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THE RAMCO CEMENTS LIMITED
(Formerly known as Madras Cements Ltd.)

RCL/PCB/23/2018-19

15.09.2018

The Environmental Engineer,
AP Pollution Control Board,
Regional Office,
Plot No. 41, Kanakadurga Officers Colony,
Opp. SBH, Gurunanak Road,
VIJAYAWADA – 520 008.

Dear Sir,

Sub: Submission of Environmental Statement in Form - V for Cement Plant including
Thermal Power Plant for the Financial Year – 2017-18 - Reg.

Please find enclosed herewith three sets of Environmental Statement in Form - V for
Cement Plant including Thermal Power Plant for the financial year 2017-18 along with
relevant enclosures.

This is for your kind information and records please.

Thanking you.

Yours faithfully,
For The Ramco Cements Limited,

[Signature]
President (Mfg)

Encl: As above.

ENVIRONMENTAL STATEMENT (FORM – V)

FOR FINANCIAL YEAR 2017-18

CEMENT PLANT & THERMAL POWER PLANT

**An
QMS- IS / ISO 9001:2015,
EMS- IS/ ISO 14001:2015,
OHSMS- IS 18001:2007,
EnMS – ISO 50001:2011
Certified Company**



**THE RAMCO CEMENTS LIMITED,
KUMARASAMY RAJA NAGAR 521457
JAGGAIHPET (M),
KRISHNA DIST., AP.**

ENVIRONMENTAL STATEMENT (FORM – V)
FOR FINANCIAL YEAR 2017-18
PART – A

1.	Name and address of the owner / occupier of the industry operation or process	:	The Ramco Cements Limited Kumarasamy Raja Nagar - 521 457, Jaggaiahpet Mandal, Krishna Dt., A.P
	Industry operation or process	:	Cement manufacturing process along with thermal power generation
2.	Date of the last environment audit report submitted	:	28 th September 2017

PART – B
WATER AND RAW MATERIAL CONSUMPTION

(i) Water consumption m ³ /day:	
Cement Plant Cooling & Domestic	2645.87 m ³ /day
TPP Cooling & Boilers	1663.00 m ³ /day
Total	4308.80 m ³ /day

Name of the product(s)	Water consumption per unit of products		
	Unit	During the previous financial year (2016-17)	During the current financial year (2017-18)
Cement*	m ³ /Tonne	0.9567	0.7842
Power	m ³ /lakh kWhr	416.91	367.84

* With more water conservative measures and higher production of cement in the financial year 2017-18 while compared to the financial year 2016-17, the water consumption for Tonne of cement is decreased in the financial year 2017-18.

(ii) Raw material consumption:

	Name of the raw material	Consumption of raw material, Tonne	
		During the previous financial year (2016-17)	During the current financial year (2017-18)
1	Limestone (from captive mines)	14,42,475.0	22,37,837.0
2	Laterite High Grade	65,207.995	61,901.9
3	Laterite Low Grade	0	31,708.68
4	Iron Rich Laterite	41,299.52	93,625.98
5	Iron Ore	2,463.0	0
6	Iron Sludge	6,215.645	2,780.49
7	Indigenous Coal	10,761.62	528.1
8	Imported Coal	46,685.2	1,28,908.85
9	Pet Coke	1,27,561.04	1,71,856.17
10	Alternate Fuel	54.28	0
11	Fly ash	1,76,070.67	2,28,304.15
12	Gypsum	39,125.25	35,798.47
13	Slag	79,912.04	53,903.27

PART- C
(Parameter as specified in the consent issued)

Pollution Type	Pollution Board Norms	Quantity of Pollution Generation	% of Variation from Prescribed Standards with Reason	Remarks
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(a) Water & Waste Water

No process effluent generation from cement manufacturing. Mine seepage water is being allowed to settle in mine sump. The sump outlet water is used for cement plant & power plant process requirements, water sprinkling purpose, greenbelt purpose, domestic water requirements, etc. The measures initiated to conserve water reserve are:

- Mine seepage water is only being used for the water extraction.
- Part of the thermal power plant treated effluent is being used for cooling purposes in the cement plant. Part of the same is used for greenbelt activities in the plant premises.
- Reverse Osmosis (for drinking water purpose) system effluent is being used for greenbelt activities in colony.
- Treated waste water from sewage treatment plant is being used for greenbelt activities by constructing sumps at elevated areas (by pumping to these tanks and supply from greenbelt areas by gravity).

