Executive Summary of Environmental Impact Assessment Report

for

Expansion of Existing Capacity of Phosphoric Acid plant

By

M/s. Greenstar Fertilizers Limited

In

SPIC Nagar, District Tuticorin, Tamil Nadu
EXECUTIVE SUMMARY

Introduction and Background Project Highlight

Southern Petrochemical Industries Corporation Ltd., or SPIC, (BSE: 590030, NSE: SPIC) is an Indian company that makes petrochemicals. Its core competency is in fertilizer products. It has operations in power, oil and natural gas, and biotechnology applications in agriculture.

Southern Petrochemical Industries Corporation Ltd, Tuticorin transferred entire Phosphatic business Di Ammonium Phosphate, ALF₃ and SSP Units and intermediate product of Sulphuric aci and Phosphoric acid to M/S Greenstar Fertilizers Limited (henceforth Greenstar), Tuticorin on 24th October 2011 through Business Transfer Agreement. So now Greenstar Fertilizers Limited, Tuticorin has ownership of Di Ammonium Phosphate, ALF₃ and SSP Unit.

Greenstar Fertilizers Private Limited, Tuticorin was originally incorporated on 25th August 2010 under Companies Act, 1956. On dated 20th July 2011 Company name was changed to Greenstar Fertilizer Limited.

Greenstar Fertilizers Limited, Greenstar proposes to enhance the capacity of their existing manufacturing unit of phosphoric acid at Tuticorin to fulfill the demand of raw materials for DAP Plant.

The Di-ammonium phosphate fertilizer will cater to domestic market & thus reduce dependency on import market.

Project Categorization

As per the EIA Notification 2006 of Ministry of Environment & Forests (MoEF), Government of India and lastly amended on December 1, 2009, Greenstar proposed Expansion of Phosphoric acid manufacturing unit has to obtain required prior environmental clearance for commissioning the plant. The proposed project is covered under Category 'A' as per the Schedule of EIA Notification and hence requires environmental clearance from EAC of Ministry of Environment & Forest, New Delhi.
Project Location

Greenstar existing plant situated on industrial Land in SPIC Nagar, Post Office Muthiahpuram P.O Taluka-Tuticorin, District Tuticorin, State of Tamil Nadu - 628005. The Plant site is located at about 8.0 km from Municipal Office of Tuticorin City on Thoothukudi- Tiruchendur Road.

Project Description (Key Steps)

*Phosphoric Acid Plant – Key Steps*
Phosphoric acid plant will consists of following sections

- Rock Phosphate unloading and storage
- Reactor section
- Hemi-Hydrate filtration section
- Transformation section
- Dehydrate filtration system
- Dry Gypsum conveying
- Clarification & Storage
- Evaporation section

**Sulphuric Acid— Key Steps**

- Sulphur Burning
- SO2 Converter
- Absorption Tower
- Storage

**Di-Ammonium Phosphate -- Key Steps**

- Reaction & Granulation
- Off gas Absorption system
- Solid handling

**SSP Plant-Key Steps**

- Rock Phosphate grinding
- Mixing – acid- rock
- Storage Den
- Solid Handling

**Aluminum Flouride**

- AHF from Hydrofluorosilicic acid
- Purification
- AHF liquification & storage
- ALF3 manufacture from AHF

**Resources Requirement**

**Land:** The proposed land terrain is near coast (~ 4.3 MSL), flat and developed. Total land area under possession of Greenstar is 519483 Sq. m with 283780 Sq. m of Green Belt. There is sufficient land for the proposed expansion project.

