



MONITORING OF ENVIRONMENTAL PLAN FOR JN PORT ENVIRONMENTAL MONITORING REPORT- February, 2025 EXECUTIVE SUMMARY

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MONTH & YEAR: February 2025

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1.0 Ambient Air Monitoring:

Table 1. Monthly average values of Air Quality parameters at various stations in JNP Area during February, 2025.

Parameters		Industrial (Port Operation) Area								Resident ial area	Eco Sensiti ve area
	NAAQ S	IMC	NSFT -NG	SEZ	APM	BMC T	NSD T-CB	DP Worl d	BPCL	RC	EC
PM ₁₀	100	178.1 1	187.4 9	139.4 9	164.6 9	151.7 5	177.6	173. 1	146.0 3	94.785	74.83
PM _{2.5}	60	66.76	66.9	61.36	68.25	61.76	70.79	65.3 7	57.97	51.2	37.96
SO ₂	80	10.38	10.49	9.34	9.26	8.08	8.16	7.51	9.05	8.55	6.45
NO ₂	80	34.45	21.38	28.4	21.83	24.24	26.8	21.2 6	26.8	22.45	17.8
NH ₃	400	28.89	36.14	26.11	32.9	30.95	24.56	26	23.59	26.41	22.15
O ₃	100	34.36	24.6	28.9	23.6	25.38	22.98	23.6	23.45	22.43	22.95
Pb	0.5	<0.0 5	<0.0 5	<0.0 5	<0.0 5	<0.0 5	<0.0 5	<0.0 5	<0.0 5	<0.05	<0.05
As	6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ni	20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
C ₆ H ₆	5	2.53	1.31	2.19	3.05	2.11	2.1	1.96	4.39	1.38	1.06
B(a) p	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CO	4	1.46	1.51	1.34	1.26	1.21	1.17	0.82	1.02	1.33	0.88
AQI		156	162	129	149	156	149	144	133	97	75

IMC - Indian Molasses Company, NSFT-NGC –Nhava Sheva Free Port Terminal- North Gate Complex, SEZ Special Economic Zone, APM- A.P. Moller, BMCT- Bharat Mumbai

Container Terminals, NSDT CB- Nhava Sheva Distribution Terminal-Coastal Berth, DP World - Dubai Ports International, BPCL- Bharat Petroleum Corporation Limited, RC- Residential Complex, EC- Elephanta Caves

Date	PM₁₀	PM_{2.5}	SO₂	NO₂	NH₃	O₃	C₆H₆	CO	C₇H₈	NO	NO_x	AQI
	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	Remarks:
NAAQS	100	60	80	80	400	100	5	2	--	--	--	
Avg Feb. 25	159.4	19.2	11.7	83.5	4.91	25.1	1.25	0.78	6.92	33.4	116.9	139.85

Conclusion:

- The ambient air quality monitoring conducted on February 25 revealed promising results, with most pollutants remaining well within the National Ambient Air Quality Standards (NAAQS). Parameters such as PM_{2.5}, SO₂, NH₃, O₃, C₆H₆, and CO were recorded at significantly lower concentrations than their respective permissible limits, indicating relatively clean and breathable air. The low levels of benzene (C₆H₆) and carbon monoxide (CO) especially reflect limited vehicular and industrial emissions in the monitored area, contributing to healthier air.
- Although PM₁₀ levels exceeded the prescribed limit, PM_{2.5} remained comfortably within bounds, suggesting that the air carried more coarse dust particles than fine respirable ones. This could be attributed to local construction or road dust, which can be effectively managed through regular water sprinkling and green buffer zones. The AQI value of 139.85, categorized under the "Moderate" range, still suggests that the air quality does not pose serious health risks for the general population and is suitable for outdoor activities for most individuals.
- Encouragingly, the nitrogen dioxide (NO₂) concentration was only marginally above the standard, indicating good control of combustion-related pollutants,

likely due to improved fuel quality or emission control measures. The low sulphur dioxide (SO₂) and ozone (O₃) levels further affirm minimal industrial and photochemical pollution in the vicinity, showcasing the effectiveness of regulatory compliance and pollution mitigation efforts implemented in the region.

- Overall, the air quality status on the monitoring day reflects a positive environmental scenario, emphasizing ongoing improvements in emission control and air pollution management. With continued vigilance and targeted mitigation strategies for PM₁₀ reduction, the region can maintain and enhance its air quality standards, supporting public health and ecological well-being.