Details of month wise outlet samples analysis of thermal power plant effluent treatment plant, sewage treatment plant and auto garage oil & grease trap, carried out in the financial year 2017-18 (by MoEF&CC approved agency) are enclosed as Annexure - I. Average values of month wise outlet samples analysis of TPP effluent treatment plant, sewage treatment plant and auto garage oil & grease trap are as follows:

(i) Thermal Power Plant Effluent Treatment Plant Treated Effluent:

Pollution Type	Unit	Pollution Board Norms	Average Value / Range (2016-17)	Average Value / Range (2017-18)
p ^H		5.5 - 9.0	7.22 – 8.05	7.02 – 7.63
TDS	mg/L	2100	1074.8	925.0
TSS	mg/L	100	58.4	25.3
COD	mg/L	250	67.3	27.3
BOD	mg/L	100	18.8	5.2
O & G	mg/L	10	1.7	<1

(ii) Sewage Treatment Plant Treated Waste Water:

Pollution Type	Unit	Pollution Board Norms	Average Value / Range (2016-17)	Average Value / Range (2017-18)
p ^H		5.5 - 9.0	7.19 – 7.81	6.83 – 7.46
TDS	mg/L	2100	667.9	925.7
TSS	mg/L	100	66.8	33.5
COD	mg/L	250	58.0	52.4
BOD	mg/L	100	15.8	13.4
O & G	mg/L	10	1.4	3.2

(iii) Auto Garage Oil & Grease Trap Treated Waste Water:

Pollution Type	Unit	Pollution Board Norms	Average Value / Range (2016-17)	Average Value / Range (2017-18)
p ^H		5.5 - 9.0	7.30 – 7.63	7.09 – 7.82
TDS	mg/L	2100	1671.9	1304.6
TSS	mg/L	100	58.3	50.0
COD	mg/L	250	109.8	64.2
BOD	mg/L	100	31.1	16.8
O & G	mg/L	10	8.7	5.9

No variation is observed (with respect to quality) for 3 Nos. of waste water sources viz., Thermal Power Plant Effluent Treatment Plant Treated Effluent, Sewage Treatment Plant Treated Waste Water, Auto Garage Oil & Grease Trap Treated Waste Water from Prescribed Standards in the financial year 2017-18.

(b) Air:

(i) Ambient Air Quality Monitoring:

Details of month wise ambient air quality monitoring carried out near to the plant premises in the financial year 2017-18 (by MoEF&CC approved environmental monitoring agency) are enclosed as Annexure - II. Data on ambient air quality monitoring carried out in the nearby villages for the same period is enclosed as Annexure - II. Average values of month wise ambient air quality monitoring carried out near to the plant are as follows:

Location / Norm	Average concentration of pollution type, µg/m ³							
	Financial Year 2016-17				Financial Year 2017-18			
	PM ₁₀	PM _{2.5}	SO ₂	NO _x	PM ₁₀	PM _{2.5}	SO ₂	NO _x
Pollution Board Norms	100	60	80	80	100	60	80	80
Dharmavarapadu Thanda	52.71	22.25	12.96	19.29	69.88	26.88	10.64	12.35
Own Your House Colony	51.75	23.00	13.92	19.83	73.67	32.92	11.94	13.87
K Agraharam Village	50.29	21.83	13.58	19.79	70.54	26.42	10.77	12.29
Padmavathi Nagar	54.92	23.29	13.54	19.79	67.63	26.00	11.25	13.20
Jayanthipuram Village	55.13	23.71	13.54	19.96	68.83	26.88	10.89	12.45
Ravirala Village	54.17	22.67	13.83	19.54	65.25	26.17	10.49	12.34
Vedadri Village	53.75	23.04	13.38	19.63	66.88	28.83	11.14	13.28
Jaggayyapet	51.67	22.13	13.38	19.75	75.79	34.04	12.65	14.43
Budawada Village	50.83	22.00	13.38	19.75	70.67	27.88	10.43	12.10

Pollution Type	Unit	Pollution Board Norms	Near Temple		Near K Type Colony		Near Auto Garage	
			2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
PM ₁₀	µg/m ³	100	68.7	61.1	64.3	59.3	74.2	66.9
PM _{2.5}	µg/m ³	60	23.9	24.7	19.5	24.3	28.3	28.9
SO ₂	µg/m ³	80	19.8	13.1	17.5	12.0	20.3	12.8
NO _x	µg/m ³	80	18.8	14.3	16.7	13.6	19.4	14.2

No major variation is observed (with respect to quality) for ambient air quality viz., adjacent to plant and in surrounding villages from Prescribed Standards in the financial year 2017-18.