**Raw Material:** The main raw materials required for the present manufacturing process of Phosphatic fertilizers are rock phosphate having P$_2$O$_5$ percentage of 31.5%, Phosphoric Acid, concentrated Sulphuric Acid & Ammonia. The quantity wise requirement of various raw materials is as given below:
Chemicals (Raw Materials) | State | Consumption (MT/Month) | Means of Storage | Capacity of Vessel/ Pack/ Barrel (Kg)
--- | --- | --- | --- | ---
Rock Phosphate | Solid | Existing: 35938 | Expansion: 21616 | Total: 62100 | Rock Silo | 30,000 MT
Sulphuric acid | Liquid | Existing: 21771 | Expansion: 23129 | Total: 54900 | Storage Tanks | 1800 MT

**Water:** Existing Phosphoric Acid plant is taking treated water from integrated effluent treatment plant of Southern Petrochemical Industries Corporation Limited Tuticorin. Existing water requirement is 160 m³/hr which will rise to 168.6 m³/hr after expansion.

**Power:** This Power supply is managed with the existing facility itself. The source of power supply is Tamil Nadu Electricity Board (TNEB) and partly from Captive power unit. There is no additional power required from TNEB, after the expansion of plant.

**Fuel:** FO/LSHS will be used as Fuels

**Manpower:** Greenstar Fertilizers Limited, Tuticorin has proposed to give preference to local people for requirement in semi-skilled and unskilled category. Approximately 300 persons would be given direct and indirect employment in operation stage. Transport and other infrastructural facilities such as market centers, business establishment, recreation etc in the area will be improved.

**Environmental Aspects**

**Air Pollution**

The main sources of air pollution due to the operation of the plant are the Stacks of Sulfuric Acid Plant, Phosphoric Acid Plant, DAP Plant Stacks, AlF₃ plant and SSP.

The control measures employed for controlling air pollution are

- Venturi Gas scrubbers, cyclonic Mist Eliminators, Bag filters to control the emissions to atmosphere. The emissions from stack will conform to the regulatory requirement
- Stack of adequate height for Phosphoric acid plant and D.G.Sets.
- Elevated stack for venting of gases from the scrubbers to atmosphere
- Reuse of dust separated from cyclone from cyclone separator and from duct collector in process

HF gas generated from the Phosphoric Acid process will be conveyed in rubber lined ducts to the multistage scrubbers and HF from scrubber liquor will be recovered.
**Water Pollution**

In this project, water would be required for industrial use, domestic & gardening purposes. Although, there will be some wastewater generation due to industrial process, the water generated from washing and scrubbing will be recycled back in the process.

The total effluent generations from the project is are as given below;

- Sewage Water – Treated and reused in green belt development
- Effluent Water: recycle to process and Zero effluent discharge
- Process effluents and washing will be treated in 2 stage lime treatment to neutralize the acidity of spillages/drains. This water will be reused for the process. It is “Zero Liquid Discharge (ZLD)”.

Greenstar Fertilizers Limited, Tuticorin has septic tanks for treatment of sewage. Treated water is using in green belt development. Each toilet block is attached with septic tank. The overflow from the same is attached to central STP. Treated sewage water is used for Greenbelt development.

**Noise Pollution**

The plant will have various rotating machines including blowers, vacuum pumps, process pumps, etc. along with DG sets, which will generate noise and noise levels are within limits.

During operation/construction phase minor noise is envisaged. The statutory national standards for noise levels at the plant boundary and at residential areas near the plant are being monitored and shall be met.

**Waste Generation**

Around 1080000 MT Gypsum will generate after the enhancement the production capacity. It will be sold to Cement and Cement Sheet Manufacturing Industries. Existing Sulphuric acid plant is generating the approximate 05 M³/Year of V2O5 Spent Catalyst, 15 KL/Year Used Oil and 350 Used Batteries. Generated Hazardous wastes will be recycle by authorized recyclers or dispose through authorized disposal site.

**Environmental Status of Plant Site and Study Area**

**Site Characteristics**

Proposed project is to be set-up in existing premises of the Greenstar located on industrial land in Tutocorin. Geographically the proposed site is located Coastal area at Latitude 80°45’ N and Longitude 78° 13’ E. The study area has been defined as an area covering the buffer study
zone of 10-km radius around project site. Figure given below shows the 10-km radius map.

