



केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE GOVT. OF INDIA

Speed Post

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December 22, 2017

To,

Dr Suresh Kumar, IAS
District Collector,
Collector's Office,
Nagapattinam - 611003

Sub: Status and action taken report on pollution caused by the operation of M/s Karaikkal Port Private Ltd., Karaikkal, Puducherry - reg

Ref.: Your letter No. DEE/TNPCB/NPM/F. Karaikkal Port/Comp1/2017-7, dated 29/06.2017

Sir,

In reference to above, it is to inform that a joint team of officials from CPCB, Regional Directorate, Bangalore along with officials from and Puducherry Pollution Control Committee (PPCC) and Tamil Nadu Pollution Control Board (TNPCB) had carried out investigation and monitoring in & around the premises of Karaikkal Port during 15-18 July, 2017. In this regard, please find enclosed status and action taken report on pollution caused by the operation of M/s Karaikkal Port Private Ltd., Karaikkal, Puducherry for kind reference.

Yours faithfully,

(B. Vinod Babu)

Addl. Director & Nodal Officer
Waste Management Division

Encl.: As above

Copy to:

- | | |
|---|--|
| 1. The Member Secretary
Puducherry Pollution Control Committee
IIIrd floor, Housing Board Complex,
Anna Nagar, Puducherry - 600 005 | : With a request to take necessary follow-up action against with M/s KPPL, Port Authority and Railway Department, please |
| 2. The Regional Director
Central Pollution Control Board,
1st& 2nd, Nisarga Bhavan, A-Block,
Thimmaiah Road, 7th D Cross,
Shivanagar, Opp. Pushpanjali Theatre,
Bangalore -560 010 | : For kind information, please |


(B. Vinod Babu)

Central Pollution Control Board
Waste Management Division

**Status and action taken report on Air Pollution caused by the operation of M/s
Karaikal Port Private Ltd., Karaikal, Puducherry**

Background

With reference to letter no. DEE/TNPCB/NPM/F. Karaikkal Port/Comp1/2017-7 dated 29/06/2017 about receiving of various complaints from Public of nearby villages and towns especially from Nagore town (which is located in Nagapattinam district of Tamil Nadu and located near the Port) and Keelavanjore, Pondicherry that they are being severely affected and environmental damages in Nagore area due to the fine coal dust emanating from the M/s Karaikkal Port Pvt. Ltd (KPPL) Nagapattinam District, Tamil Nadu.

In this regard, a joint team of officials from CPCB Regional Directorate, Bangalore and Puducherry Pollution Control Committee (PPCC) in co-ordination with the official(s) from Tamil Nadu Pollution Control Board (TNPCB), Nagapattinam, Tamil Nadu were investigated and monitored in & around the premises of M/s Karaikkal Port during 15-18th July, 2017 by the officials.

During investigation interacted with the Complainants

Officials of CPCB and PPCC also interacted with the following complainants at their respective places on 15/07/2017.

- Mr. Sahul Amid, Mr. Umar Sharif, Mr. Shahul Hamed along with other public belonging to the Nagore area, Nagapattinam, Tamil Nadu.
- Mr. R. K. Baskaran, Panchayat Leader, Mr. R. Murugesan, Treasurer, Mr. K. Sasikumar, Secretary of the Keelavanjore village, Puducherry.

Both the complainants from Nagore area of Tamil Nadu and Keelavanjore of Puducherry have informed that there are no such dust/coal pollution deposits now a day since the prevailing wind direction is towards land to sea i.e. Southwest to Northeast. The complainants of Nagore area, Tamil Nadu informed that the coal deposit on the railway track between Karaikkal Port to Nagore Railway station (as given at Picture-1) and claimed that similar deposit forms when the wind direction follows towards Northeast to Southwest from sea to land particularly during the months of November to February.



Picture-1

The complainants and the public of Keelavanjore village, Pondicherry also claimed that trees and soil are damaged due to the spread of coal carried through wind from Karaikal Port.

During the field survey by the officials of CPCB & PPCC along with the complainants/public, the coal deposit on the railway track from Karaikkal Port to Nagore Railway station was observed. It is reported that these coal deposits are the leaks from the bottom opening of wagons while moving on the track if the doors are not properly closed. The deposit of a coal on the railway track appears to be an accumulated from many days/ even months added with the present leakages. It seems such leaks are not regularly taking place. No leakages have found during the investigation/monitoring period. However, nowhere on the open land/buildings of the Nagore in Tamil Nadu coal deposit was seen. The extent of damage of trees at Keelavanjore village, Pondicherry indicates that those trees are damaged from many years back.

In this regard, the Port Authority has also informed that continual persuasion is made with Railway Department to avoid such spillages on the track and ensuring proper closing of the bottom opening doors of the wagons.

However, the people of the Keelavanjore village, Puducherry expressed that coal deposits could be seen on the floors & buildings when the wind direction is towards Northeast to Southwest from sea to land which falls during November to February period. They have also expressed that many of the people in the village are suffering from breathing difficulties caused by the spread over of the fine coal powder in the vicinity.