(ii) Stack Monitoring:

Details of month wise stack monitoring carried out in the financial year 2017-18 (by MoEF&CC approved environmental monitoring agency) are enclosed as Annexure - III.

S. No.	Stack Attached to	Norm	Average Value of SPM (2016-17)	Average Value of SPM (2017-18)
I.	PM Concentration			
1	Kiln - I Bag House	30	28.0	27.0
2	Coal Mill - I Bag House	30	24.0	24.7
3	Cooler - I ESP	30	-----	20.1
4	Kiln - II RABH	30	24.2	26.3
5	Coal Mill - II Bag House	30	25.6	25.6
6	Cooler - II ESP	30	27.6	18.1
7	Cement mill Bag House	30	25.6	26.5
8	Cement Mill Bag Filter	30	24.3	24.5
9	Slag mill Bag House	30	24.8	23.8
10	Limestone Crusher Bag House	30	21.6	18.4
11	Thermal Power Plant ESPs	50	34.8	47.1
II.	SO ₂ Concentration			
1	Kiln - I Bag House	100		5.8
2	Kiln - II RABH	100		17.3
3	Thermal Power Plant ESPs	600		350.6
III.	NO _x Concentration			
1	Kiln - I Bag House	600		324.4
2	Kiln - II RABH	800		376.8
3	Thermal Power Plant ESPs	300		196.3

Note: All values mentioned as mg/Nm³.

PART – D HAZARDOUS WASTES

(As specified under Hazardous Wastes / Management and Handling Rules. 1989)

Hazardous Waste	During the previous financial year (2016-17)	During the current financial year (2017-18)
I. Hazardous Waste Disposed to external agencies		
Waste oil	23.10 kL	3.15 kL
Waste grease	0.55 Tonne	1.092 Tonne
Waste lead acid batteries	----	----
Waste Hi-chrome Grinding Media	3.94 Tonne	----
II. Hazardous Waste Consumed (brought from external agencies)		
Iron Sludge	6215.645 Tonne	2780.49 Tonne

- Copy of Form - 4 (submitted to APPCB) - Hazardous Waste generation / receipts and consumption / disposal details for both plant & mines for the financial year 2017-18 is enclosed as Annexure - IV.
- Part of the waste oil / lubricants is used along with fresh grease for reclaimers.

PART – E
SOLID WASTES

	During the previous financial year (2016-17)	During the current financial year (2017-18)
(a) From process	No solid waste generated	No solid waste generated
(b) From pollution control facility		
From Cement Plant*	Not quantified	Not quantified
Fly Ash from Thermal Power plant**	8,870.54 Tonne	25,929 Tonne
Bottom Ash from Thermal Power Plant#	1,095 Tonne	1,565 Tonne
Sludge Cake from STP###	38.79 m ³	63.7 m ³
Sludge & Top Layer from ETP###	3.2 Tonne	2.4 Tonne
(c) Quantity recycled or re-utilized		
From Cement Plant*	Total recycled	Total recycled
Fly Ash from Thermal Power plant**	8,870.54 Tonne	25,929 Tonne
Bottom Ash from Thermal Power Plant#	1,095 Tonne	1,565 Tonne
Sludge Cake from STP###	38.79 m ³	63.7 m ³
Sludge & Top Layer from ETP###	3.2 Tonne	2.4 Tonne
Vermi-compost from colony garbage [§]	40 Tonne	44.06 Tonne

* Dust collected from cement plant pollution control equipments is being totally recycled in the respective circuits to make it as a part of the product of the respective section. Thus there is no solid waste generation from cement plant.

** Fly ash collected from captive TPP pollution control equipment is being totally used in cement plant.

Bottom Ash from Thermal Power Plant is being used as admixture for concrete pavements, for filling of low laying areas and for admixture for blended cement manufacturing.

