



September 12, 2016

Member Secretary
Goa State Pollution Control Board
Dempo Tower, I Floor
EDC Complex, Patto Plaza
PANAJI – 403001, GOA

Dear Sir,

Subject: Environmental Statement for the year 2015- 16

Please find enclosed herewith the “Environmental Statement” for the year 2015-16 in Form – V in compliance with Rule-14 of the Environment (Protection) Rules, 1986.

Hope the information provided meets your requirement.

Thanking you,

Yours truly,
For **Zuari Agro Chemicals Ltd.**

A handwritten signature in black ink, appearing to read 'A.A. Pacheco', is written over the typed name.

A.A. Pacheco
General Manger-Manufacturing

Enclosed: as above

ZUARI AGRO CHEMICALS LTD, ZUARINAGAR, GOA

FORM - V

Environmental Statement for the financial year ending 31st March, 2016

PART – A

(i) **Name and Address of the Owner / Occupier of the Industry, Operation or Process**

Mr. Kapil Mehan •
Managing Director
Zuari Agro Chemicals Ltd.
(Fertilizer Division)
Jaikisaan Bhawan
Zuarinagar – 403 726
Goa

(ii) **Industry Category** ----- Primary – (STC Code) / Secondary – (SIC Code)

Chemical Fertilizer Industry (Nitrogenous and Complex Grades)

(ii) **Production Capacity – Units**

Sr. No.	Product	Installed Production Capacity MT/ Year	Actual Production for 2015-16, MT
1	Ammonia *	220000	239005
2	Urea	376200	399600
3	Complex Grades in NPK-A plant	150000	251423.5
4	Complex Grades in NPK-B plant	150000	392831.8
5	Liquid Argon	2.2 Million SM3	NIL

(* Intermediate Product used for captive consumption)

(iv) **Year of Establishment**

1967 (Actual commercial production started in 1973)

(v) **Date of the last Environmental Statement submitted**

September 16, 2015

PART – B

Water and Raw Material Consumption

(i) Water Consumption	M³ / Day (Based on typical water balance) at Avg. plant loads)
Process	3470 *
Cooling	5630
Domestic	470
 Total	 9570 **

(* includes Boiler feed water make up, Treated water etc.)

**excludes Avg. colony water supply of about 400 M³ / Day)

Name of Products	Process water consumption per unit of product output	
	During the previous financial year 2014-15	During the current financial year 2015-16
Urea	8.46 M ³ / MT	7.90 M ³ / MT
Complex Grades in NPK-A plant	0.0719 M ³ / MT	0.1016 M ³ / MT
Complex Grades in NPK-B plant	0.0541 M ³ / MT	0.3895 M ³ / MT

(* Process water consumption requirement of NPK-A and NPK-B plants is met by recycling the effluent/ waste water from Effluent Treatment Plant)

(i) Raw Material Consumption

Name of Raw Material *	Name of Products	Consumption of Raw Material per unit of Output (MT/MT)	
		During the previous financial year 2014-15	During the current financial year 2015-16
Natural Gas	Ammonia (Intermediate product for captive consumption)	0.710	0.560
Ammonia	Urea	0.58	0.58
CO ₂		0.755	0.740

Name of Raw Material *	Name of Products	Consumption of Raw Material per unit of Output (MT/MT)	
		During the previous financial year 2014-15	During the current financial year 2015-16
Ammonia P ₂ O ₅ H ₂ SO ₄ Filler	18:46:00 grade (Samrat)	0.1990 0.4157 0.0555 0.041	0.1931 0.4629 0.0486 0.0388
Ammonia P ₂ O ₅ Potash H ₂ SO ₄ Filler	10:26:26 grade (Samarth)	0.1223 0.2602 0.444 0.0042 0.060	0.1215 0.2609 0.4444 0.0344 0.0455
Ammonia P ₂ O ₅ Potash H ₂ SO ₄ Filler	12:32:16 grade (Sampatti)	0.1480 0.3209 0.2790 0.0064 0.083	0.1458 0.3204 0.2790 0.0208 0.0730
Ammonia P ₂ O ₅ Potash H ₂ SO ₄ Filler Urea	19:19:19 grade (Sampoorna)	0.0681 0.1901 0.3330 0.0335 0.005 0.2913	0.0841 0.1907 0.3344 0.0124 0.0168 0.2626

