EXECUTIVE SUMMARY

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

The Rashtriya Chemicals and Fertilizers Limited (RCFL) Thal was issued TOR (Terms of Reference) on 20th January 2022 from Ministry of Environment and Forests & Climate Change (MoEF&CC) to obtain Environment Clearance (EC) for the proposed project of "Setting-up a New 1200 MTPD (DAP BASIS) NPK/DAP Complex Fertilizer Plant at existing RCF Facility, Thal, Maharashtra".

This Executive Summary highlights the key findings of the Environmental Impact Assessment (EIA) for the project to comply with the TOR granted by competent authority.

Background

RCF is one of the most revered Public Sector Undertaking (PSU) of the Ministry of Chemical and Fertilizers of Government of India. It was established in 1978 after re-organization of Fertilizer Corporation of India (FCI).

RCF, a Public Sector Undertaking is engaged in the manufacture and marketing of Fertilizers and Industrial Chemicals. The company has presently two manufacturing units, located at Trombay and Thal, both in Maharashtra. The Thal unit of RCF produces Urea, Ammonia, MAP, DMF, DMAC CO, Formic, Argon etc.

In view of the national vision of "Atmanirbhar Bharat" and to meet the growing domestic demand for NPK/DAP in recent, RCF proposes to set-up New NPK/DAP Complex fertilizer Plant of 1200 MTPD capacity within the existing RCF Thal Unit premises.

In this regard, RCF is advised to obtain environmental clearance (EC) from MoEF&CC for the establishment of New NPK/DAP Plant to be set-up within the existing RCF Facility, which attracts the provision of obtaining environment clearance under the guidelines laid in EIA Notification 2006 and its amendment.

As per EIA Notification 2006, published in Gazette of India, Extraordinary Part-II, Section-3, sub-section (ii) of Ministry of Environment & Forest dated 14.09.2006 and subsequent amendments, the proposed project falls in Activity 5(a), Category-A of "List of Projects or Activities Requiring Prior Environmental Clearance". All projects or activities included as Category 'A' in the Schedule, including expansion and modernization of existing projects or activities and change in product mix, shall require prior environmental clearance from the Central Government in the Ministry of Environment Forests and Climate Change (MoEF&CC) on the recommendations of an Expert Appraisal Committee (EAC) constituted by the Central Government for the purposes of this notification.

The Environmental Impact Assessment and Management Plan has been prepared to fulfill the basic requirement for protection of the environment according to the approved TOR granted on 20.01.2022 vide letter no. **No. No.IA-J-11011/533/2021-IA-II(I)** by MoEF&CC against proposal no. **IA/MH/IND3/246984/2021** for conducting environment impact assessment study for chemical fertilizers and information to be included in EIA/EMP report for seeking environmental clearance.

Project Proposal

The project proposal by RCF relates to setting-up A New 1200 MTPD (DAP BASIS) NPK/DAP Complex Fertilizer Plant at existing RCF Facility, Thal, Maharashtra based on PR+PN Technology using Sulphuric acid, Phosphoric acid and Ammonia as raw materials. In view of the

national vision of “Atmanirbhar Bharat” and to meet the growing domestic demand of NPK/DAP complex fertilizer, RCF proposes to set-up new plant at its Thal Unit.

Details Of Eia Consultant

Projects & Development India Limited (PDIL), a premier engineering and NABET accredited EIA consultant organization (NABET/EIA/1821/SA 0124), have been retained by RCF for preparation of EIA Report, online submission and obtaining environmental clearance from MoEF&CC. PDIL is also equipped with CPCB recognized environmental laboratory at Noida.
PDIL is a Mini Ratna, Category-I, Govt. of India Undertaking under Department of Fertilizers. PDIL is an ISO 9001:2015, ISO 45001:2018 Certified and ISO/IEC 17020:2012 accredited premier Engineering & Consultancy Organization which has played pivotal role in the growth of Indian Fertilizer Industry.

Project Cost & Completion Schedule

The estimated cost of the project is Rs. 914.58 Crores and the scheduled completion time is 24 months (Mechanical completion) from the Date of award of contract to LSTK Bidder.

Project Location

The proposed project shall be located at latitude ***18°41'48.17°N,*** longitude ***72°52'10.56°E*** & 5 m MSL inside existing industrial premises of RCF, Thal. The complex is situated in a coastal plain bordering in West towards the Arabian Sea and in East towards Hills. The existing fertilizer complex is situated in an agricultural region. The plant is approximately 100 km from Mumbai by road and is connected to National Highway (NH-17) by a State road. Thal complex is connected by railway to Apta-Panvel-Diva section of railway network via Pen.