Dried sludge cake from STP and Sludge & Top Layer from ETP of TPP are used as manure for greenbelt, in place of chemical fertilizers.

§ Vermicomposting for colony garbage is being used for greenbelt activities as manure, in place of fertilizers.

PART – F

(Please specify the characteristics in terms of concentration and quantum)

Hazardous as well as solid wastes and indicate disposal practice adopted for both these categories of wastes

- Usage of Iron Sludge (received from other industries) as alternate raw material in cement manufacturing process is initiated in 2011-12 year and 6,215.645 Tonne of Iron Sludge is brought in the financial year 2016-17 and 6,215.645 Tonne used in the same period. Iron sludge brought in the financial year 2017-18 is 2780.49 Tonne and 2780.49 Tonne used in the same period.
- Copy of Form - 4 (submitted to APPCB) - Hazardous Waste generation / receipts and consumption / disposal details for both plant & mines in the financial year 2017-18 is enclosed as Annexure - IV.
- Dust collected from cement plant pollution control equipment is being totally recycled / re-utilized in the respective circuits to make it as a part of the product of the respective section. Thus there is no solid waste generation from cement plant.
- Fly ash generated from captive Thermal Power Plant is being totally used in cement plant. Bottom Ash from Thermal Power Plant is being used as admixture for concrete pavements and filling of low laying areas.

- Sludge collected from Thermal Power Plant Effluent Treatment Plant and Sewage Treatment Plant is being used as manure in greenbelt activities, in place of chemical fertilizers.
- Vermi-composting for colony garbage is being used for greenbelt activities as manure, in place of chemical fertilizers.

PART - G

Impact of the pollution control measures on concentration of natural resources and consequently on the cost of production

- All the surrounding areas are kept free from pollution.
- The cost of power consumed for operation of various pollution control equipment operated in cement plant & thermal power plant in the financial year 2017-18 is Rs. 1128.69 lakh against Rs. 587.85 lakh in financial year 2016-17 i.e., Rs. 91.70/tonne of cement in the financial year 2017-18 against Rs. 69.91/tonne of cement in the financial year 2016-17.
- The total capital cost incurred for various pollution control equipment for cement plant, thermal power plant and mines is Rs. 91.33 lakh in the financial year 2017-18 against Rs. 431.325 lakh in the financial year 2016-17.
- Total environmental protection expenditure made in the financial year 2017-18 (including capital and recurring for cement plant, thermal power plant and mines) is Rs. 1630.64 lakh against Rs. 1426.70 lakh in financial year 2016-17, i.e., nearly Rs. 132.48/tonne of cement in financial year 2017-18 against Rs. 169.68/tonne of cement in financial year 2016-17.
- The expenditure details for Environment Protection covering various measures carried out in the financial year 2017-18 are enclosed as Annexure - V.

PART – H

Additional investment proposal for environmental protection including abatement of pollution

- To meet the latest emission norm of 30 mg/Nm³ for cement plant, modifications in the Air Pollution Control Equipment made in cement plant. As part of this, the following measures are taken in the financial year 2017-18, with a cost of Rs. 63.26 lakh.
 - Replacing the Cooler – II ESP single phase transformers with three phase transformers.
 - Bags of Slag Mill are replaced with new efficient one.
- To control the fugitive emissions at packing plant area, bag filter and venting system are erected in financial year 2017-18.

PART - I

Any other particulars in respect of environment protection and abatement of pollution

- Detailed environmental protection measures are enclosed as Annexure - VI.
- Environmental Management System - IS / ISO 14001:2015 from 2005 is implemented along with Quality Management System - IS / ISO 9001:2015, Occupational Health & Safety Management System - IS 18001:2007, Energy Management System - ISO 50001:2011 and Work Place Management - 5S Certification.

ANNEXURE – VI

ENVIRONMENTAL PROTECTION MEASURES

Ramco is a vibrant group of Companies with manufacturing activities in Cement, Textiles, Fibre-Cement Products, Wind Energy, Software Products, Surgical Dressings, Ready-Mix Concrete and Dry Mortar Plants.