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

PART – C

Pollution discharged to Environment / Unit of Output

(Parameters as specified in the consent issued)

Pollutants	Quantity of pollutants discharged (mass / day) Kg / Hr *	Concentration of pollutants in discharge (mass / vol.) mg / M3 *	Percentage of variation from prescribed standards with reasons
(a) Water *	NIL	NIL	N.A
(b) Air			
i) Particulate Matter from Prilling Tower – Urea plant	---	78.85	Less by 47.43%
ii) Particulate Matter from Dust Separator – Urea plant	---	49.10	Less by 67.26%
iii) Ammonia from Off Gas Absorber – Urea plant	2.04	---	Less by 79.6%
iv) Ammonia from Amm. Recovery Absorber – Urea plant	1.70	---	Less by 83%
v) Ammonia from Fumes Stack – NPK-A plant	2.36	---	Less by 76.4%
vi) Particulate Matter from Dryer Stack – NPK-A plant	---	48.34	Less by 67.77%
vii) Particulate Matter from Dedusting Stack – NPK-A plant	---	48.19	Less by 67.87%
viii) Ammonia from NPK-B Stack	4.33	---	Less by 56.7%
ix) Particulate Matter from NPK-B Stack	---	52.78	Less by 64.81%
x) SO ₂ from Boiler Stack	1.38	---	NA
xi) Particulate Matter from Boiler Stack	---	37.91	NA
xii) SO ₂ from DG Set stack	6.47	---	Less by 93.87%
xiii) Particulate Matter from DG Stack	---	55.63	Less by 62.91%
xiv) NO _x from DG Stack	---	155.16 ppm	Less by 85.89%
xv) NMHC from DG Stack	---	5.30	Less by 96.46%
xvi) CO from DG Stack	---	9.23	Less by 93.84%

(* Annual average values expressed at 25 deg. Centigrade, Atm. Pr. & 0 % moisture)

PART – D

Hazardous Waste

[As specified under Hazardous Waste (Mgt. & Handling) Rules, 2008]

Hazardous Waste	Total Quantity	
	During the previous financial year 2014-15	During the current financial year 2015-16
(a) From Process		
(i) Used / Spent Oil under H.W. Category No.5.1	27.74 MT	28.98 MT
(ii) Spent Catalyst under H.W. Category No.18.1	33.02 MT	56.03 MT
(iii) Furnace Oil Tank cleaning sludge under H.W. Category No.3.1	244.29 MT	248.59 MT
(b) From pollution control facilities		
(i) ETP sludge under H.W. Category No.34.3	36 MT	42 MT
(c)(i) Quantity recycled / reused within Unit	36 MT ETP Sludge	42 MT ETP Sludge
(ii) Sold (used/spent Oil)	27.74 MT	28.98 MT
(iii) Sold (Spent Catalyst)	33.02 MT	56.03 MT
(iv) Sold (Furnace oil Tank cleaning residue)	244.29 MT	248.59 MT

PART – E

Solid Wastes

Solid Waste from Process	Total Quantity	
	During the previous financial year 2014-15	During the current financial year 2015-16
(a) From Process		
(i) DM plant resin material	Approx. 4 M ³	Approx. 4 M ³
(ii) Sand from filters	Approx. 20 M ³	Approx. 19 M ³
(iii) Activated carbon from filters	Approx. 4 M ³	Approx. 6 M ³
(b) From pollution control facilities		
(i) STP Sludge	Approx. 1.5 M ³	Approx. 2 M ³
(c) (i) Quantity recycled / reused within unit	Approx. 20M ³ (Sand)	Approx. 19M ³ (Sand)
(ii) Quantity Sold	NIL	NIL
(iii) Disposed (Resin material, Active Carbon & STP sludge)	Approx. 9.5 M ³	Approx. 12 M ³

PART – F

Please specify the characterizations (in terms of composition and quantum) of Hazardous as well as Solid Wastes and indicate the disposal practice adopted for both these categories of wastes