Field Survey & Identification of Suitable Monitoring Locations

Joint field survey carried out by the officials of CPCB & PPCC along with the complainants/public of Nagore, Tamil Nadu, Keelavanjore, Puducherry and identified two suitable monitoring locations in Nagore & two locations in Keelavanjore village on 15/07/2017. Joint field survey again carried out along with the official of TNPCB on 17/07/2017 to understand the suitability of the 5 locations monitored by the officials of TNPCB on 08/02/2017 and to show the present monitoring locations selected by CPCB & PPCC in Nagore area. Table-1 and Figure-1, below depicts the name of the ambient air quality monitoring (AAQM) locations and its geographical details.

Table-1: Name of the locations for ambient air quality monitoring (AAQM) carried out during 16 - 18th July, 2017:

S. No.	Locations of AAQM	Geographical Position	Aerial Distance from Main gate of KPPL
1.	Mr. Shahul Amid S/o Kunju Mohamed, House No.29, Therupalli Theru, Near IOB Bank, Nagoor, Nagapatinam Tamil Nadu -611 002	Lat:10°49'14" Lng:79°50'31"	1-1.5 km
2.	Mr. Shahul Hahamed, S/o Syed Ahamed, No.5, Panam Kolli, Yusufia Nagar, Nagoor, Tamil Nadu -611 002	Lat:10°49'4" Lng:79°50'41"	1.5-2.0 km
3.	Mr. Tamilaran, House No.15, Nadu Theru, Keelavanjore, Karaikal, Puducherry -611 002	Lat:10°50'17" Lng:79°50'23"	0.5-0.75 km
4.	Mr. Nadarajan S/o Veeraputran No.5, Pallivasal Theru, Keelavanjore, Karaikal, Puducherry -611 002	Lat:10°50'6" Lng:79°50'21"	0.5-0.75 km
5.	Near Admin Building, Karaikal Port Premises, Karaikal, Puducherry	Lat:10°49'50" Lng:79°50'21"	~200 m
6.	Near Iron Ore storage plot Near Northern Break waters Karaikal Port Premises , Karaikal, Puducherry	Lat:10°50'66" Lng:79°50'92"	1.5-2.0 km



Figure-1: Locations of aforesaid AAQM carried out during 16 – 18th July, 2017

Setup of Manual Monitoring Stations

In co-ordination with the officials of PPCC, AAQM stations were installed at six locations covering two locations in Nagore area of Tamil Nadu, two locations in Keelavanjore village of Puducherry and two locations in the up & down wind directions of the Karaikkal Port premises.

Inspection in Karaikkal Port Private Limited (KPPL)

Karaikkal Port Private Limited (KPPL) located at Keelavanjore village, T. R. Patinam, Karaikkal was developed by the Chennai based M/s MARG Limited and became operational in April, 2009. The port has an area of about 600 acres and is situated on the Eastern coast in Karaikkal with the latitude of 10° 54' 49.9932" N and Longitude of 79° 50' 41.4816" E. The port obtained rail connectivity in January, 2010 and its railway sidings are connected to Trichy via Nagore. The

details of statutory clearance obtained from various ministries /departments are given below Table-2.

Table-2: Details of statutory clearance obtained from various ministries /departments

S. No.	Clearances	Authority	Ref Nos	Date of Issue	Validity
1	Environment Clearance	MoEF	MoEF No. 10-42/2009 IA-III	22.09.2009 & 03.02.2015	21.09.017
2	Environment Clearance	MoEF	MoEF No.F.No.11-35/2010- IA.III	25.10.2010	
3	NOC Pollution Angle	PPCC	No.PPCC/NOC/K KL/JE/2006/303	09.02.2006	One time
5	Hazardous Waste Authorization	PPCC	PPCC.No.7162/P PCC/HWM/JSA/2015/1265	07.12.2015	07.12.2020
6	NOC Pollution Angle (General Cargo)	PPCC	No.PPCC/NOC/A DD-PRO/ TRP/ KKL/JE/1106	23.11.2016	One time
7	NOC Pollution Angle (Coal enhancement)	PPCC	No.PPCC/MIN/NO C/ENH/TRP/KKL /JE/2016/1201	13.12.2016	One Time
8	NOC from (State Ground Water Unit) Puducherry	SGWU	No.854/HG-II/SGWU&SC/20 16-17/1111	20.12.2016	One time
9	Consent for Air, Water to operate	PPCC	No.PPCC/CON/AI R/TRP/KKL/JE/2015/1476; No.PPCC/CON/ WTR/TRP/KKL/J E/2016/1477	01.02.2016	Expired on 30.09.2016 and operating on NOC

Activities in the Karaikal Port Private Limited (KPPL)

Puducherry Pollution Control Committee has permitted M/s Karaikal Port Pvt Ltd to handle different types of Cargo in four berths comprising of following materials. Table-3:

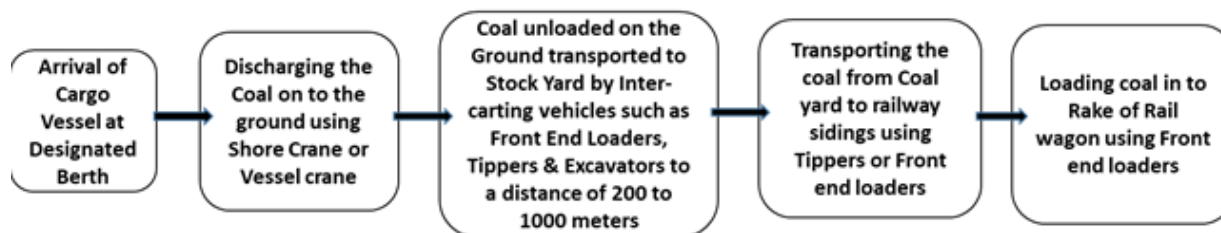
Table-3: Different types of Cargo in four berths

S. No.	Product	Consented Quantity (MMTPA) by PPCC	Quantity Handled 2015-16 (MMTPA)	Quantity Handled 2016-17 (MMTPA)	Quantity Handled from April to June 2017
1	Coal	Consented = 6.0 NOC to handle =10.0	4.658	6.967	1.504
2	General Cargo	2	0.907	1.721	0.474
3	Edible Oil	2.5	0.133	0.152	0.039
4	Crude	1	0.267	0.281	0.030
Note: General cargo means comprising of Textiles, Machinery, Timber, Steel, Containers, Granite, Wood Chips, Aggregates, Dolomite and clinkers, Marble Slabs, Iron ore, Fertilizers, Clay, Gypsum, Limestone, Agro Products like Sugar, Red Chilies, Wheat, Corn., Salt and Cement (Bags)					

It is reported that the materials are imported through cargos from various countries namely Indonesia, Australia, South Africa, and USA and it is transported in inland to various industries of cement, power plant and TNPL

The general cargo items as mentioned above are unloaded from vessel, transported and stored under the closed shelter except the wood chips and limestone which have been stored in the open yard.

Coal handling is a major quantity (as per NOC 10 MMTPA) in which the operation sequence of handling/unloading of coal from vessel to customer end are as follows:



During the inspection, no single cargo has arrived to port to observe the unloading/ loading activities from vessel to ground.

- However, on arrival of cargo vessel at designated berth, the coal is shifted from vessel to open ground using shore crane or vessel crane. During this process, flying of coal to the atmosphere is quite possible since it is handled in open space exposed to high coastal wind speed. **The sprinklers and wetting equipment installed are not working effectively.**
- Coal is unloaded on the ground, then transported to Stock Pile/Yard by Inter-carting vehicles such as Front End Loaders, Tippers & Excavators to a distance of 0.2 to 1 km. The coal is stocked in the stockyard following the height less than 10 meters as stipulated in the consent. **The stockyard is**

not properly designed and designated. The coal is dumped in the yard haphazardly. There is no labelling about coal yard size, plot identity, quantity, details of order of coal received and name of roads connecting the plots. The condition of coal yard is not scientifically maintained/stored but excess water is applied to suppress the coal fly particles. Application of more water has resulted in stagnation of water mixed with coal/dust powder forms as slurry on the ground particularly around the yards and on roadsides. ***These wetted coal/dust again carried away along with the tyres of heavy vehicles and spreading all over the area.*** The entire floor area and road of the Port is excessively wetted because of water is pumped rather than sprinkling. The photo nos. 4, 5, 6, 7, & 8) below depicts the condition of storage and stagnation of water between coal yards and on roadsides. ***There is no proper slope/barrier for collecting sprinkled and storm water around each yard.***



Photo Nos. 4, & 5: Status of coal storage, water stagnation and undulance of the floor



Photo Nos. 6 & 7: Kind of storage of coal and water stagnation on the floor

- Coal is transported using Tippers or Front end loaders from coal yard to railway sidings. The coal kept on the floor of the railway sidings as shown in

photo no. 8 again lifted for loading into wagons. During unloading onto the ground and loading into the wagons, the spread of fine dust is suppressed by fogging machine and by the sprinklers. This railway siding is located near by the village Keelavanjore at an ariel distance of 0.5 km. There are layers of windscreens, rows of plantations to suppress the dust flying towards Keelavanjore village. Since the coal and roads are excessively wetted, the chance of coal flying is minimized. Coal is transported to customer by Road or by Rail is adequately wetted and covered with Tarpaulin to avoid spillage while in motion as shown in photo no. 9.



Photo No. 8: Loading coal in to wagon/Rake



Photo No. 9: Loading of general cargo in to wagon

- It is observed from the record submitted by M/s KPPL, that about 1,19,038 trucks and 525 inter-carting trucks are moved in the port area during the year 2015-2016 while in the year 2016-2017, the trucks moved are 1,14,215 and inter- carting trucks are 645. Therefore, high potential to create dust dispersion in the area while loading & unloading of coal is possible which might also carryover through tyres on the road. Continuous movement of heavy vehicle on the excess wetted road/area, the tyres carry fine wetted coal mixed with road dust all-around the area.