Google map of the project Site

Figure given below shows location map of the study area.
Executive Summary of Environmental Impact Assessment of proposed Expansion of Existing Phosphoric Acid plant of M/s. Greenstar Fertilizers Limited (Greenstar), Tuticorin

Topography and Geology:

Greenstar proposed expansion site is situated in Mullakadu Village, Taluka& district Tuticorin of Tamil Nadu State. Approximately 8 kms from Tuticorintown on Thoothukudi-Trichendur-Kanyakumari road (NH-7A).

Climate:

The climate of the humid (coastal climate). December and January constitutes winter months with daily mean minimum temperature around 21.3°C and daily mean maximum temperature around 29.0°C. June is the hottest month with daily mean maximum temperature around 35.8°C and daily mean minimum temperature around 26.1°C.

The annual total rainfall is 640.7 mm. Over 80% of the total annual rainfall is received during the Post monsoon period between June to September.

Seismicity:

According to the seismic-zoning map of India, the project area falls in Zone II of seismicity. It thus lies among the Low-risk earthquake areas. For pockets with high rise buildings, specific consideration of earthquake resistance shall be incorporated. IS 4326:1993 ‘Earthquake Resistant Design and Construction of Buildings – Code of Practice’ and IS 13920:1993 ‘Ductile Detailing of Reinforced Concrete Structures subjected to Seismic Forces – Code of Practice’ shall be followed as per the requirement.

Micro-meteorology:

Meteorological study exerts a critical influence on air quality as it is an important factor in governing the ambient air quality. The meteorological data recorded during the study period is used for interpretation of the baseline information as well as input for air quality simulation models. Meteorological data was collected for the Summer season of April to June 2015. Utmost care was taken to ensure that the stations were free from obstructions to free flow of winds. Wind speed, wind direction, temperature and relative humidity data was collected daily on an hourly basis during the study period.

Soil:

The soil samples collected from seven locations. Soil study reveals that the soil is made-up of two main parts:

- Tiny bits of mineral particles which come from larger rocks, and humus, which is dark brown in color and consists of decaying remains of plants and animals.
- Soil also contains water, air and living organisms, such as fungi, bacteria, earthworms, roundworms, insects, etc. Actually more living organisms live in the soil than above it.
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**Landuse:**

The agricultural area represents around 7.8%. Open shrub land & vegetation is about 23.35% & 4.72% respectively. Barren land is 2.17% and 35.96% water bodies within 10 km. area of project site.

**Water:**

- Ground water quality was monitored as per drinking water norms (IS 10500) at 6 locations within the 10 km study area. The groundwater of the study area is saline in nature to the tune of high salinity to slightly saline. The salinity depends upon proximity to sea or sea channel. High conductivity and hardness has been observed in the ground water samples near the sea, which may be due to coastal aquifer. Overall the parameters in ground water sample were well within the desirable limit of Indian Standard IS: 10500-2012 except total hardness which is slightly high with respect to the permissible limit of Indian Standard IS: 10500-2012.

Surface water quality of the pond near Periyanyagapuram, Pond near Ramson nagar, Pond near Sivaganganpuram was found to meet the Best Designated Use – ‘C’ Criteria of CPCB. No metallic contamination was found in pond water. The other surface water shows high TDS, Hardness, chloride and alkalinity that may be due to the sea back water contamination. Metallic contents in the surface water of the study area are with in the standard.

**Air Quality:**

Ambient air quality was monitored for PM$_{10}$, PM$_{2.5}$, SO$_2$, NOx, CO and NH$_3$, at 8 locations within the study area. The existing PM10, PM2.5, SO2, NOx, CO and NH3 concentrations (monthly average) at all eight (8) monitoring locations are given as Table 3.9. All the criteria pollutants concentrations were observed well within National Ambient Air Quality Standards for industrial, residential and rural areas at all 8 locations.

