

(July, 2019 to Dec. 2019)

PLL has signed MoU with ALIMCO to provide Aids and Equipment to disables of Bharuch District. PLL has signed MoU with Wockhardt Foundation to run Mobile Medical Unit (MMU) in nearby villages of PLL plant area. PLL has signed MoU with NHFDC to provide skill training to disable youth of Bharuch District. PLL has supported relief camp for affected community near Lakhigam during monsoon season.

14. Environmental Audit report indicating the changes, if any with respect to the baseline quality, in the coastal and marine environmental shall be submitted every year.

Noted.

15. A six monthly report on compliance of the conditions mentioned in this letter shall have to be furnished by the PLL on regular basis to this Department.

Noted and complied

16. Any other condition that may be stipulated by this Department from time to time for environmental protection / management purpose shall also have to be complied with by the PLL.

Noted.



ANNEXURE - II - ENVIRONMENT DATA

AMBIENT AIR QUALITY STATUS REPORT

All units are in $\mu\text{g}/\text{m}^3$.

Sr.no.	Month	PM10		PM2.5		SOx		NOx		HC as Methane CH ₄	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
	NAAQ norms	100 $\mu\text{g}/\text{m}^3$		60 $\mu\text{g}/\text{m}^3$		80 $\mu\text{g}/\text{m}^3$		80 $\mu\text{g}/\text{m}^3$		Absent	
1	Jan-19	61.00	77.00	16.00	26.00	11.10	22.40	12.80	28.30	BDL	BDL
2	Feb-19	62.00	86.00	16.00	28.00	12.40	21.50	16.80	40.80	BDL	BDL
3	Mar-19	66.00	88.00	18.00	26.00	11.60	22.60	16.30	26.40	BDL	BDL
4	Apr-19	66.00	88.00	18.00	24.00	14.60	22.30	18.60	26.40	BDL	BDL
5	May-19	66.00	92.00	18.00	28.00	14.50	20.60	14.70	25.10	BDL	BDL
6	Jun-19	62.00	90.00	17.00	26.00	13.40	20.80	17.80	27.90	BDL	BDL
7	Jul-19	61.00	88.00	14.00	26.00	11.80	21.80	14.10	24.60	BDL	BDL
8	Aug-19	62.00	86.00	14.00	26.00	11.30	18.60	12.40	22.40	BDL	BDL
9	Sep-19	56.00	76.00	14.00	26.00	10.30	18.40	12.10	21.40	BDL	BDL
10	Oct-19	66.00	82.00	18.00	25.00	14.50	22.40	17.30	26.60	BDL	BDL
11	Nov-19	64.00	88.00	18.00	28.00	11.40	21.30	14.30	22.60	BDL	BDL
12	Dec-19	64.00	88.00	18.00	33.00	13.20	19.40	14.30	21.60	BDL	BDL
	Range (Jan-19 to Dec-19)	56-92		14-33		10.3-22.6		12.1-40.8		BDL	

Signature

STACK EMISSION AIR QUALITY STATUS REPORT

Sr.no.	Month	GTG			DG SET		
		SPM	SO _x	NO _x	SPM	SO _x	NO _x
	GPCB norms	150 mg/NM ³	100 ppm	50 ppm	150 mg/NM ³	100 ppm	50 ppm
1	Jan-19	BDL	BDL	24.00	84.00	41.00	46.00
2	Feb-19	BDL	BDL	20.30	82.00	43.00	47.00
3	Mar-19	BDL	BDL	21.10	84.00	46.00	44.00
4	Apr-19	BDL	BDL	15.60	86.00	44.00	46.00
5	May-19	BDL	BDL	13.60	86.00	44.00	42.00
6	Jun-19	BDL	BDL	14.30	88.00	42.00	44.00
7	Jul-19	BDL	BDL	12.70	91.00	36.00	46.00
8	Aug-19	BDL	BDL	16.10	81.00	38.00	44.00
9	Sep-19	BDL	BDL	18.20	74.00	36.00	41.00
10	Oct-19	BDL	BDL	18.30	76.00	38.00	42.00
11	Nov-19	BDL	BDL	14.20	82.00	44.00	42.00
12	Dec-19	BDL	BDL	12.30	88.00	36.00	46.00
	Range (Jan-19 to Dec-19)	BDL	BDL	12.3-24	74-91	36-46	41-47

BDL: Below Detection Level.