Status of vehicle parking area

The loose fine soil (about half feet height) from the surface of floor allotted for parking of trucks (photo no.10) nearby the petrol bunk in front of main gate is flying heavily on the movement of every vehicle. Similar kind of loose fine soil found at the tipper maintenance area too (photo no.11). This loose soil not only flies during the movement of heavy vehicles also flies during small wind and spreads lot of dust around the area. Photo nos. 10 & 11 below indicates the condition of vehicle parking area.



Photo No. 10: Loose soil at Parking area nearby the petrol bunk in front of main gate



Photo No. 11: Loose soil at Tipper Maintenance area having

During inspection, there were lot of loose soil deposited all along the road starting from Karaikal high way to main road of the port and also inside the port from main gate to custom office entry (about 1km). This dust is not from coal but it is a dust of loose fine soil carried through tyres of the trucks from parking area. M/s KPPL is not wiping or removing such deposits on the road regularly which might have high potential to spread towards Keelavanjore village & in around the area.

It is observed from the meteorological data generated by M/s KPPL during the period from 1-18th July, 2017 that, the minimum wind speed recorded is 2.1 m/s and the maximum is 12.9 m/s with an average of 5.4 m/s. This wind speed is adequate enough to carry over the fine dust from loose soil area and from coal handling area if not properly cleaned or wetted.

Status of Dust Suppression System (DSS)

(a) Sprinklers

Out of 15 Sprinklers, four numbers towards road no. 8, two numbers towards right side of the road no. 9, two numbers near Amma lines road and seven numbers of sprinklers near by the Northern coal yard are installed.



Photo No. 12: sprinkling machine

During inspection, it was asked to operate all the sprinklers, ***none of the sprinklers are sprinkling the water towards the designed distance (30 mt) and the sprinkled water falling at the front portion of the coal yard but not covering the maximum area of coal yard.*** Few sprinklers are pumping the

water towards coal yard rather sprinkling. Regular maintenance of these sprinklers and more no. of sprinklers needs to be adopted.

(b) Two water tanker lorries (each with capacity up to 10 KL) fitted with rear water spreaders and engaged to continuously wet the roads.

(c) Roads are concreted from main road to coal plots. Since, the dust wiping/collection system is not properly handled, it is excessively wetted, forms slurry mixed with coal which carryovers through tires of heavy vehicles

(d) If coal is carried by bottom opening wagon/rail, there is a possibility of coal spillage on the railway track (as seen nearby Nagore Railway Station), this spillage cleaning is not in practice by the Port authority.

(e) Fogging Machines

There are two fogging machines (called as DS 150 (mobile) and DSS 200) one is fitted on the mobile vehicle and another is mounted on the raised platform towards North end of the port nearby railway sidings. Both the fogging machines are working effectively.



Photo No. 13: Fogging Machine

(f) Vehicle washing

Vehicle washing is connected with 16 KLD **ETP-II**, the floor of vehicle wash is lower than the collection tank of the washed water. Hence, the floor of the vehicle wash is to be elevated so as to washed water will flow to collection tank on gravity instead of stagnating /overflowing in front of ETP-II.



Photo No. 14: ETP-II

(g) Automatic tyre washing system

Automatic tyre washing system is working well but since the lot of wet dust is already deposited on the roadside, the cleaned tyre is again moving on dirty road and the effectiveness of tyre cleaning become ineffective.



Photo No. 15: Vehicle washing and ETP-I

However, the washed water is fed to 25 KLD **ETP-I** and after filtration and settling, the suppurated water again reused for the same purpose of cleaning.

(h) **ETP-III -50KLD**

The coal wash water and storm water are routed through open channel to ETP-III of the 50KLD capacity. The collection tank of the ETP-III is not adequate to receive both wash and storm waters.



Photo No. 16: ETP-III:50KLD

However, the storm water at all location are not properly centralized. The treated water again reused for coal washing and the slurry taken to the storage area.

(i) In addition, there are sufficient numbers of water hydrants installed all around the coal plots which also facilitating manual sprinkling of water while loading on to trucks and to facilitate for Dust Suppression System.

(j) It appears from the wetness of the flooring all around the area that there is no dry dust collection system followed.

(k) Dust Separation Screens

Dust separation screens made of high quality polymer meshes have been provided adjacent to the coal yard towards the road no. 2. to a height of 15 m of length 1.1 km to acts as primary wind barrier and similar quality nets have also been provided on the other side of road no. 2 towards rail way track to a height of 09 or 12 m of length 1.5 km, to act as a secondary barrier. It is observed that most of the windscreens are damaged and not practiced to replace periodically. Photo nos.17 & 18 below indicates extent of damage.



Photo No. 17: Wind Screen second barrier from coal yard towards railway track



Photo No. 18: Wind Screen first barrier from Coal yard

(I) Three tier system of plantation (Photo no. 19) is developed towards Keelavanjore village in which the first tier is Casurina, second tier is Ashoka or Pencil tree and the third tier is Pungam, Badam, Poovarasuetc to act a third tier wind barrier. This are the effective dust barriers towards Keelavanjore village



Photo No. 19: Plantation acting as third barrier from coal yard towards Keelavanjore village, Pondicherry

(m) Two tire system of trees and wind screen (Photo no. 20) are developed at the tank form area which eliminate the dust emission towards Nagore area of Tamil Nadu



Photo No. 20: Wind screen towards Nagore area of Tamil Nadu

(n) It is reported that about 1,45,000 hybrid Casuarina saplings/ eucalyptus including other variety plants all around the periphery of Port premises developed to act as a natural wind barrier thus preventing the dust from being carried away.