**Noise:**

The noise levels at the plant site were found within industrial limit. At other locations (nearby villages) it was also found within limit.

**Flora & Fauna:**

There are no National Parks/wildlife sanctuaries in the 10 km radius of the study area. With reference to the list of endangered species prepared by Botanical Survey of India (BSI) and Zoological Survey of India (ZSI), Ministry of Environment and Forests, Government of India, none of the species present in the study area belonged to the ‘endangered’ category.

**Demography:**

The study area of 10 km radial zone mainly falls in two tehsils Srivaikuntam and Thoothudi of Thoothukkudi District. There are total 20 villages in the study area. 5 villages namely Iruvappapuram, Palayakkayal, Manjanirkayal, Agaram & Mukkani and 15 villages namely
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Kumaragiri, Thoothukudi, Ayyanadaippu, Muthuswamipuram, Terkusilukanpatti, Maravanmatam, Korampallam (Part), Sendilampannai, Kuttudankadu, Servaikaranmadam, Kuliyanarkisal, Mullakadu (Part), Sankaraperi (CT), Mappilaiurani (CT), Milavittan (CT) falls under Srivaikuntam and Thoothudi Tehsils respectively. As per the Census of India 2011, the Total Population of the Study area is 167442 with the total number of Household being 42663. Total Male Population of the Study area is 83997 and total Female Population of the Study Area is 83445.

Literacy Level

Literacy level is quantifiable indicator to assess the development status of any area or region. The literate male and female in the study area are 67994 and 62038 which implies that the literacy rate is 77.65% with male and female percentage being 40% and 37% respectively. The illiterates are 22.34% of the total population of which male and female illiterates are 16003 (10%) and 21407 (13%) respectively.

Health facilities

In many villages, medical facilities, primary health centres and dispensaries are away to a distance of 5 km or more.

Drinking Water facilities

Hand pump, tap water, bore wells are prime source of drinking water in villages.

Communication Facilities

Communication facilities are adequate in the study area.

Transportation facilities are poor, as bus services are available only to those villages having an approach of pucca roads.

Electricity

Adequate electric power supply is available for industries and domestic purposes.

Environmental Impact Assessment

The activities involved in site preparation will be site clearance of the project site, cutting and uprooting of shrubs, earthwork excavation etc. The development of site will also involve the removal of top soil, removal of shrubs, soils, etc. As the topography of the land is almost flat, there will be very minimum cutting and filling required for setting up of the plant and no filling material from outside is required. Hence, there will be very limited impact on the land environment due to the proposed project.
Air Quality

The main sources of additional air pollution due to the operation of proposed project will be phosphoric acid plant stack, HF.

For the proposed project, computations of 24-hour average ground level concentrations were carried out using ISCST3 model, which is a recommended model by USEPA for prediction of air quality from point area and line sources.

**Summary of Maximum 24-hour GLC due to the Existing Facility**

<table>
<thead>
<tr>
<th>Description</th>
<th>Concentration (µg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SOx</td>
</tr>
<tr>
<td>Maximum Rise in GLC</td>
<td>8.75</td>
</tr>
<tr>
<td>Distance of occurrence (km)</td>
<td>2.7</td>
</tr>
<tr>
<td>Direction of Occurrence</td>
<td>NE</td>
</tr>
<tr>
<td>Maximum Baseline Concentration reported</td>
<td>19.5</td>
</tr>
<tr>
<td>Total Concentration</td>
<td>28.25</td>
</tr>
</tbody>
</table>
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**Prescribed Standards**

<table>
<thead>
<tr>
<th></th>
<th>80</th>
<th>80</th>
<th>200</th>
<th>400</th>
</tr>
</thead>
</table>

