

EXECUTIVE SUMMARY

PROPOSED GTG-HRSG PROJECT

OF



M/S RASHTRIYA CHEMICALS & FERTILIZERS LIMITED



AT

TROMBAY, MUMBAI, MAHARASHTRA

Prepared By



PROJECTS & DEVELOPMENT INDIA LIMITED

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The EIA report has been prepared based on approved TOR in addition to Generic requirement as per EIA notification, 2006. It has been covered in 11 no. of chapters along with the supporting annexures excluding executive summary.

BACKGROUND

RCF is one of the most revered Public Sector Undertaking (PSU) of the Ministry of Fertilizers of Government of India. It falls under Mini Ratna category of central public sector undertaking and meets the requisite criteria for Navratna. It was established in 1978 after re-organization of Fertilizer Corporation of India (FCI).

RCF manufactures Urea, Complex Fertilizers, Bio-fertilizers, Micro-nutrients, 100 per cent water soluble fertilizers, soil conditioners and a wide range of Industrial Chemicals. It produces 25.5 lakhs MT Urea, 6 lakhs MT Complex fertilizers and 5.35 lakhs MT of Industrial Chemicals annually. The company is a household name in rural India with brands "Ujjwala" (urea) and "Suphala" (complex fertilizers) which carry high brand equity. RCF has countrywide marketing network in all major states. Apart from the own manufactured products, the Company is also engaged in marketing of SSP and imported fertilizer inputs like, DAP, MOP & NPK fertilizers. Besides fertilizer products, RCF also produces almost twenty industrial chemicals that are important for the manufacture of dyes, solvents, leather, pharmaceuticals and a host of other industrial products.

RCF Trombay, as such, does not fall under critically polluted industrial zone as per recent (26.04.2016) assessment of critically polluted industrial areas by CPCB & MPCB.

PROJECT PROPOSAL

RCF is relentlessly trying to reduce energy consumption by adopting new technologically reliable, reproducible technology from time to time.

Now, with a view to reduce energy consumption, RCF intends to install Gas Turbine Generator (GTG) and Heat Recovery Steam Generation (HRSG) at RCF, Trombay Unit. Total power requirement of RCF Trombay at present is 40.7 MW (approx.) and average steam requirement is about 184 MT/hr (approx.). At present, the power required is met by TATA power and steam required for the complex is generated in the existing gas fired boilers.

The proposed modification is limited only to change in the steam and power production. The existing arrangement of power import shall be replaced by installation of GT of 2x32 MW (ISO Rating) and HRSG of 2x65 MTPH capacities. However, in normal operation, steam shall be generated without additional firing in both HRSG. In each HRSG, there

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shall be independent De-aerator and BFW Pump-Motor set (1 working +1 stand-by). With the addition of GTG and HRSG, steam load to the service boiler shall be reduced to the extent of steam available from HRSGs. In the modification scheme, the steam requirement has been so balanced that minimum let down of steam shall be required. One existing boiler shall be kept in line to produce balance HP superheated steam. HRSG shall be provided with one common Cooling Tower and Cooling Water pumps (1working +1stand-by). The total power requirement of the complex shall be met through the power generation from the proposed GTG.

DETAILS OF EIA CONSULTANT

PDIL is a Mini Ratna, Category-I, Govt. of India Undertaking under Department of Fertilizers. PDIL is an ISO 9001:2015 & OHSAS 18001:2007 Certified and ISO/IEC 17020:2012 accredited premier Consultancy and Engineering Organization which has played pivotal role in the growth of Indian Fertilizer Industry. PDIL is duly accredited by NABET as EIA Consultancy Organization listed at sl. No. 120 as on 10.04.2017.

PROJECT COST & COMPLETION SCHEDULE

The cost estimates for the proposed project has been worked out to *Rs. 481.61Crores*. The total time schedule for completion of project would be about 24 months after grant of EC approval from concerned authorities & statutory bodies.

PROJECT LOCATION

The proposed GT-HRSG project shall be located near Ammonia-I old compressor house area of RCF, Trombay. The *Geo Co-ordinate of proposed GT-HRSG is 19°02'10.579" North and 72°53'19.233" East* at an elevation of 6 m above mean sea level (MSL) in Chembur (a suburb in eastern Mumbai). Eastern Express Highway is located at a distance of about 1 km from the unit. Chhatrapati Shivaji International Airport is located in North direction at a distance of about 6 km from Trombay Unit.

NEED & JUSTIFICATION

The need and justification of the proposed project is summarized as under:

- Reduction in specific energy consumption for production of Ammonia-Urea is need of the hour and shall be partly and techno-economically fulfilled by implementation of the proposed project.
- It will lead to a significant reduction in pollution load by installation of ultra Low NOx burner.