Continuous Ambient Air quality Monitoring Stations (CAAQMS)

The Port Authority has installed three Continuous ambient air quality monitoring stations (CAAQMS) supplied by M/s Thermofisher at the following locations nearby the boundaries of the premises based on the predominant wind direction and the same is reflected in Table no. 4 and in Figure no. 2.

Table-4: Continuous ambient air quality monitoring stations (CAAQMS) supplied by M/s Thermofisher

CAAQMS	Locations of Continuous Ambient Air Quality Monitoring Stations	Geographical Position	Distance from main gate
Station-1	Near Main Gate, Helipad Area, M/s KPPL , Keezhavanjore Village, Karaikal	Lat: 10° 49' 58.48" N Lan: 79° 50' 29.29" E	150 m
Station-2	Near Tank farm area, M/s KPPL, Keezhavanjore Village, Karaikal	Lat: 10° 49' 43.51" N Lan: 79° 50' 59.94" E	1.0 to 1.5 km
Station-3	Pump House area, M/s KPPL , Keezhavanjore Village, Karaikal	Lat: 10° 50' 51.43" N Lan: 79° 50' 35.79" E	1.5 to 2 ms



Figure 2: Indicating the locations of three CAAQM stations in Karaikal Port

All three CAAQM stations are working. These monitoring stations are networked through their local server. Also same online data is connected to PPCC at Puducherry through a separate computer since the PPCC is not having common server. The parameters measured are PM₁₀, PM_{2.5} and Carbon Monoxide (CO). This time series concentration averaged day wise and statistically computed. The PM₁₀ concentration is ranging from 10 to 40.9 µg/m³ with an average of 20.7 µg/m³ at main gate whereas at tank farm towards Nagore area is ranging from 8.0 to 46.4 µg/m³ with an average of 32.4 µg/m³. The concentration of RSPM₁₀ is ranging from 22.8 to 53.0 µg/m³ with an average of 35.2 µg/m³ at Pump house. The monthly average minimum, maximum and average concentration measured at three monitoring stations for the period from January, 2017 to June, 2017 is reflected in Table no. 5.

Table no. 5: Monthly average minimum, maximum and average concentration measured at three monitoring stations for the period from January, 2017 to June, 2017

Month			CAAQMS-1 Main Gate Towards Keelavanjore		CAAQMS-2 Tank Form Towards Nagor Area		CAAQMS-3 Pump House Towards VadakuVanjur		
Month	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Jan-17	10.0	17.6	12.9	30.1	41.3	37.1	27.9	41.7	35.1
Feb-17	15.6	30.8	21.5	32.1	46.4	38.8	30.4	42.7	36.1
Mar-17	13.6	31.7	21.2	30.8	41.8	35.8	22.8	38.0	31.6
Apr-17	16.3	40.9	25.6	32.9	43.7	36.9	30.6	43.3	37.5
May-17	13.2	37.5	23.0	8.2	35.0	17.9	28.6	53.0	37.5
Jun-17	11.0	32.8	19.9	19.9	37.0	27.9	28.0	41.4	33.5
Range	10.0	40.9	20.7	8.2	46.4	32.4	22.8	53.0	35.2
Note : All values are in $\mu\text{g}/\text{m}^3$									

The monthly average concentrations on time series basis of three CAAQMS from January, 2017 to June, 2017 is reflected in Figure nos. 3, 4 & 5.

Ambient Air Quality Status – Manual by CPCB & PPCC

Based on the suggestions from complainants and on the field survey by the officials CPCB & PPCC, the AAQM stations were installed at 06 locations covering **02 locations in Nagore area in Tamil Nadu, 02 locations in Keelavanjore village of Puducherry and 02 locations in the up & down wind direction of the Karaikal Port premises.** The monitoring was carried out for two days during 16-18th July, 2017 for 48 hours.

Particulate Matter (PM₁₀) samples of 36 filter papers were collected on 08 hourly basis and the same was analyzed in the laboratory of Central pollution Control Board, Bengaluru. The gaseous samples for Sulphur Dioxide (SO₂) and Nitrogen Dioxide (NO₂) were collected on 04 hourly basis and all together 120 samples were analysed by the laboratory of PPCC. The results of AAQM carried out at 06 locations are reflected in Table no. 6.