### Summary of Maximum 24-hour GLC due to the Existing and Proposed Expansion

<table>
<thead>
<tr>
<th>Description</th>
<th>SOx</th>
<th>F</th>
<th>PM</th>
<th>NH₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Rise in GLC</td>
<td>--</td>
<td>7.49</td>
<td>30.2</td>
<td>--</td>
</tr>
<tr>
<td>Distance of occurrence (km)</td>
<td>--</td>
<td>2.6</td>
<td>2.6</td>
<td>--</td>
</tr>
<tr>
<td>Direction of Occurrence</td>
<td>--</td>
<td>NE</td>
<td>NE</td>
<td>--</td>
</tr>
<tr>
<td>Maximum Baseline Concentration reported</td>
<td>--</td>
<td>BDL</td>
<td>87.1</td>
<td>--</td>
</tr>
<tr>
<td>Total Concentration</td>
<td>--</td>
<td>7.49</td>
<td>127.3</td>
<td>--</td>
</tr>
<tr>
<td>Prescribed Standards</td>
<td>80</td>
<td>80</td>
<td>200</td>
<td>400</td>
</tr>
</tbody>
</table>

The above table shows that in the worst case scenario, the maximum ground level concentration due to the proposed project will be in the NE direction. In the post-project scenario, the total 24-hour average concentration for PM exceed the ambient air quality standards for industrial, residential, rural and other areas in the worst case. It should be noted that the maximum baseline concentration in the study area is itself near the prescribed standards for PM.

**Noise**

The sources of noise during the operational phase of the expansion project are mainly granulator, dryers and coolers, crushers, bucket elevators, screw conveyors, pumps etc. The other sources of noise are the movement of vehicles along the road all around the plant. The proposed Phosphoric acid expansion project will be a smaller project with advanced technology and improved equipment both in terms of energy efficiency and less noisy. However the material handling equipment especially crushers, bucket elevators and pay loaders are noisy but the noise level is limited. These machines will be provided with appropriate acoustic enclosures to maintain the noise levels within limits.

Hence, there would not be any adverse impact due to the operation of the plant on the residents of the nearby areas. Employees working near crushers, bucket elevators and pay-loaders are exposed to slightly high decibels noise (+ 80 dBA). Employees working in these areas will be provided with adequate PPEs.

**Water Resources and Water Quality**

Total water demand for the proposed expansion project is about 8.6 m3hr.mainly industrial water requirement. Existing water requirement is 160 m3hr. After the proposed expansion the water requirement will increase to 168.6 m3hr. The freshwater requirement will be met from SPIC. SPIC will supply ~2591 KLD fresh water and ~1455 KLD treated effluents for industrial use in Greenstar Fertilizers Limited.

Greenstar Fertilizers Limited, Tuticorin has septic tanks for treatment of sewage. Treated water is using in green belt development. Each toilet block is attached with septic tank. The overflow
from the same is attached to central STP. Treated sewage water is used for Greenbelt development.

Process effluents and washing will be treated in 2 stage lime treatment to neutralize the acidity of spillages/drains. This water will be reused for the process. It is “Zero Liquid Discharge (ZLD)".

The proposed expansion project will not have any adverse impact due to water or effluents.

**Land Use**

No additional land is to be acquired. No significant impact on land environment has been envisaged during the operation phase. The project is not going to generate huge quantities of hazardous waste. The gypsum the solid waste generated will be used in cement industries. Around ~35% of the land utilized for greenbelt development, which will help in enhancing the aesthetic environment of the area.

**Biological Environment**

Greenstar has allocated 283780 Sq. m land for greenbelt and lawn which is > 33% of the total land. This green belt need further thickening. These activities will help in reducing the air and noise pollution as well as will enhance the biological and aesthetic environment in and around the project site. The development of green belt provides habitat, food and breeding areas to birds, small animals and insects. No rare or endangered species of fauna are reported to exist in the area. Thus, no impacts on rare or endangered species are envisaged due to normal operations. Indigenous tree plantation will be preferred in greenbelt development. Hence, no impact on biological environment is envisaged.