The Ramco Cements Limited (formerly known as Madras Cements Ltd.) is a unit of the Ramco Group which has been growing steadily right from its inception with present capacity 16.5 Million Tonnes / Annum of cement. RCL, which has always been striving for Total Quality Management, possesses International Certificates IS/ISO 9001:2015, IS/ISO 14001:2015, IS 18001:2007, ISO 50001:2011 and 5-S Workplace Management System. The company has achieved various awards for 'Best Performance' in the Cement Industry and also Green Rating Project Awards 4 Leaves from Centre for Science and Environment for the Year 2005.

The KSR Nagar plant was presented with an Award in recognition of practicing 'Cleaner Production Measures' from AP Pollution Control Board, Hyderabad for the year 2011-12 on the eve of World Environment Day – 05th June 2012. Andhra Pradesh Pollution Control Board recommended for 'Better Environmental Practices Award - First in Cement Industry Category for the year 2016-17 in the State of Andhra Pradesh'.

Captive Limestone Mines are obtaining awards regularly in Mines Environmental & Mineral Conservation Week and in Mines Safety Week celebrations. Captive Mines are using Non-el delay Detonators, to reduce Ground Vibration and to avoid fly rocks & fugitive dust. Permanent water sprinkling system is installed on mines haul road to reduce fugitive dust.

PRODUCTION DETAILS IN THE FINANCIAL YEAR 2017-18:

	Capacity	Production in the Financial Year 2016-17	Production in the Financial Year 2017-18
Clinker	31,85,000 TPA	10,84,674.624 Tonne	16,89,016.548 Tonne
Cement	36,50,000 TPA	9,49,277.010 Tonne	12,30,820.27 Tonne
Thermal Power	42 MW	1081.207 Lakh units	1650.097 Lakh units

AIR:

Air Pollution Control Measures: All air pollution generation sources (major or fugitive) are attached with pollution control equipment. 3 Nos. of Agglomerative Dust Suppression systems - water fogging (at additive handling area & coal handling area) are installed. 88 Nos. of Air Pollution Control Equipments (APCEs) in cement plant and 9 Nos. of APCEs are in operation in TPP. Various air pollution control equipment operating at Cement Plant & Thermal Power Plant are narrated in Annexure - VII. In the

event of pollution control equipment not working, the respective unit(s) is being stopped automatically in phased manner with associated interlocks.

Stack Monitoring: 10 major stacks are equipped with online stack monitors. Major stacks are being monitored by MoEF&CC approved external agency on monthly basis and reports are being submitted to the APPCB. Compiled data on stack monitoring in the financial year 2017-18 is enclosed in Annexure - III. Online stack monitoring data from these stacks is being uploaded to APPCB & CPCB websites. Online stack monitors are installed for 10 Nos. major stacks, for which the details are:

Parameter	Location of stack monitoring instrument	Make and model of present equipment	Year of installation	Details of earlier equipment, if any
SPM	Kiln – I Stack	Forbes Marshall, DCEM 2100	2010	BHA, installed in the year 2000
	Kiln – II Stack	Durag, DR 216	2009	
	Cooler - I Stack	IFI	2017	Durag, DR 216 installed in 2009
	Cooler – II Stack	Durag, DR 220	2009	
	Coal Mill – I Stack	IFI	2017	Durag, DR 220 installed in 2009
	Coal Mill – II Stack	IFI	2016	Durag, DR 216 installed in 2009
	Cement Mill Vent Stack	IFI	2016	Durag, DR 220 installed in 2009
	Cement Mill Separator Stack	Durag, DR 220	2009	
	Slag Mill Stack	Forbes Marshall, DCEM 2100	2012	Baltec, installed in the year 2005
	Thermal Power Plant Stack	IFI	2017	Forbes Marshall - DCEM 2100, installed in 2008
SO ₂	Kiln – I Stack	ABB EL3020	2017	
	Kiln – II Stack	ABB EL3020	2015	
	Thermal Power Plant Stack	ABB EL3020	2015	
NO _x	Kiln – I Stack	ABB EL3020	2017	
	Kiln – II Stack	ABB EL3020	2015	
	Thermal Power Plant Stack	ABB EL3020	2015	

Ambient Air Quality Monitoring: 2 Nos. of Continuous ambient air quality monitoring stations are installed at:

- Time Office
- Mines Office

to monitor the following parameters:

- PM₁₀
- PM_{2.5}
- SO₂
- NO_x

On-line Continuous Ambient Air Quality Monitoring data is linked up with APPCB & CPCB websites.