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- It will develop self-reliance & stop the dependency of RCF Trombay Unit over TATA Power (about 40.7 MW) and will be made available to the other needy consumers or nation.
- It will impose positive impact on the consumption pattern of electricity by reduction in power factor for RCF.
- It will reduce the consumption of natural resource like water which in turn will impart positive impact on environment.
- It will maintain the profitability of RCF and reduce the competitive burden of the product.
- It will maintain stability in indigenous / domestic market for Urea.
- There will be temporary employment generation during construction period.

PROJECT BENEFITS

The proposed project is an independent project and not interlinked with any other project. After implementation of proposed scheme, specific energy consumption of Ammonia-V plant shall reduce from 8.73 GCal/MT to about 8.40 GCal/MT. Thus, there will be energy saving of 0.33 GCal/MT for Ammonia.

The specific energy consumption of Urea shall reduce from 6.75 GCal/MT to about 6.45GCal/MT. Thus, there will be energy saving of 0.30 GCal/MT for Urea. The overall energy saving of Trombay complex shall be 86.05 GCal/Hr. The saving of natural resources like water has been estimated around 1270 m³/day.

PRESENT ENVIRONMENTAL STATUS

Climate & Meteorology

The meteorological data have been generated during January 2017 to March 2017. During the study period, dominant wind direction was recorded as NW, W & WNW with calm condition prevailing in the study area.

Ambient temperature was in the range of 12 to 38^oC

Relative humidity was in the range of 10 to 92%.

The rainfall during the study period has been found Nil.

Soil Environment

The soils of the area have following characteristics:

The texture of soil in the study area was sandy loam.

Level of Nitrogen as N ranged between 276.8 to 295.5 mg/Kg

Level of Phosphorous as P₂O₅ ranged between 54.8 to 72.8 mg/Kg.

Level of Potash as K₂O ranged between 128.4 & 140.0 mg/Kg

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The proposed project activity will not impart any visible impact on the soil component of the environment.

Air Environment

Air pollution due to NO_x and SO₂ does not invite any adverse comments. For CEPI calculation w.r. to air component, only 03 parameters viz. – PM_{2.5}, SO₂ & NO_x have been considered.

**Table-3
Summary of Air Quality**

LOCATION CODE	PM ₁₀ /100			PM _{2.5} /60			SO ₂ /80			NO ₂ /80			AQI
	MIN	MAX	AVG	MIN	MAX	AVG	MIN	MAX	AVG	MIN	MAX	AVG	
SA1	56	69	63.0	30	40	35.4	27.8	29.9	28.9	35.2	40.9	38.1	Satisfactory
SA2	58	75	65.5	27	45	35.9	25.9	32.3	29.4	34.0	43.8	38.8	Satisfactory
SA3	60	76	65.6	26	46	36.1	24.1	35.4	29.7	31.6	48.2	39.7	Satisfactory
SA4	55	80	67.0	29	49	36.8	27.8	37.3	31.3	36.0	50.3	41.7	Satisfactory
SA5	56	72	62.9	26	44	35.2	24.9	33.3	29.1	32.6	44.8	39.0	Satisfactory
SA6	58	73	63.0	25	42	33.9	21.1	34.7	28.2	30.3	44.2	38.5	Satisfactory
SA7	56	70	61.7	25	44	33.9	21.1	33.5	27.5	31.2	44.3	38.2	Satisfactory
SA8	54	70	59.5	24	43	33.4	19.4	32.4	25.0	29.6	41.3	36.2	Satisfactory

The air environment has a good buffering and tolerance capacity to remain in the II category of (satisfactory) as per the study conducted by PDIL. Thus no noticeable impact of air environment due to the project during construction and operation has been envisaged.

National Air Quality Index

AQI	Possible Health impacts
Good (0–50)	Minimal Impact
Satisfactory (51–100)	Minor breathing discomfort to sensitive people
Moderate (101–200)	Breathing discomfort to the people with lung, heart disease, children and older adults
Poor (201–300)	Breathing discomfort to people on prolonged exposure
Very Poor (301–400)	Respiratory illness to the people on prolonged exposure
Severe (>400)	Respiratory effects even on healthy people

The AQI dwells between good to satisfactory as per categorization under Swachh Bharat Abhiyaan with health impact of minor breathing discomfort to sensitive people. It has been envisaged that the proposed plant will have well sustainable impact on the air component of the environment.