Table no. 6 Analysis Results of AAQM carried out CPCP jointly with PPCC

S. No	Date of Monitoring	16-17 July, 2017	17-18 July, 2017	16-17 July, 2017	17-18 July, 2017	16-17 July, 2017	17-18 July, 2017	Distance from KPPL Main gate
Locations		RSPM (PM ₁₀) $\mu\text{g}/\text{m}^3$		SO ₂ $\mu\text{g}/\text{m}^3$		NO ₂ $\mu\text{g}/\text{m}^3$		
1.	Mr. Shahul Amid S/o Kunju Mohamed, House No.29,	19.7	28.9	2.0	2.0	5.4	4.9	1-1.5 km

	Therupalli Theru, Nagoor, Nagapatinam, Tamil Nadu- 611 002.							
2.	Mr. ShahulHahame d, S/o Syed Ahamed, No.5, PanamKolli, Yusufia Nagar, Nagoor, Tamil Nadu-611 002	27	46.4	2.3	2.0	4.5	4.5	1.5-2.0 km
3.	Mr. Tamilaran S/o House No.15, Nadu Theru, Keelavanjore, Karaikal, Puducherry- 611 002	32.9	40.6	2.0	2.0	5.1	5.5	0.5-0.75 km
4.	Mr. Nadarajan S/o VeeraPutran No.5, Pallivasal Theru, Keelavanjore, Karaikal, Puducherry- 611 002	23.9	56.4	2.0	2.0	7.0	5.2	0.5-0.75 km
5.	Near Admin Building, Karaikal Port Premises, Karaikal, Puducherry (Up wind)	65.8	56.8	2.5	2.0	8.2	7.5	0.5 m
6.	Port Iron area, Karaikal Port Premises.(Down Wind)	180.1	96.9	NM	NM	NM	NM	1.5-2.0 km
Standard limit for 24hours $\mu\text{g}/\text{m}^3$		100		80		80		

The results manual monitoring carried out by CPCB jointly with PPCC, reveals that the 24 hourly average Particulate Matter (PM₁₀) concentrations is ranging from 19.7 to 180.1 $\mu\text{g}/\text{m}^3$ on first day and while in second day it varies from 28.9 $\mu\text{g}/\text{m}^3$ to 96.9 $\mu\text{g}/\text{m}^3$ at all 06 locations. **The highest concentration 180.1 $\mu\text{g}/\text{m}^3$ that has exceeded the 24 hourly stipulated limit of 100 $\mu\text{g}/\text{m}^3$ is observed at iron ore area in the premises of Karaikal Port.** The concentration is high since the prevailing wind direction is towards land to sea i.e. Southwest to Northeast. The instrument is placed near to the iron ore area in the down wind direction. The concentration of SO₂ is ranged from 2 to 2.15 $\mu\text{g}/\text{m}^3$ for both the days whereas the

concentration of NO₂ varies from 4.50 to 8.22 µg/m³. Out of 06 locations, gaseous sampling was carried out at 05 locations and the concentrations of both SO₂ and NO₂ are well within the standard limit. The 24 hourly average concentration of PM₁₀.

Ambient Air Quality Status - CAAQMS by Karaikal Port

The AAQ data measured by CAAQM stations at Karaikal port is obtained for the period from 16-19th July, 2017. The concentrations of PM₁₀ on time series basis and on daily average basis are within the prescribed limit of 100 µg/m³.

Review of AAQM carried out by Tamil Nadu Pollution Control Board

Based on the frequent public complaints received from Nagore, the Tamil Nadu Pollution Control Board has also carried out 24 hourly AAQM at 05 locations during 8-9th February, 2017.

Table 7: Ambient Air Quality Survey conducted at Nagore village by TNPCB dated during 8-9th February, 2017

Locations			PM₁₀ in µg/m³	Distance from source
TN1	On the Way to Mr.Jaganathan House, MariammanKoil Street, Pattinachery, Nagore, Nagapattinam, Tamil Nadu	Lat:10°49'21" Lng:79°50'46"	40	350 m
TN2	On Top Of MohideenPallivasal building, MohideenPalli Street, Nagore, Nagapattinam, Tamil Nadu	Lat:10°49'11" Lng :79°50'40"	104	1.4 km
TN3	On Top of scaffolding at Kattupalli Pallivasal, Meth Street, Nagore, Nagapattinam, Tamil Nadu	Lat:10°49'20" Lng :79°50'35"	60	700 m
TN4	On Top of Safia Complex building, Nagore Main road, Chinnapalam, Keelavanjur, Panagudi-Post, Nagore, Nagapattinam, Tamil Nadu	Lat:10°49'30" Lng :79°50'13"	106	500 m
TN5	On top of House of Mr.P.R.RaviRathavathillam, Sivan North Street, Nagore, Nagapattinam, Tamil Nadu	Lat:10°49'15" Lng :79°50'11"	113	1.0 km

The one day monitoring results reveals that the concentration of PM₁₀ has exceeded the standard limit of 100 µg/m³ at 03 locations namely Mohideen Pallivasal building, (104 µg/m³), Safia Complex building (106 µg/m³) and Rathavathillam, Sivan North Street (113 µg/m³).

Review of AAQM carried out by PPCC engaging thirty party

The PPCC has engaged various NABL accredited private laboratories to carry out the AAQM for five days season wise at 03 locations in the premises of M/s KKPL. The analysis results of various parties on different seasons from August, 2015 to June, 2016 are tabulated. The five days average concentration of PM₁₀ and PM_{2.5} at all 04 locations are within the stipulated standard limit.