Need & Benefits

- DAP fertilizer is an excellent source of P and nitrogen (N) for plant nutrition. It's highly soluble and thus dissolves quickly in soil to release plant-available phosphate and ammonium. A notable property of DAP is the alkaline pH that develops around the dissolving granule.
- NPK/DAP is popular for its readiness to mix with the soil and hence, is used as a favourable crop fertilizer to improve nitrogen content of soil it has High yield & High in nutrients value.
- It does not have side effects as it is broken down by the soil bacteria
- The high content of Nitrogen and Phosphorous needed for the plants is provided by DAP
- Cost-effective and high growth in plants brings in high profits.
- DAP (Di-ammonium phosphate) is a concentrated phosphate-based fertilizer. Phosphorus is an essential nutrient along with Nitrogen and plays a vital role in the development of new plant tissues and the regulation of protein synthesis in crops.

Present Environmental Status

Climate & Meteorology

The climate of the study area falls under tropical wet and dry climate under the Köppen climate classification, with seven months of dryness and peak of rains in July. The cooler season from December to February are followed by the summer season from March to June. The period from June to about the end of September constitutes the south-west monsoon season, and October and November form the post-monsoon season. The study period for the proposed project was

20th January 2022 to 19th April 2022.
Ambient temperature was in the range of **13.0 to 40.0°C.**
Relative humidity was in the range of **15 to 94%.**

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 **110.0 and 144.8 Kg/Ha.**
Level of Phosphorous as P_2O_5 ranged between **6.8 & 10.2 Kg/Ha.**
Level of Potash as K_2O ranged between **52.0 & 76.6 Kg/Ha.**

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

Air Environment

Air pollution due to NOx and SO_2 does not invite any adverse comments.

Table-E1

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	43	53	48	16	27	19	12.5	18.5	15.0	21.9	35.0	27.1	Satisfactory
SA2	48	60	54	15	26	19	12.2	18.1	14.7	19.3	30.8	23.9	Satisfactory
SA3	57	71	64	25	32	29	12.7	18.8	15.2	22.2	35.5	27.5	Satisfactory
SA4	40	49	44	18	23	21	9.8	14.6	11.8	12.2	19.5	15.1	Good
SA5	39	48	43	17	23	20	9.6	14.3	11.5	11.9	19.1	14.8	Good
SA6	35	44	39	15	20	18	8.7	12.9	10.4	10.7	17.2	13.3	Good
SA7	36	48	42	17	25	21	9.1	14.0	10.7	11.8	20.8	15.4	Good
SA8	32	43	38	14	21	18	10.0	15.4	11.8	13.0	22.8	16.9	Good

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 operation phase has been envisaged. However, increase in PM level at construction site can't be ruled out during construction phase.

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 **Swachchh Bharat Abhiyaan** with health impacts 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

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

Where,

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

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

Calculation of EPI for Ground Water within study area

Parameter	Min	Max	Standard	EF	SNLF
pH	7.3	7.6	8.5	0.89	0.00
Total Dissolved Solids	400	2000	2000	1.00	0.13
Total Alkalinity as $CaCO_3$	120	650	600	1.08	0.14
Total Hardness, as $CaCO_3$	122	780	600	1.30	0.16
Chloride as Cl	66	428	1000	0.43	0.00
Sulphate as SO_4	32	650	400	1.63	0.20
Nitrate as NO_3	2.3	3.6	45	0.08	0.00
Iron as Fe	0.18	0.26	0.3	0.87	0.00

Calculation of EPI for Surface Water within study area

Parameter	Min	Max	Standard	EF	SNLF
pH	7.2	7.8	8.5	0.92	0.0
Turbidity	7	32	5.00	6.40	6.4
Total Dissolved Solids	400	40000	2000	20.00	5.0
Total Alkalinity as $CaCO_3$	146	800	600	1.33	0.3
Total Hardness, as $CaCO_3$	130	6000	600	10.00	3.8
Chloride as Cl	20	22800	1000	22.80	5.7
Sulphate as SO_4	104	780	400	1.95	0.5
Nitrate as NO_3	1.2	5	45	0.11	0.0
Iron as Fe	0.08	0.14	0.3	0.47	0.0

Noise Environment

The noise generation during construction phase may temporally have impact on the existing ambient noise levels. The major works associated with installation/ construction activities shall be carried out during day time. The heavy construction equipment may result in high noise, which may affect the personnel in the work zone. However, use of Personal Protective Equipments (PPE) such as earplugs, ear muffs, barricading construction area will mitigate any adverse impact of the noise on working personnel.