Water Environment

Five numbers of ground water and six numbers of surface water samples have been collected and characterized during the study period. The calculation of Pollution Index is as follows:

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Concept of EF and SNLF

Where,

$$EF = \frac{\text{Analytical value}}{\text{Standard}}$$

$$SNLF = EF \times \frac{\text{No. of samples exceeding standard}}{\text{Total No. of sample under study}}$$

Table- 4

Calculation of EPI for Surface Water within study area

PARAMETERS	STANDARD AS PER IS: 10500	SW	
		EF	SNLF
Total Dissolved Solids	500	47.68	39.73
Total Alkalinity	200	0.40	0.00
Total Hardness	300	14.27	11.89
Chloride as Cl	250	52.13	43.44
Sulphate as SO ₄	200	5.61	4.67
Nitrate as NO ₃	45	0.06	0.00

Table - 5

Calculation of EPI for Ground Water within study area

PARAMETERS	STANDARD AS PER IS: 10500	GW	
		EF	SNLF
Total Dissolved Solids	500	1.36	0.54
Total Alkalinity	200	0.79	0.16
Total Hardness	300	1.36	1.09
Chloride as Cl	250	1.05	0.42
Sulphate as SO ₄	200	0.26	0.00
Nitrate as NO ₃	45	0.03	0.00
Iron as Fe	0.3	1.81	0.73

Total water requirement of Trombay Unit is 18930 (Cooling water) + 1050 (process water) + 5960 (Steam generation) =25940 m³/day. STP reject water is used for horticulture, scrubbing and floor washing in Suphala and ANP Plants and in Phosphoric Acid Plant. Wastewater generation from the existing plant facilities is equivalent to 1500 to 2000 m³/day. Effluent generated in each process plant is collected in in-plant effluent pit. The Integrated ETP comprises of primary (physico-chemical) and secondary (biological) and tertiary treatment units. After tertiary treatment like filtration, the treated wastewater is discharged to sea via Mahul creek. Data regarding overflow (pH, flow & Ammonical Nitrogen) is online transmitted to Maharashtra Pollution Control Board and Central Pollution Control Board.

Noise Environment

Table- 6

Estimation of HSD Affected Persons

Location Code	Name of Location	Noise Level dB(A) Night		% HSD*	24 Hrs Avg. Noise Level dB(A), L _{den}	% HA*
		Max.	Min.			
SN1	AAQMS,1	63.8	55.1	5.6	61.9	12.3
SN2	AAQMS,2	61.4	51.8	6.3	59.8	10.1

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SN3	AAQMS,3	63.0	52.6	6.7	61.5	11.8
SN4	AAQMS,4	62.4	52.5	6.6	60.9	11.2
SN5	Near Priyadarshini	56.5	49.3	5.2	55.1	6.5
SN6	Near I-Max wadala	57.0	47.8	4.6	55.5	6.7
SN7	RCF Colony Gate IV	56.6	50.1	5.5	55.3	6.6
SN8	Gangadhar Deshmukh Hall	48.5	44.8	3.6	47.6	2.6

*HSD: highly sleep disturbed, *HA: Highly Annoyed Persons HA> HSD in the area.

It is envisaged that proposed plant will have no impact on the noise component of the environment during normal operation of the plant.

Risk Analysis

This chapter covers ten failure cases with multiple scenarios in each in the existing and proposed plant. Iso-risk contours have been plotted by PHAST Risk Micro software of M/s DNV Technica, by considering proposed project and other allied facilities which infers that acceptable limit of individual risk of 1.0×10^{-6} per year remains mainly confined within the plant premises. The Societal Risk has been observed in acceptable region. Hence, the plant operations may be considered environmentally safe from risk point of view.

The downwind distances to GLC of Ammonia may extend beyond factory boundary in case of major failure. Hence, the population outside should be made aware of the properties of gas/s and what to do in case of gas leakage.

Socio-Economic Status

The 10 km radius study area around RCF Fertilizer complex covers 23 wards/ villages falling in Kurla, Sion, Chembur, Maravali Church. Wadala Truck Terminus, Sewri Fort etc. The total population of the entire wards/villages under study area was 33,10,657 (District Census handbook - 2011). Under the category of sex ratio, the number of females per 1000 males is 869. The social compositions in the study area are such that nearly 5.34 % of total population is Scheduled Caste population and 0.80% of total population is Scheduled Tribe population. The literacy rate in the study area was 81.4% out of which the literacy rate in male category is 84.3% whereas the literacy rate is 77.9% in female category and both are far above the national average.

Flora & Fauna

The surrounding area of RCF at Trombay, Mumbai has different kinds of habitats namely mangrove forest, tidal lagoon, mudflats, scrub vegetation and roadside plantations. No adverse impact has been estimated due to operation of proposed facilities on the existing flora & fauna of the study area.

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Traffic

The main raw material for proposed project is NG. NG shall be received through existing system of pipeline transport being provided by GAIL (India). There will be no change in production rate, hence, transportation of raw material and finished products shall not produce any adverse impact on the environment as well as existing traffic network.