Table 8: PPCC - 3rd Party 04 Seasonal Monitoring Results - Particulate Matters (Averages)

S. No.	Season 1		Season 2		Season 3		Season 4	
Locations	M/s Bureau Veritas Consumer Products Services India Pvt ltd		M/s Green Chem Solutions Pvt Ltd		M/s Eco services Pvt Ltd		M/s ABC Techno Labs India Pvt Ltd.	
	10 to 15 th August, 2015		19 to 24 th January, 2016		23 to 28 th February, 2016		30 th May, 2016 to 04 th June, 2016	
Iron Ore Plot (Near North BW)	PM10 µg/m ³	PM2.5 µg/m ³	PM10 µg/m ³	PM2.5 µg/m ³	PM10 µg/m ³	PM2.5 µg/m ³	PM10 µg/m ³	PM2.5 µg/m ³
DS 200 (Near High mass 20)	55.0	29.5	63.8	28.8	67.6	27.0	62.5	26.6
Berth 9 (Near MCT)	61.8	28.2	51.0	20.8	57.7	24.7	57.3	24.0
Admin (Between Admin & Customs)	72.6	37.2	73.2	34.6	45.7	18.6	49.1	21.6
Iron Ore Plot (Near North BW)	49.0	22.8	88.8	34.8	72.0	33.3	54.8	23.5

Review of AAQM carried out by M/s SMS Labs Services Pvt. Ltd. for M/s KPPL

M/s KPPL has engaged M/s SMS Labs Services Pvt. Ltd. to carry out the AAQM for five days season wise at 03 locations in the premises of M/s KPPL. The analysis results of various parties on different seasons during August, 2015 to June, 2016 are tabulated. The five days average concentration of PM₁₀ & PM_{2.5} at all 04 locations are within the stipulated standard limits.

Table 9: AAQM results carried out by M/s SMS Labs engaged by M/s KPPL during 23rd May, 2017 to 23rd January, 2017

Date of Monitoring	Keelavanjore		North Vanjore		Nagore Village	
	PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}
23 rd May, 2017	53.2	29.7	58.4	32.2	63.7	38.7
18 th April, 2017	54	27.8	59.1	35.6	54.6	28.9
21 st March, 2017	62.6	33.5	59.7	30.2	45.2	25.4
20 th February, 2017	47.5	26	55.8	27	58.6	27.5
23 rd January, 2017	44.8	20.2	42.3	24.7	42.8	22.1

The 24 hourly concentration of PM₁₀ & PM_{2.5} at 03 locations on the five days monitored are within the stipulated standard limit of 100µg/m³.

Other Sources of Pollution

- **Keelavanjore Village, Pondicherry:** Karaikal port is partially disposing the plastic waste through an unauthorized third party. The third party intern brings waste and dumping hap hazarously near the Keelavanjore village which also spreads to the ring cannel provided around the Keelavanjore village.
- **Nagore, Tamil Nadu:** The huge quantity of municipal solid waste is dumped near to the Vettar river. The dumping stretch is about 400-500 meters distance. The dumping site is 0.5 km to Nagore and 1.0 km to Karaikal port. During the inspection, the solid waste is burnt throughout the day for all three days and lot of smoke and dust dispersing observed. If wind falls towards Nagore or Keelavanjore, the same may affect the area.

Conclusions

The public complaint on coal handling issues at M/s Karaikal port was jointly investigated by a team during 15-18th July, 2017.

The team in presence of complainants have not observed any coal deposit on the buildings, trees, roads or on open places during field visit in Nagore, Tamil Nadu and Keelavanjore village, Puducherry except coal deposits on Railway track.

The ambient air quality monitoring carried out by departments such as PPCC, TNPCB, Manual monitoring & CAAQMS of Karaikal Port and CPCB at various locations on several occasions, reveals that the concentration of Particulate Matter (PM₁₀ & PM_{2.5}), SO₂ and NO₂ are within the standard limits except at 03 locations monitored for one day by TNPCB.

The AAQM carried out by different agencies at various locations in & around the M/s KPPL results reveal that;

- **Results by CPCB & PPCC:**

Out of 06 locations monitored for two days during 16-18th July, 2017 for 48 hours, the concentration of Particulate Matter at iron ore area in the premises of Karaikal port is exceeding (180.1 $\mu\text{g}/\text{m}^3$) against the 24 hourly standard limit of 100 $\mu\text{g}/\text{m}^3$.

- **Results by CAAQMS by Karaikal Port:**

Out of 12382 measurements made on hourly basis for PM₁₀ at 03 locations in the Karaikal port premises during January, 2017 to June, 2017, about 18 measurements have exceeded the standard limit of 100 $\mu\text{g}/\text{m}^3$ which is of less than 2% of exceedance.

- **Results by TNPCB:**

Out of 05 locations monitored in the Nagore area, Tamil Nadu on 08/02/2017, the /PM₁₀ concentration exceeded marginally at 03 locations.