Estimation of HSD & HA Affected Persons

Sl. No.	Location	Noise Level dB (A)		HSD %	Noise Level dB (A)	HA%
		Leq (Day)	Leq (Night)		Leq (DN)	
SA1	Near Proposed Project Site (RCF Thal)	55.3	46.4	4.07	53.8	5.66
SA2	Garden Area near Workshop (RCF Thal)	55.7	44.9	3.61	54.2	5.90
SA3	Near Material Gate (RCF Thal)	63.1	47.0	4.28	48.9	11.73
SA4	Admin Building (RCF Thal)	50.2	43.8	3.32	59.1	3.17
SA5	Wadgaon	51.8	42.6	3.04	50.3	3.82
SA6	Hospital RCF Colony	43.8	39.4	2.50	49.7	0.35
SA7	Thal Bazar	53.2	43.4	3.22	51.7	4.51
SA8	Swagat Guest House	47.6	41.8	2.87	46.4	2.06

**HSD: highly sleep disturbed, *HA: Highly Annoyance,* HA> HSD in the maximum location.

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 $1.0x10^{-6}$ 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

According to the 2011 Census, there are 81 revenue villages and one census town of Alibag located within the distance of 10-kms from Thal Fertilizer complex. Out of 81 revenue villages, 40 villages are located within Alibag Tehsil, 10 within Uran Tehsil and 31 within Pen Tehsil of Raigad district. Formerly called the Kolaba district, the district was renamed after Raigad, the fort that was the former capital of the Maratha leader Shivaji Maharaj, and is located in the interior regions of the district, in dense forests on a west-facing spur of the Western Ghats of Sahyadri range. In 2011, the district had a population of 2,635,394, compared to 2,207,929 in 2001. In 2011 urban

dwellers had increased to 36.91% from 24.22% in 2001.

Flora & Fauna

The floristic component of the study area does not include any rare or endangered species. Thus, impact on rare and endangered species of flora is not envisaged. The project does not envisage destruction or displacement of any fauna species. Thus, indirect impact on fauna due to loss of habitat is not foreseen..

Traffic

Total Traffic Density during weekday: **8033 PCU**
Total Traffic Density during weekend: **11397 PCU**

Traffic influence by

- High Medium Vehicles (HMV) caused by the material transportation to& fro RCF plant and Bus from Alibagh to Mumbai and Rewas.
- During weekend (Saturday-Sunday) traffic influenced by local markets like Chondhi bazaar & tourists ingress etc.

Environmental Impact

As the project is limited to setting-up New NPK/DAP plant in existing RCF Facility thus during construction limited Environmental impact is envisaged. Although operation phase of project comprises various activities, each of which may have either positive or negative impact on some or other environmental attributes which may be regarded as temporary or short-term & reversible. As per the study no significant adverse impact on environment is envisaged.

Environmental Management Plan

Impact on Topography

During the construction phase, the soil topography may be slightly impacted due to activities such as preparation of Bore/holes, Site work line excavation of soil/filling of demolition waste, Temporary facilities such as Sheds, approach roads, sanitary facility, Site Clearance and removal of trees, shrubs and grass can impact topography temporarily.

Mitigation Measures: The soil investigation is limited to construction of bore wells/holes which will have no impact on the topography and environment. After the Soil investigation, the bore/hole will be covered or refilled. Due the plant erection, change in topography is envisaged on micro level which may be considered insignificant in view of product demand & benefits arising out of it.

Impact on Climate

The climate of the study area falls under tropical wet and dry climate, as it is a small project which is limited to RCF Thal premises. Hence, no impact on climate is envisaged.

Land Environment

There will be no change in land use as the proposed site is demarcated for industrial use only. Construction/installation shall be done as per the industrial area and local norms. Leveling of site shall be maintained as per the local drainage pattern at the site.

Mitigation Measures: Proposed plant would be established on a small piece of land within existing factory premises of the fertilizer plant. Hence, there shall be no change in land use pattern; existing drainage pattern shall be maintained even after establishment of the proposed project. Proposed project shall be based on latest manufacturing Technology which is supposed to be one of the cleanest processes.