ENVIRONMENTAL IMPACT

The proposed project shall be set up in a very small portion of existing plant premises of RCF fertilizer Complex with an aim to conserve energy & natural resources. The project will also reduce the pollutant emission like SO₂, NO_x & PM by adoption of ultra modern technique for steam & power generation. An impact of wastewater discharge has been assessed as per CPCB Guidelines based on calculation of EF & SNLF and the degree of pollution has been estimated as *LOW*. Overall environmental impact on all the components viz. climate, meteorology, air, water, soil, noise, flora-fauna & socio-economic shall be well within the sustainable limit rather will have positive impact in terms of providing employment opportunity, saving of about 86.05 GCal/Hr energy and about 1270 m³/day water.

ENVIRONMENTAL MANAGEMENT PLAN

Solid Waste Management

Construction Phase: Pollution expected during construction phase of proposed GT-HRSG project is considerably insignificant. The impact of the pollutants during construction phase on the environment would be basically of transient nature and are expected to wear out gradually on completion of the construction phase. However during construction of GT-HRSG and laying of pipes, some solid waste materials will be generated. These materials will be sold through CPCB / MPCB registered scrap dealers.

Operation Phase: RCF is relentlessly adopting the recent technology for the benefit of environment and to maintain the profitability even after the increase in the cost of raw material. Emphasis is given on adoption of 4R methodology (Reduce, Recover, Reuse and Recycle).

Air Environment

Flue gas from GT Set containing NO_x, CO:

The concentration of NO_x in the flue gas from GT-HRSG shall be reduced by installation of Flameless Oxidation (Flox / DeNO_x) burner, which will operate below 850°C, to a level of less than 50 ppm. Practically, there will be no SO₂ emission because the NG being used as Fuel will have a Sulphur concentration of <10ppm.

Exhausts from DG set:

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The DG sets shall be used only in case of emergency and as back-up power. The stack height shall be kept as per the standard calculation of stack height viewing the capacity of DG. However, the intermittent use i.e. only during emergency shall not impart any adverse impact on the environment hence; no management plan has been envisaged.

Mitigation Measures:

- Generation of atmospheric dust during construction phase due to movement of vehicles and earthmovers as well as due to filling and leveling shall be controlled through spray of water.
- The afforestation plan shall be aimed to cover all the vacant areas around the facilities.
- Concentrations of atmospheric pollutants shall be monitored regularly.

Water Environment

Water Supply & Consumption in existing plants

The proposed project will reduce the gross requirement of raw water equivalent to 1270 m³/day due to adoption of technologically advance GT-HRSG system and maximum recovery of heat. RCF commissioned STP plant in the year 2000 to reclaim process water from Municipal sewage from Mumbai city. This project helps to treat about 5MGD of sewage safely. About 55 to 58% of total water requirement of the factory is met by this plant. Also this helps to assure supply of process water to plants in Trombay complex.

RCF have taken further steps to establish second phase of STP unit to treat municipal sewage. This project will treat 20.7 MLD of sewage and obtain 15 MLD treated water for use. *Consent to establish* for this project has already obtained from MPCB with an aim to reduce a gross water pollution due to discharge of untreated municipal sewage into the environment.

GREEN BELT DEVELOPMENT

Areas to be Afforested

While preparing the layout plan for locating the different facilities, extreme care shall be taken to preserve the existing plantation to the extent possible. Trees, lawns and gardens have been developed within the premises to cover all the vacant areas.

Noise Environment

Measures for control and mitigation are as follows:

- Vendors of individual items shall ensure that the noise level at a horizontal distance of 1 m from the equipment does not exceed the indicated levels 90 dB(A).
- The high noise level generating equipment will be provided within acoustic walls.

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- The LSTK Contractor shall guarantee maximum noise level of 85 dB in the working environment.
- A proper green belt development program has been formulated.
- Control rooms shall be provided with acoustic walls.
- During visits to the areas of higher noise levels, the operational and maintenance personnel will use earplugs as a safety measure.
- Moving parts of equipment and earthmovers shall be properly maintained and lubricated to minimise the generation of noise.

CONCLUSION

The proposed project is limited only to adoption of improved technology for generation of power and steam through minimum energy consumption which will indirectly induced a energy saving of 0.33 GCal/MT of Ammonia and 0.30 GCal/MT Urea.

There will be no change in the category of air quality due to the project. The air quality shall remain in satisfactory category (II) even after implementation of the project.

There will be a positive impact on natural resources due to saving of water from natural aquatic resources equivalent to 1270 m³/day. Further, a reduction in total energy due to implementation of project, which has been calculated equivalent to 86.05 GCal/Hr, will enhance the stability and sustainability of the environment and ecosystem.

The implementation of the project will reduce the production cost of Urea resulting in reduction of subsidy burden of the country.