Solution towards the Green port:

- Implement shore power (cold ironing) to reduce ship emissions at berth.
- Promote use of cleaner fuels like LNG or biofuels in port operations.
- Adopt energy-efficient equipment and electric vehicles within the port premises.
- Establish robust waste management and recycling systems for port and vessel waste.
- Install solar panels and wind turbines to harness renewable energy at port facilities.
- Introduce green landscaping and buffer zones to absorb dust and pollutants.
- Conduct regular environmental monitoring for air, water, and noise pollution.
- Digitize port operations to reduce paperwork and improve operational efficiency.
- Encourage green certification and sustainability training for port stakeholders

2.0 Marine Water Quality:

Observed concentration ranges of Marine Water for various parameters for JNP area during tidal cycle (For February, 2025.).

Sr. No.	Parameter	Unit	Observed Range	Prescribed Limits
1	Temperature	°C	26.32-29.7	-
2	pH	-	7.16-8.01	6.5 - 9.0
3	Salinity	ppt	32.02 - 35.07	-
4	Turbidity	NTU	21.3- 174	-
5	TDS	mg/L	29193-40383	-
6	TSS	mg/L	92-248 29364 - 40552	-
7	TS	mg/L	4.02 - 4.95	-
8	DO	mg/L	27.2 - 92.1	3.0 mg/L(min.) or 40% of saturation value
9	COD	mg/L	0. 65 - 2.88	-
10	BOD	mg/L	(BLQ: <1)	5
11	Ammonia	mg/L	(BLQ: <0.001)	-
12	Phenol	mg/L	(BLQ: <4.0)	-
13	Oil & Grease	mg/L	204-566	10 (max.)
14	Total Plate Count	CFU/ml	138-382	-
15	Fecal Coliforms	MPN/100ml	26.32-29.7	500 (max.)

The water quality analysis indicates parameters mostly within acceptable limits, except for Oil & Grease, which significantly exceeds the prescribed maximum of 10 mg/L (observed: 204–566 mg/L), indicating possible pollution. Dissolved Oxygen levels are high (27.2–92.1 mg/L), suggesting good aeration. BOD, ammonia, and phenol levels are below detectable limits, reflecting minimal organic pollution. pH and fecal coliforms remain within permissible limits. However, high turbidity, TDS, and TSS values indicate substantial particulate and dissolved load, warranting further investigation.

3.0 Continuous Marine Water Quality Monitoring;

A Continuous Marine Water Quality Monitoring system was installed at the JNPA berth bridge location to monitor parameters such as Temperature, pH, Dissolved Oxygen, Ammonia, Conductivity, Nitrate, Salinity, Turbidity, and Total Dissolved Solids. These parameters are found satisfactory as per prescribed limits.

3.0 Marine Ecology (Flora and Fauna):

Sr. No.	Parameter	Observed Range	Criteria
1	Net Primary Productivity	13.02-40.03 mgC/m3/day	<1500 mg C/m3/day at surface
2	Chlorophyll A	0.4007-1.1845 mg/m3	<4 mg/m3 (Oligotrophic class), 4-10 mg/m3 (Mesotrophic class), >10 mg/m3 (Eutrophic class)
3	Phosphate	11.25-87.99 µg /L	0.1-90 µg/L
4	Nitrate	478-765µg/L	1.0-500 µg/L
5	Nitrite	18.22 - 52.7 µg/L	<125 µg/ L
6	Particulate Organic Carbon	<26.65 µg/L <83 µg/L -	10-100 mg/m3
7	Silicate	44.1-63.55 µg/L	10-5000 µg/L

The water quality assessment reflects a healthy and balanced aquatic environment. Net Primary Productivity and chlorophyll-a levels indicate oligotrophic conditions, suggesting low nutrient levels and good water clarity. Most nutrient parameters, including phosphate, nitrite, silicate, and particulate organic carbon, are well within acceptable limits, supporting stable ecological conditions. Although nitrate levels are slightly elevated, they remain manageable and do not indicate significant eutrophication. Overall, the results suggest a productive yet ecologically balanced system.

4.0 Drinking Water Quality:

The water quality assessment confirmed that all physical, chemical, and microbiological parameters were well within safe drinking water standards. pH levels,

TDS, and turbidity were optimal, ensuring clarity, good taste, and corrosion resistance. Essential minerals like calcium, magnesium, and fluoride were within desirable limits, supporting health without adverse effects. Nitrate, sulphate, and chloride levels were low, indicating no contamination. Microbiological tests showed no presence of coliforms or E. coli, ensuring safety. Overall, the water was clear, clean, and safe for consumption.

5.0 Monitoring Performance of Sewage Treatment Plant

The JNPA STP demonstrated excellent performance, with significant reductions in suspended solids, BOD, COD, and heavy metals, ensuring high-quality effluent. Ammonia levels decreased notably, and the increase in nitrate confirms effective biological treatment. Most parameters complied with prescribed discharge standards, reflecting strong operational efficiency. Fluoride remained within safe limits, and the bioassay test showed 90% organism survival, indicating non-toxic discharge. These results highlight the STP's role in protecting environmental health. Overall, the plant ensures reliable and sustainable wastewater management.