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NOISE LEVEL REPORT

Sr.no.	Location	Unit	Limit	Jan-19		Feb-19		Mar-19		Apr-19		May-19		Jun-19		Jul-19		Aug-19		Sep-19		Oct-19		Nov-19		Dec-19	
				L _{day}	L _{night}	L _{day}	L _{night}	L _{day}	L _{night}	L _{day}	L _{night}	L _{day}	L _{night}	L _{day}	L _{night}	L _{day}	L _{night}	L _{day}	L _{night}	L _{day}	L _{night}	L _{day}	L _{night}	L _{day}	L _{night}	L _{day}	L _{night}
1	North	decibel	Day-75 db Night-70db	68	51	70	53	72	51	70	52	68	50	66	49	68	44	64	46	62	41	68	48	64	42	66	48
2	East	decibel	Day-75 db Night-70db	66	46	66	49	64	48	66	49	71	48	69	52	71	42	66	47	54	44	62	42	67	41	62	46
3	West	decibel	Day-75 db Night-70db	62	52	63	52	71	44	68	46	72	51	68	50	64	46	62	52	58	42	65	46	66	44	58	41
4	South	decibel	Day-75 db Night-70db	56	48	60	50	68	46	72	48	70	49	70	52	66	51	66	48	64	46	71	43	62	48	66	52

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GROUND WATER QUALITY STATUS REPORT

Sr.no.	Parameter	Unit	Feb-19		May-19		Aug-19		Nov-19	
			GW1	GW2	GW1	GW2	GW1	GW2	GW1	GW2
1	Temperature	*C	31	31	33	33	29	29	32	32
2	PH	-	8.65	8.53	8.61	8.69	8.46	7.97	8.44	8.04
3	Total Dissolved Solids (TDS)	mg/L	2640	4480	3105	3805	2820	2095	2035	2200
4	Chlorides as CL	mg/L	837.1	1480.3	1027.3	1255.6	738.2	641	779.7	539.8
5	Sulphate as SO4	mg/L	143	893	299.4	708	69.7	129.7	170.5	312
6	BOD (5 days @ 20°C)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	COD	mg/L	4.1	6.1	BDL	8.2	BDL	BDL	BDL	BDL
8	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	Phenolic Compound	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	Zinc as Zn	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Total Chromium as Cr+3	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Lead as Pb	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Cyanide as CN	mg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
14	Flouride as F	mg/L	1.15	BDL	2.22	1.32	1.05	0.8	1.39	0.99
15	Copper as Cu	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Insecticide	mg/L	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
17	Pesticide	mg/L	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
18	Mercury as Hg	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
ND*: Not detected										

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MARINE WATER QUALITY STATUS REPORT