Waste	Composition	Disposal Practice adopted
Hazardous Waste		
Used / Spent Oil	Used Oil	Sold to recycler registered with CPCB and having valid authorization of SPCB
Furnace Oil Tank sludge & cleaning residue	Oil sludge & cleaning residue	Sold to recycler registered with CPCB and having valid authorization of SPCB
Spent Catalyst	Spent catalyst containing metals/oxides like Ni, Cu, Zn, Fe, Co, Mo etc.in different composition	Sold to recycler registered with CPCB and having valid authorization of SPCB
ETP Sludge	Amm./Urea nitrogen, Phosphate, Sulphate, KCl, Salts of Na, Ca, Mg & Suspended solids	Recovered into process as recycle along with filler material in NPK-A and NPK-B plants
Solid Waste from Process		
DM plant resin material	Water insoluble co-polymers	Used along with backfilling material for structure / building foundation, road construction etc.
Sand from filters		Used along with backfilling material for structure / building foundation, road construction etc.
Activated carbon from filters	Carbon material	Used along with backfilling material for structure / building foundation, road construction etc.
STP Sludge	Organic matter	Used as bio-fertilizer for trees in our green belt.

PART – G

Impact of pollution abatement measures taken on conservation of natural resources and on cost of production

Pollution control measures are an integral part of our processes and every effort is made to reduce the amount of effluent/emission and waste generation in the manufacturing process & associated activities. This has resulted in reduction of consumption of water, raw materials and energy over a period of time. This has also resulted in reduction of effluent/emission generation at source itself and in re-use/recycling/recovery of nutrients from the effluent/wastes. In April 2014 with the new agreement of water supply with Water Resources Department, Goa we have totally stopped utilizing the borewells water. Ultimately all these measures have certainly added to the conservation of natural resources and cost savings. However, the exact impact of this on cost of production is difficult to quantify and thus is intangible.

PART – H

Additional measures / Investment proposal for Environmental Protection including abatement of pollution, prevention of pollution

- (i) Our CO₂ absorption system in Ammonia plant has been changed and converted totally to non-arsenic based.
- (ii) Several Energy savings measures implemented over last few years have reduced the specific energy consumption of Urea which has reduced Fuel consumption in our Utility Boilers and hence reduced the emissions. Every year some energy saving measures are implemented.
- (iii) We have installed Reverse Osmosis unit in our ETP for enhanced treatment and recovery/recycle of treated water from our wastewater/effluent.
- (iv) We have completed the process of retrofitting the Ammonia plant for changeover of feedstock and fuel from Naphtha to Natural Gas/Regassified Liquid Natural Gas and reduction of specific energy consumption and also changeover of fuel from Furnace oil to NG/RLNG in Utilities boilers. We have started using Gas as fuel and feed in our Ammonia & Utilities plant from October 2013 thereby reducing the emission levels of CO₂, SO₂ (by 99 %) and Particulate Matter (by 77%) substantially through the flue gases in Ammonia & Utilities plants.
- (v) Revamping of our scrubbing system in NPK-A plant for further reduction of the emission levels completed in November, 2015. Revamping of NPK-B plant for further reduction of the emission levels is in process.

- (vi) During the revamp/debottlenecking the capacity of Ammonia, Urea, NPK-A & NPK-B plants, a capital investment of approx. Rs.35 Crores has been earmarked for implementing the schemes meant for protection of environment.
- (vii) Rain water harvesting for storage in the form of captive lake of 235 MG capacity already exists. In April 2014, with the new agreement of water supply with Water Resources Department, Goa, we have totally stopped utilizing the bore wells water.
- (viii) During its operation for last four decades, Zuari Agro Chemicals Ltd. has already undertaken many eco-development measures like afforestation, creation and maintenance of green belt around the factory premises etc.
- (ix) The Company has also undertaken community welfare measures like providing land for sulabh toilets for general public in the neighborhood, development of neighboring govt. school playground and construction of toilet, maintenance of public gardens in Vasco city, beautification of highway road divider, awarding scholarships, providing skills training to local youth in domestic Electrician, Data Entry, and Tailoring, conducting health camps, supply of safe drinking water, cleanliness drive, school for poor neighboring community, distribution of free saplings as a part of tree plantation drive etc. as part of Corporate Social Responsibility Schemes.
- (x) We have installed and commissioned the continuous ambient air quality monitoring unit at an AAQM station in February 2013. This station measures five parameters on continuous basis.
- (xi) The Company continues to maintain the Zero Effluent Discharge status. Yet, we have installed online monitoring instruments for measurement of pH, Conductivity & Temperature of our final effluent discharge in the event of any emergency disposal. The final effluent discharge pipeline is being continuously monitored by means of provisions of a camera and a flow meter. The Monitoring is done on a "Real Time" basis as these are hooked up to the CPCB server/system.
- (xii) We have installed and commissioned continuous stack emission monitoring station for our common stack of our Utilities Boilers in July 2013 for NOx parameter. We have also installed and commissioned continuous stack emission monitoring station for Ammonia Reformer stack in May 2015 for monitoring NOx. Currently trials are in progress for DG stack analyzer, Urea prilling, Urea dust separator stack and NPK-A Plant fume stack