**Demographic and Socio-economic**

Proposed project will generate direct /indirect employment. People will be engaged in in raw material and final products transportation, contractual manpower / retail for non-critical activities at the plant. The industrial growth of the region will help in infrastructure development in the area. It will also generate income for government through taxes. Overall the project will have positive impacts on socio-economic environment.

**Infrastructure**

The raw material (rock phosphate, Ammonia and Aluminium Hydroxide etc.) will be transported from mines / ports located in Rajasthan/Gujarat or will be imported. Approximately 150 to 200 trucks/ day will come to the plant. The final product (DAP/SSP/Aluminium Flouride) will be dispatched from plant to various parts of the country through the State and National high way and railways, for which nearly 100-120 trucks will be used for the same. Based on the estimation, approximately 10 to 15 trucks per hour will remain at the project site. Hence, due to the project activities the increase in the vehicular traffic density in the study area will be about 150 to 200 trucks per day. However, adequate parking for trucks at the project site along with rest room and canteen facilities within the premises of the factory for drivers will be provided.
The project site and National Highway (NH-7A), is only about 6 km away. Hence, this marginal increase in the traffic, will not affect the road infrastructure of the study area.

**Environmental Management Plan**

**Air Environment**

In order to mitigate the adverse environmental impact due to the construction and operation of the proposed project following measures are recommended:

**Construction Phase:**

- Excavators shall be used for construction. The excavated material such as topsoil and stones shall be stacked at safe places for reuse at a later stage of construction.
- To prevent soil erosion during construction phase, temporary seeding, sedimentation basins, contour trenching, mulching etc. can be done based on the net imperviousness of the site and it should not exceed the imperviousness factor as prescribed by the National Building Code, 2005.
- Preserving existing vegetation or re-vegetating disturbed soils is one of the most effective ways to control soil erosion.
- During dry weather, control of the dust nuisance created by excavation, and transportation activities shall be carried out by water sprinkling.
- Spill prevention and control plans shall be made, clearly stating measures to stop the source of the spill, to contain the spill, to dispose the contaminated material including paints, cleaners, and petroleum products.

**Operation Phase (Fugitive Dust):**

- Special care will be taken for the handling & transportation of the raw material within the premises.
- Sprinkling of water in an open ground area of the factory premises
- Speed of vehicles inside the factory premises will be controlled.
- Greenbelt will be maintained to attenuate the air pollution.
- Closed loop system will be adopted to reduce the workers exposure to hazardous chemicals during manufacturing process.
- Proper personal protective equipment will be provided to the workers.
- All trucks will be transported after covering from the top.
- Raw material unloading will be done by mechanized truck unloading system.
- Dust collectors will be in line with unloading hoppers.
- Material handling in the plant will be done in closed conveyors.
- All the trucks being used for transportation of raw material and final product shall be checked for "Pollution under Control" certificate prior to their entry to the plant premises.

**Noise Environment**

- All the equipment in the plant would be designed to have a total noise level as per the requirement of OHSAS:18001 (Occupational Safety and Health Assessment Series).
- Manufacturers/Suppliers of major noise generating machines/equipment like compressors, feed pumps, vacuum pumps, diesel engines, generators etc. should ensure the State-of-the-Art low noise equipment to comply with international standards.
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- Noise traps/ mufflers silencers shall be provided for noise reduction wherever possible. Acoustic design with sound proof glass paneling should be provided for in-house operators/ control rooms to mitigate any occupational exposure.
- Use of personal protective devices such as ear-muffs, ear-plugs etc. should be strictly enforced for the workers engaged in high noise areas.
- Provision of acoustic dampeners in foundations and insulators in the interiors.
- The insulation provided for prevention of loss of heat and personnel safety will also act as noise reducers.