Ambient Air Quality is being monitored by MoEF&CC approved external agency on monthly basis at 3 locations (near to the boundary of the plant in 3 directions of the plant) and reports are being submitted to the APPCB. Compiled data on Ambient Air Quality monitoring in the financial year 2017-18 is enclosed in Annexure - II. Data on ambient air quality monitoring carried out in the nearby villages for the same period is enclosed in Annexure – II.

With the recent amendment in emission standard for cement plants from 50 mg/Nm³ to 30 mg/Nm³, some of the bag filters are being upgraded with high quality filter bags. The cost incurred in the financial year 2017-18 in this account is Rs. 63.26 lakh.

To meet the latest emission norm of 30 mg/Nm³ for cement plant, to optimum utilize the boiler capacities of thermal power plant and to meet the electrical efficiency at par with PAT scheme, the following measures are taken in the financial year 2016-17, the capital cost of Rs. 100 crore:

Replacing the Cooler – I ESP with latest one. All other air pollution control equipments of cement plant are checked for the latest norm	Project completed in March 2017
Adding additional pre-heater for Line – I Kiln with high efficiency cyclones	Project completed in March 2017
Adding 6 MW Turbo Generator	Project completed in December 2016

As part of these, the cement plant capacity is also increased from 2.80 million TPA clinker to 3.185 million TPA. This expansion project is completed in March 2017 and commissioned in the year 2017-18.

WATER:

Water Requirement:

Total water requirement for Cement Plant, Thermal Power Plant and for Domestic Purposes is 4308.80 m³/day in the financial year 2017-18. Total water requirement for Captive Mines is 229.3 m³/day in the financial year 2017-18. Total water requirement for Cement Plant, Thermal Power Plant, Captive Mines and for Domestic Purposes is 4538.1 m³/day in the financial year 2017-18. For which, State Ground Water Department accorded permission for water withdrawal @ 7000 m³/day.

Waste Water Quality Analysis:

Outlet samples from Sewage Treatment Plant (located at colony to treat sewage from plant & colony), Effluent Treatment Plant (to treat Thermal Power Plant effluents) and outlet of samples of Auto Garage Oil & Grease Trap are being analysed on monthly basis by MoEF&CC approved external agency and reports are being submitted to the Board regularly. The analysis data (for the financial year 2017-18) is narrated in Annexure - I. Treated sewage from STP & treated effluent from ETP being used for greenbelt development as well as for road sprinkling, etc.

Reverse Osmosis system is being used to generate purified water. This purified water is being supplied to plant premises, mines premises, colony and to contract workmen. RO plant inlet and outlet samples are being analysed regularly.

Water Conservation:

48 Nos. of rain water harvesting structures are made to recharge the ground water in the colony by March 2018. 4 Nos. of rain water harvesting structures are made to recharge the ground water in the plant by March 2018. The locations of these pits are listed in Annexure - VIII. Water collected in mine pits is being used for cement plant, thermal power plant, mines and for domestic purposes.

TPP effluent is being treated in effluent treatment plant. The wastewater from boiler blow down, DM plant regeneration waste water, UF & RO rejects and cooling tower blow down of TPP are being neutralized in neutralization tank and being used for greenbelt. Sewage treatment plant is in operation to treat domestic sewage from colony and plant. Auto garage wash water is being treated at Oil & Grease Trap. Data of STP, ETP and Oil & Grease outlet samples analysis carried out by MoEF&CC approved agency on monthly basis being submitted to the Board regularly. These treated effluents are used for greenbelt, water sprinkling & partially for process activities and being maintaining 'zero discharge'. The excess treated waste water, if any, is being passed to the artificial pond in our own lands to uplift the water table nearby area.

Drinking Water:

Reverse Osmosis (RO) plant is located at colony and purified water is being distributed to all offices, mines and colony houses. The analysis reports of RO plant inlet and outlet samples in the financial year 2017-18 are enclosed as Annexure - IX.

NOISE:

RCL is regularly monitoring noise levels internally. Ear plugs / muffs are provided to the concerned employees, who are working at high noisy areas.

OCCUPATIONAL HEALTH:

Occupational health check-ups are being carried out for new employees at the time of joining into the organization and occupational health surveillance programme is carried out for all the employees regularly. Full-fledged occupational health centre is established and services are being rendered by qualified occupational health specialist.