PART – I

Any other particulars for improving the quality of Environment

- (i) Regular monitoring of process stack emissions once in three months and regular monitoring of ambient air quality around the complex at four strategic CPCB identified locations twice a week by an accredited MoEF&CC recognized laboratory is being carried out. The results of stacks as well as ambient air quality monitoring are well within the standards prescribed by CPCB/SPCB. The monitored results are also displayed on electronic display boards located in public domain. The summaries of results are also sent to the office of RO-MoEF&CC and ZO-CPCB at Bangalore.
- (ii) Work zone environment monitoring for ammonia and noise at various locations inside the factory premises and the ambient noise level at different locations around factory premises is carried out. The results of monitoring conform to the limits prescribed.
- (iii) All the wastewater generated within the factory premises is given primary/secondary treatment and then recycled to NPK-A and NPK-B plants for process use or to cooling towers as part make up water. The domestic effluent is treated in Sewage Treatment Plant and the treated domestic effluent is totally recycled to cooling towers as make up. Zuari Agro Chemicals Ltd, Goa continues to maintain zero effluent discharge status.
- (iv) Every effort is made to reduce the generation of effluent/emission/wastes at the source itself and to explore the possibility of reusing/recycling of the wastes that are generated.
- (v) Hazardous Wastes like used/spent oil, furnace oil tank sludge/cleaning residue and spent catalysts that are generated are stored separately and sold to only those Vendors registered with CPCB as Recyclers and having Consents/Authorization from State Pollution Control Boards.
- (vi) We are disposing off our e-waste to the authorized recycler in compliance with The E-waste (Handling & Management) Rules, 2011.
- (vii) Other solid materials like product spillages, off specification products, ETP sludge are recycled back to process directly or along with the filler material in NPK-A and NPK-B plants.
- (viii) Efficient and effective management of cooling water quality control program for operating the cooling towers at higher cycles of concentration to reduce the generation of cooling tower blow-down effluent.
- (ix) Effluent storage ponds like acidic/alkali effluent ponds at Water Treatment Plant, Settling ponds/Holding pond/Guard pond at Effluent Treatment Plant are regularly

cleaned, inspected, repaired if required and chemically resistant epoxy coated from inside to avoid any seepage.

- (x) Natural Gas/Ammonia/Chlorine sensors are installed at strategic locations inside the plant premises for early detection of any leak and corrective measures. These sensors are regularly checked for proper functioning.
- (xi) Regular generation of meteorological data like wind speed, wind direction, temperatures and wind rose diagrams by maintaining thermo-hydrograph and data logger.
- (xii) As is the practice every year, tree plantation drive (Van Mahotsav) is carried out during monsoon. More area around the factory complex is being developed as green belt and saplings of various plants are distributed to the neighboring villagers free of cost.
- (xiii) Maintenance of approx. 260 hectares of green belt around the factory complex to mitigate the effect of fugitive emissions and noise as per CPCB guidelines.
- (xiv) Zuari is in operation for over four decades. A full fledged laboratory with necessary facilities is created for carrying out analysis and monitoring. Stack emission and ambient air quality monitoring is carried out by MoEF recognized external laboratory as stipulated by GSPCB. A person of Jt. General Manager level is dedicated to be in-charge of overall environmental management functions and he is ably assisted by a dedicated team. Besides, environment management is also one of the mainstream functions of all the section heads who contribute in their own way.
- (xv) The Company continues its environment and safety initiatives and has successfully implemented internationally recognized Standards and is now (since September 2015) an ISO 14001:2004 & OHSAS 18001:2007 certified organization. The Certification process was carried out by TUV Nord.