Air Environment

Land preparation and civil construction activities will lead to generation of dust. Installation of equipment and mechanical fabrications will also lead to generation of gaseous pollutants like SO_2 & NO_x mainly from the exhausts of earthmovers and other construction equipment. However, these activities will persist for a limited period of construction and will be confined within boundary walls and the corridor of trees existing.

Mitigation Measures: Water sprinkling shall be done at regular intervals at construction site. Roads in the area are already paved thus will reduce the abrasion and thereby reduce the dust generation. Temporary road will be constructed wherever required for movement of trucks. Raw materials/debris/excavated muck shall be properly stacked and stored under covered conditions at designated areas/storage yards and removed regularly. Storage of raw materials like cement, sand, soil, etc. shall be done in covered area or should be covered by tarpaulin cover. Construction workers shall be equipped with mask, helmet, gloves, & other PPEs at construction site.

Noise Environment

Temporary impact on the existing ambient noise levels. The major works associated with installation/ construction activities would be carried out during day time. The heavy construction equipment may result in high noise, which may affect the personnel in the work zone. However, use of Personal Protective Equipments (PPE) such as earplugs, ear muffs will mitigate any adverse impact of the noise on working personnel.

Mitigation Measures: The construction activity shall be carried out mostly during daytime.

Regular noise level monitoring shall be carried out for taking corrective action. All the construction machinery and equipment used shall be provided with adequate noise mufflers and noise suppression equipment along with proper lubrication. Adequate parking space will be provided at the project site to minimize the honking requirement due to congestion and jams and restricting the speed limits. Protection devices (earplugs or earmuffs) shall be provided to those workers who cannot be isolated from the source of noise and reducing the exposure time of workers to the higher noise levels by rotation.

Water Environment

During construction phase, about 350 labourers would be engaged by the contractors. water requirements during construction & operation shall be fulfilled through the water available from existing facilities of RCF Unit. Drinking water shall be supplied separately through existing source of MIDC.

Mitigation Measures: No vehicle washing or maintenance shall be carried out at construction site. No ground water shall be extracted for construction purpose and no excavation works shall be undertaken during monsoon season. Water supply and sanitation facilities shall made available at labour camp and other areas at site. Loose Raw material and construction debris shall be stored in covered areas and paved areas to avoid direct exposure and mixing with run-off. No wastewater shall dispose to nearby water body. During operation phase there is provision of ZLD no waste water discharge envisaged.

Solid Waste Management

Construction activities lead to generation of concrete, muck, metal scraps, stone, bricks, glass, polythene sheets, plastic, paper etc. as waste. Various operations during the construction activities lead to the varied compositions in the total solid waste stream and affect the site.

Mitigation Measures: The waste is required to be collected, segregated and disposed in manner

that it does not mixes or polluting air, water and soiling environment. Excavated topsoil shall be used for backfilling/ greenbelt development & plantation. Municipal waste will be minimal as most of construction workforce will come from near areas and no construction camp is proposed. The waste generated will be collected, segregated and disposed off suitably as per C&D waste management rules 2016. Hence impacts will be insignificant and for short duration only.

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).

Impact on Ecology

The impact on the surrounding ecology during the operation of the project will mainly occur from the deposition of air pollutants. Air pollution affects the biotic and abiotic components of the ecosystem individually and synergistically with other pollutants. Acute effects on plants and animals may be induced when the concentration of air pollutants exceeds threshold limits. As ZLD technology will be considered, no effluent will be discharged outside the proposed plant.

Impact on Socio Economic

The development due to proposed project will have marginal impacts on local socio-economic condition of the people residing in the area. The construction activities would provide temporary employment to the skilled / unskilled people residing in adjoining villages.

NPK/DAP fertilizer production will reduce the demand supply gap which will also contribute to the Local and National GDP in terms of positive impact on societal growth and helps in farmers' growth to create better agriculture practices and build a healthy nation. This project will ensure ease in availability of NPK fertilizers to the consumers.

Conclusion

The proposal for the establishment of New NPK/DAP plant (Capacity 1200 MTPD) doesn't envisage any adverse environmental impacts on the surrounding environment. The green belt will also be strengthened to contain the dust and noise due to various activities. Hence no significant impact on ecology is expected during construction phase and operation phase.

RCF has also been involved in executing various Corporate Sustainability Activities, which address issues on environment and community. RCF has been consistently working for the betterment of community and its contribution in this area has a long history. RCF is taking up various activities related to CSR much before the incorporation of CSR activity under Company's act 2013.

Based on the EIA study and various safety and security measures mentioned above for the proposal for production enhancement project, it may be inferred that the project may be considered acceptable from environment point of view.