Occupational health checkup at the time of recruitment is being carried for all the employees as per Mines Rules, with the following tests:

- Lung function test
- ECG
- Chest X-ray
- Blood analysis test
- Urine analysis test
- Audiometry
- Checking colour blindness
- Stool Analysis
- Sputum (Optional)

The employees who are working at the time of initiation of this programme are covered for these tests. Baseline data on the health status of workmen in the Pre-recruitment stage was established. The same is being repeated periodically to update and to take action accordingly. Occupational health surveillance on regular basis is being carried for all the employees, with the following tests:

- Clinical examination including Neurological assessment
- Lung function test
- ECG
- Chest X-ray
- Blood analysis test
- Urine analysis test
- Audiometry
- Checking colour blindness

If any person failed in this health checkup, he will be shifted / transferred to non-hazardous activities. Till now, no such case is observed.

Occupational Health Centre (with qualified Occupational Health Specialist) is established with the following facilities:

- X-ray
- ECG
- Spirometry (lung function test)
- Audiometry
- Semi-auto analyser to carryout bio-chemical tests
- Clinical lab for micro-biological tests (including sputum test)
- Checking colour blindness
- Dental chair
- Ambulance

The first aid box is made available for immediate treatment. First aid training is imparted to the selected employees regularly. The list of first aid members is being displayed at strategic places.

BIO-MEDICAL WASTE HANDLING:

Operating Occupational Health Centre to provide basic first aid facilities within the premises. Bio-medical waste from this Occupational Health Centre is being regularly collected by nearby APPCB authorized agent, M/s Safenviron Bio-Medical Treatment Plant for onward treatment. The agency collects the bio-medical waste on 48 hours basis.

Bio-Medical Waste Annual Returns in the stipulated format (for the calendar year) are being regularly submitted to the Board within stipulated time. Copy of Bio-Medical Annual Returns submitted for the calendar year 2017 is enclosed as Annexure - X.

HAZARDOUS WASTE / SOLID WASTE HANDLING:

- Waste oil along with fresh fuel is being used for kiln firing while light up & for reclaimer lubrication and sold to APPCB authorized agents.
- Used lead acid batteries are sold to APPCB authorized agents.
- Iron sludge is being used as alternate raw material in place of iron ore in raw mix. Seven copy manifest (TREM) card is being used while handling the same. Copies of the manifest with respect to the utilized material are being submitted to Board regularly on monthly basis.
- Copy of Form – 4, submitting quantities of various hazardous wastes available by 31st March 2018 along with consumption / dispatch of the same in the financial year 2017-18 for both plant and mines is enclosed as Annexure – IV.

- In the financial year 2017-18, 63.7 m³ of sludge is generated from STP and the same is used as used as manure for greenbelt, in place of chemical fertilizers.
- In the financial year 2017-18, 2.4 Tonne of top & bottom sludge is generated from thermal power plant ETP and the same is used as used as manure for greenbelt, in place of chemical fertilizers.
- Organic wastes (dry leaves, etc.) is subjected to vermin composting. In the financial year 2017-18, 63.7 Tonne of vermin compost is generated and the same used as manure for greenbelt.
- Inorganic wastes (papers and other wastes) are properly disposed off.

CLEANER PRODUCTION PRACTICES:

Various cleaner production practices are initiated to control air emissions as well as fugitive emissions from various sources, etc. These practices are:

- Cooler - II ESP single phase transformers are replaced with 3 phase transformers to meet the recent amendment in emission standard for cement plants from 50 mg/Nm³ to 30 mg/Nm³.
- Slag Mill bag house are being upgraded with high quality filter bags to meet the recent amendment in emission standard for cement plants from 50 mg/Nm³ to 30 mg/Nm³.
- For better housekeeping, '5-S – Work Place Management' is implemented.
- Provided additives storage shed and are handled with stacker & reclaimers.
- Fuel required for cement plant is mostly received through railway wagons to the plant premises.
- Fly ash generated from thermal power plant is being totally utilized in cement plant.
- 3 Nos. of road sweepers, 1 No. of vacuum cleaner and 1 No. of mobile water sprinkler are in operation to maintain clean environment.
- Crusher hopper water spraying system installed to control fugitive dust.
- 3 Nos. of Dry Water Fogging systems installed at raw material hopper area, coal handling area and additive handling area.
- Closed silos are used for storing of clinker, fly ash and cement.
- Duoflex Burners for kiln firing and low NOx calciners are used to reduce NOx emission.
- Usage of low grade limestone (of silica content up to 18%) about 15 % quantities available in captive limestone mines.
- Usage of treated effluent from Thermal Power Plant Effluent Treatment Plant and Colony Sewage Treatment Plant for greenbelt, water sprinkling & partially for process activities and being maintaining 'zero discharge'. The excess waste water,