**Water Environment**

Greenstar has taken ample precautions to reduce water consumptions and tackle effluents problem. All the process effluent generated from the proposed project will be treated in ETP & recycled back in the process itself and there will not be any disposal of industrial effluent. Domestic effluent, which will be treated in sewage treatment plant and treated water utilised in green belt development. No impact on ground or surface water is envisaged due to the project and hence, no mitigation measures are required. However, rainwater harvesting and recycle & reuse of all the industrial effluent have been adopted in the project to conserve the water resources. The project is “Zero Liquid Discharge” plant.

**Biological Environment**

Greenstar has allocated large part of land for greenbelt and lawn which is > 33% of the total land. This green belt need further thickening. These activities will help in reducing the air and noise pollution as well as will enhance the biological and aesthetic environment in and around the project site. The development of green belt provides habitat, food and breeding areas to birds, small animals and insects. No rare or endangered species of fauna are reported to exist in the area. Thus, no impacts on rare or endangered species are envisaged due to normal operations. Indigenous tree plantation will be preferred in greenbelt development. Hence, no impact on biological environment is envisaged.

**Corporate Social Responsibility**

- The proposed plant will have positive and beneficial impact on the status of employment generation. Greenstar have with a strong social conscience and this ideology seems out of the fact that we closely linked to community. Greenstar started its community devolvement program from day of operation and same shall be maintained in surrounding villages through community participation. Initiatives such as training of farmers for horticulture development through visits, , social forestry and women empowerment through self-help groups is already taken up under the CSR plan.
- The proposed project shall further strengthen its commitments on CSR investment for overall upliftment of socio economic index of the communities around the project site by way of financial and administrative support. The project will open up large employment opportunities, directly and also indirectly. There shall be opportunities for entrepreneurs to engage in many service sectors directly or indirectly associated with the project.
- The CSR approach of the company shall be towards sustainable livelihood management of the community around. There shall be focus on education, health, sanitation, drinking water, agriculture, water shed management, culture identity preservation, welfare of socially weaker sections and marginalized people.
Company shall allocate adequate percentage of the profit of proposed project cost towards implementation of corporate social responsibility initiatives, over five years from the commencement of project.

Projected cost for CSR activities

<table>
<thead>
<tr>
<th>S. No.</th>
<th>CSR ACTIVITY</th>
<th>Approx. Cost (RsCrores) (For 10 Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vocational training for local people employment for ITI.</td>
<td>7.2</td>
</tr>
<tr>
<td>2</td>
<td>Training for local people employment for Diploma / Degree Engineers.</td>
<td>3.22</td>
</tr>
<tr>
<td>3</td>
<td>Sponsoring national festival celebration, sports meet at nearby schools</td>
<td>1.9</td>
</tr>
<tr>
<td>4</td>
<td>Distribution of books to needy children at nearby schools. Donation in eye surgery, blood donation, and health checkup camps for local people.</td>
<td>1.4</td>
</tr>
<tr>
<td>5</td>
<td>Assisting district authority for local mela, providing drinking water to villagers.</td>
<td>0.7</td>
</tr>
<tr>
<td>6</td>
<td>Tree plantation in nearby areas.</td>
<td>0.2</td>
</tr>
<tr>
<td>7</td>
<td>Furniture donation to nearby schools.</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>15.32</strong></td>
</tr>
</tbody>
</table>

Occupational Health

A detailed mitigation plan will be followed:

- Periodical medical examination is being carried out for employees and contractors.
- Continuous and periodical Ambient air quality monitoring will be carried out.
- Work permit system is being followed.
- The required PPEs for each area/operation will be provided to the personnel.
- Waste management and hazardous waste handling.

Environment Monitoring Plan

A detailed environmental monitoring plan for the proposed project during construction and operation phases of the project has been outlined.