- **Results by PPCC through Third Parties:**

Out of 05 seasons in each seasons five days monitored during August, 2015, January, 2016, February, 2016 and June, 2016 at 04 locations in the premises of Karaikal port, the concentration of PM₁₀ and PM_{2.5} measured are well within the standard limits.

Status of Statutory compliance of Karaikal Port:

Consent issued by PPCC expired on 30/09/2016. However, No Objection Certificate is issued to handle enhanced capacity from 6.0 MMTPA to 10.0 MMTPA of coal with the condition to renew the bank guarantee and to implement the mechanized conveyer system at the earliest. ***Though the work is under progress, Karaikal port has not provided any time limit in completing the mechanized conveyer system.*** It is reported that water for spraying on the coal yard is received through tankers from Puducherry Agro Service & Industries Corporation Limited and water for road cleaning is drawn from sea. There is no quantifying device adopted for both the raw and seawater.

Status of Air Pollution Control Devices in Karaikal Port:

Application of excess water on coal transfer process & on coal storage areas, water stagnation around the coal yards and on the road connecting coal yard was found. Movement of heavy vehicles from coal yard and on road, further accelerates the deposit of dust mixed with coal on road and spreads on road for longer distance in the premises.

The sprinklers or fogging machines are used to suppress the dust flying. Due to improper maintenance of sprinklers, the sprinklers pumps the water rather than

spraying which creates excessive wetting all around the coal yard and roadside. Karaikal port not practicing the dry cleaning/collection of dust instead, lot of water is utilized for both floor and road cleaning.

Karaikal port has allotted parking area near main gate and another at tipper maintenance area. Due to loose soil about half feet on the parking area, lot of soil dust is carried through tires of heavy vehicle towards in & outside the port. Such dry dust deposit found on road from Karaikal main road to custom office of port premises which need to be cleaned regularly. Though, the Karaikal port has provided adequate wind screens, the practice of replacing the torn /damaged is not regular.

The coal yards need to be scientifically maintained and designated with proper sign boards with adequate wash/storm collection system.

The vehicle wash floor provided to ETP-II is under the floor level of ETP collection tank, which leads to stagnation and overflows instead of entering in to the collection tank. The collection tanks capacity provided for collecting wash water from ETP-I, ETP-II and ETP-III is not adequate.

Plantation around the boundaries is effectively helping in controlling the dust dispersion.

Recommendations

The AAQM results carried out by CPCB, PPCC, TNPCB and CAAQMS of Karaikal port, reveals that the concentration of Particulate Matter (PM₁₀ & PM_{2.5}), SO₂ and NO₂ are within the standard limits at many instances/locations. During field visit in Nagore, Tamil Nadu and Keelavanjore village, Puducherry, there was no coal deposit found physically on the buildings, trees, roads and on open places except within the premises of Port. However, the nature activity in the port may impose adverse effect if the controlling measures are not operated adequately. Therefore, to ensure proper management and control of pollution, the following directions may be issued to Karaikal Port. M/s KPPL shall be directed;

- To complete the installation of mechanized conveyer system and to put into operation,
- To remove/clean the coal deposit on the railway track in co-ordination with Railway Department and to reuse,
- To realign the existing garland drain around coal yard to properly collect the wash and storm water by gravity for treatment in ETP,
- To concrete the flooring at vehicle parking near main gate and at tipper maintenance area to avoid soil dust emissions,
- To engage adequate vacuum based dust cleaning vehicles for routine cleaning,

- To clean/wipe the roads connecting from Karaikal main road to custom office of the port regularly and to ensure no dust is found on the road,
- To have hardened/concrete flooring along the railway sidings of the port to minimize dust emission,
- To ensure proper closing of the mouth of bottom opening wagons while before leaving the port to avoid coal deposits on the track,
- To replace damaged/torn wind screens from time to time and maintain records,
- To undertake periodical maintenance of sprinklers, fogging machines as to ensure effective functioning,
- To minimize the water usage to avoid stagnation of wastewater in & around the coal yard,
- To pave all unpaved roads between the coal plots so as to minimize dust emissions,
- To install water meter (preferably online) at intake points for both raw & sea water and to maintain a record on water consumption on daily basis,
- To connect 03 continuous AAQM stations with the CPCB server at Delhi and to display the results on real time basis at main gate of M/s KPPL,
- To ensure that roads are well cleaned after the vehicle wash and no dust is carried on road ways through tyres of cleaned vehicles,
- To elevate washing floor at ETP-II and enhance the collection tank capacity at all ETPs,
- To dispose the plastic wastes only to the authorized agencies and to ensure proper storage and treatment,
- To instruct M/s KPPL to device a mechanism to show the public about the pollution control measures adopted to minimize the coal dust emission, and
- In addition, TNPCB, Nagapattinam shall be asked to ensure that burning of municipal solid waste does not happens at bank of Vettar River.

Action Recommended:

However, considering the improper management of coal unloading, loading, storage, transfer and other lack of periodical maintenance of dust suppression systems (DSS) with in the M/s Karaikal Port as reported by team, it is suggested to direct the M/s KPPL to comply with all recommendations within certain time frame.