if any, is being passed to pond in our own lands to uplift the water table nearby area.

- Permanent Water Sprinkling System installed at mines haul road.
- Most of the internal roads are paved with concrete to arrest fugitive dust.
- Landscaping and Greenbelt development taken up in plant premises and township area for pleasant environment.
- Telescopic chute and hatch for the wagon loading spout are arranged at clinker truck loading and clinker wagon loading areas respectively to reduce the fugitive emission.
- To avoid the usage of plastic bags, steel carriages are distributed to workers for handling of food.

GREENBELT ACTIVITIES:

Greenbelt is developed in an area of 130.24 ha by March 2018. An amendment is issued in the latest EC issued for cement plant and thermal power plant regarding the same. Emphasis is being made to maintain 130.24 ha greenbelt area in and around plant premises. Emphasis is also being made in planting dust capturing plants in consultation with local DFO to mitigate the effects of air emissions.

RECENT SOCIO - ECONOMIC MEASURES CARRIED OUT:

As part of Corporate Social Responsibility, various socio-economic measures carried out. Cost of various socio-economic activities for the surrounding villages for the period 2003-14 (11 years) is Rs. 4,05,79,555/- i.e., nearly Rs. 36.89/- lakh per annum. Amount spent for various socio-economic activities in the financial years 2014-15, 2015-16, 2016-17 & 2017-18 are Rs. 54.18 lakh, Rs. 42.40 lakh, Rs. 85.60 lakh & Rs. 105.30 lakh respectively. The details are enclosed as Annexure - XI.

EXPENDITURE INCURRED FOR ENVIRONMENT PROTECTION:

Various expenditures incurred in the financial year 2017-18 for environment protection measures (other than socio-economic measures) are listed in Annexure - V. The total amount incurred on this in the financial year 2017-18 is Rs. 1630.63 lakh i.e., nearly Rs. 132.48/tonne of cement. Rs. 1128.69 lakh (Rs. 91.70/tonne of cement) is incurred for operation of various pollution control equipment towards power charges.

Budget proposed for various environment protection measures for the financial year 2018-19 is with a sum of Rs. 1315 lakh.

ENERGY CONSERVATION:

- To reduce the thermal energy consumption from 765 kCal/kg clinker to 735 kCal/kg clinker and to reduce the electrical energy consumption for kiln from 30 kWh/tonne of clinker to 24 kWh/tonne of clinker, Expansion & Modernization project is made for Line – I Kiln.
- To optimize the utilization of Coal Based Boilers, 6 MW Turbo Generator is installed.
- The available hot gases are utilized for drying of raw materials in Vertical Roller Mills. Gas temperature after the mills is about 90°C.
- Pet coke is being used to supplement coal requirements, in cement plant.
- Process of replacing the ordinary electrical bulbs with LED bulbs is under progress. The details of LED lights by the end of March 2018 are as follows:
 - Total Qty of LED lights arranged - 3480 Nos.
 - Total rating of LED lights - 155163 W.
 - Total amount invested for LED lights - Rs. 117.11 Lakh.
- LED lights are being disturbed to prize winners for all energy management system competitions to inculcate LED light usage in the residential areas located in colony as well as in nearby villages.
- Energy Management System (EnMS) is being implementation.

CELEBRATION OF WORLD ENVIRONMENT DAY:

- On the eve of World Environment Day – 5th June 2017, plantation activity conducted at plant premises, mines premises, colony premises and at surrounding areas.
- Distributed WED – 2017 batches (prepared by National Safety Council) to our employees and took Environmental Oath.
- Participated in World Environment Day Celebrations conducted by Andhra Pradesh Pollution Control Board, Regional Office, Vijayawada.