Environmental Monitoring Plan

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Location</th>
<th>Parameter</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Air Quality</td>
<td>Three AAQ stations</td>
<td>SOx, NOx &amp; F</td>
<td>Monthly</td>
</tr>
<tr>
<td>Works Zone Ambient Air Quality</td>
<td>Within Plant Premises</td>
<td>SOx, NOx, PM10, PM2.5, Ammonia &amp; F</td>
<td>Monthly</td>
</tr>
<tr>
<td>Stack Emission</td>
<td>All continuous stacks</td>
<td>PM, Ammonia and F.</td>
<td>Monthly</td>
</tr>
<tr>
<td>Noise</td>
<td>Plant area &amp; Day &amp; Night time noise</td>
<td></td>
<td>Monthly</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Discipline</th>
<th>Location</th>
<th>Parameter</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Check Up</td>
<td>All Plant Personnel</td>
<td>Disease of eyes, ears and chest</td>
<td>General - Yearly &amp; specific parameters for Critical area – Six monthly</td>
</tr>
</tbody>
</table>

General Safety Measures

- All required safety precautions is being followed in the plant.
- Safety awareness program and training of the worker will be carried out to motivate the workers to increase the safety level at personal level.
- The unit will provide special precautions for storage & handling of acids and other chemicals within the premises.

Salient Features of the proposed phosphoric acid plant:

1. **Reduction Grinding energy and dust emission** – In the revamped plant, rock phosphate up to 5 mm size can be used for Phosphoric acid production. Only over size rock from the screen is fed to the old hopper for grinding and hence there will be a substantial reduction in over all energy requirement for rock grinding operation in comparison with existing Phosphoric acid plant which requires 100 % grinding. As the grinding requirement has reduced, the dust emission level also getting reduced by 90%.

2. **Reduction in specific consumption of water** – Byproduct obtained from DH filtration is dry gypsum instead of wet gypsum slurry in the conventional process. The filtrate is used in HH filtration section and hence significant reduction in specific water consumption.

3. **Reduction in emission level** – after the addition of off gas stack in existing TCA – III exit, there will be reduction of almost 50 % of gas emission quantity form the process.

4. **Fluorine recovery**: In the revamped process, the fluorine recovery is possible from reaction stage also as against the conventional process and hence the fluorine recovery will get improved.
Project Cost & Cost towards Environmental Protection

The total project cost of the proposed Ammonium Phosphate and Aluminium Flouride plant is ~Rs. 129.00 crores. The total capital cost of air pollution and water pollution control measures is Rs. 604 Lacs. The recurring cost for the Pollution control measure will be around Rs 240 Lacs/annum.

### Cost towards Environmental protection

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Head</th>
<th>Approximate capital cost (Rs. in lacs)</th>
<th>Approximate Recurring cost per Annum (Rs. In lacs)</th>
<th>Basis for cost estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Air pollution control and noise pollution monitoring</td>
<td>86</td>
<td>62</td>
<td>Stack, ladder and platform, monitoring of Air environment, Ambient Noise monitoring, Acoustic hoods/enclosures, noise mapping, hearing protection</td>
</tr>
<tr>
<td>2</td>
<td>Water pollution control</td>
<td>500</td>
<td>134</td>
<td>Cost of ETP and STP including civil works, mechanical and electrical works, recurring cost for treatment of waste water</td>
</tr>
<tr>
<td>3</td>
<td>solid and Hazardous waste management</td>
<td>-</td>
<td>5</td>
<td>Cost for storage, transportation and disposal</td>
</tr>
<tr>
<td>4</td>
<td>Environment monitoring and management</td>
<td>-</td>
<td>32</td>
<td>Monitoring and statutory payments</td>
</tr>
<tr>
<td>5</td>
<td>Occupational Health</td>
<td>15</td>
<td>6</td>
<td>Periodical Health check up and personal Protective equipments</td>
</tr>
<tr>
<td>6</td>
<td>Green belt and rain water harvesting</td>
<td>3</td>
<td>1</td>
<td>Cost for plant species and labor cost for plantation and recurring cost for maintenance of green belt</td>
</tr>
</tbody>
</table>

| Total  | 604                                          | 240                                                 |