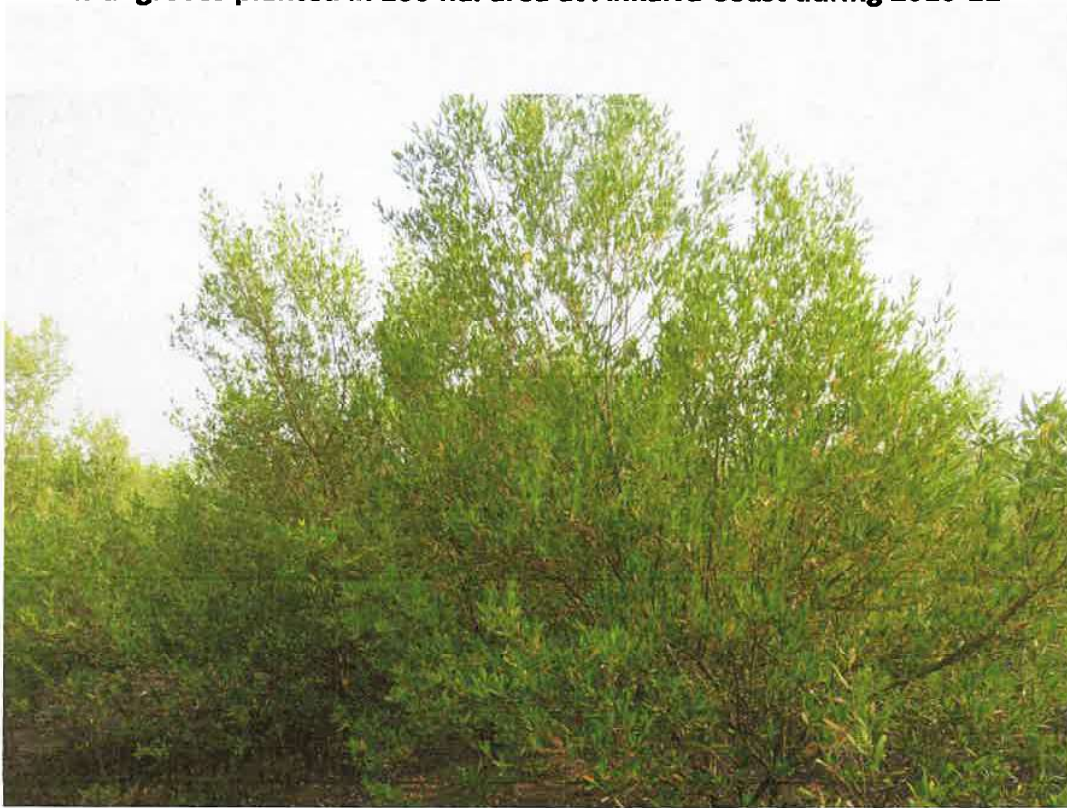
Sr.no.	Parameter	Unit	Feb-19		May-19		Aug-19		Nov-19	
			MW		MW		MW		MW	
1	Temperature	*C	32		33		29		32	
2	PH	-	7.92		8.04		8.01		7.42	
3	Color	Co-pt	20		20		20		20	
4	Total Suspended Solids	mg/L	855		890		710		620	
5	Total Dissolved Solids (TDS)	mg/L	34085		41850		20500		18540	
6	Chlorides as CL	mg/L	16845.8		24318		10198.9		11996.2	
7	Sulphate as SO4	mg/L	2384		3639		218.2		1669.5	
8	BOD (5 days @ 20°C)	mg/L	46		BDL		8		12	
9	COD	mg/L	145.4		BDL		33		41.1	
10	Oil & Grease	mg/L	BDL		BDL		BDL		BDL	
11	Phenolic Compound	mg/L	BDL		BDL		BDL		BDL	
12	Zinc as Zn	mg/L	0.082		0.096		0.074		0.063	
13	Total Chromium as Cr+3	mg/L	0.067		0.075		0.052		0.059	
14	Lead as Pb	mg/L	BDL		BDL		BDL		BDL	
15	Cyanide as CN	mg/L	BDL		BDL		BDL		BDL	
16	Flouride as F	mg/L	0.75		0.42		1.23		0.94	
17	Copper as Cu	mg/L	0.065		0.056		BDL		BDL	
18	Insecticide	mg/L	N.D.		N.D.		N.D.		N.D.	
19	Pesticide	mg/L	Absent		Absent		Absent		Absent	
20	Mercury as Hg	mg/L	N.D.		BDL		BDL		N.D.	
21	Hexavalent Chromium as Cr+6	mg/L	N.D.		BDL		BDL		N.D.	
22	Nickel as Ni	mg/L	0.142		0.125		0.108		0.091	
ND*: Not detected										

T. S. Manicku

Mangroves planted in 50 ha. area at NADA Coast during 2009-10



Mangroves planted in 100 ha. area at Ankalva Coast during 2010-11



Mangroves planted in 200 ha. area at Ankalva Coast during 2011-12



Mangroves planted in 200 ha. area at Ankalva Coast during 2012-13



Mangroves planted in 100 ha. area at Bhavnagar Coast during 2012-13



Mangroves planted in 200 ha. area at Bhavnagar Coast during 2013-14



Mangroves planted in 200 ha. area at Bhavnagar Coast during 2014-15



Mangroves planted in 50 ha. area at at Kentiyajal Coast during 2014-15



Mangroves planted in 50 ha. area at Gadhula, Talaja Coast during 2016-17

