PROJECT REPORT

of

PROGRESSIVE FERTICHEM PVT. LTD.

FOR EXPANSION/ DIVERSIFICATION OF EXSISTING SULPHURIC ACID, SINGLE SUPER PHOSPHATE FERTILIZER, ZINC SULPHATE UNITS & INSTALLATION OF ROCK GRINDING UNIT

PREPARED

BY

ABHISHEK ENGINEERING CONSULTANTS

304, Aakar Apartment, Mangilal Plot, Camp Road, Amravati (M.S.)- 444 602, INDIA

E-mail : gskakpure@rediffmail.com
**PROJECT AT A GLANCE FOR PROPOSED EXPANSION**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>01</strong></td>
<td>Name of the unit</td>
<td>Progressive Fertichem (P) Ltd</td>
</tr>
<tr>
<td><strong>02</strong></td>
<td>Name of the promoter</td>
<td>Stake holders of the Company</td>
</tr>
<tr>
<td><strong>03</strong></td>
<td>Proposed location</td>
<td>Topatoli Dist: Kamrup (Metro), Assam</td>
</tr>
<tr>
<td><strong>04</strong></td>
<td>Total Fixed Capital after Expansion</td>
<td>Rs. 922.54 Lacs</td>
</tr>
<tr>
<td><strong>05</strong></td>
<td>Total Project Cost after Expansion</td>
<td>Rs. 1846.54 Lacs</td>
</tr>
<tr>
<td><strong>06</strong></td>
<td>Additional Finance Required For Proposed Expansion</td>
<td>Rs. 846.54 Lacs</td>
</tr>
<tr>
<td><strong>07</strong></td>
<td>Means of Finance:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Promoters’ contribution @ 45%</td>
<td>Rs. 380.94 Lacs</td>
</tr>
<tr>
<td></td>
<td>Subsidy from NEC @ 25%</td>
<td>Rs. 211.64 Lacs</td>
</tr>
<tr>
<td></td>
<td>Loan from Promoter’s Associate units</td>
<td>Rs. 253.96 Lacs</td>
</tr>
<tr>
<td><strong>08</strong></td>
<td>Estimated Net Profit after Expansion</td>
<td>Rs. 14175.00 Lacs</td>
</tr>
<tr>
<td><strong>09</strong></td>
<td>Percentage of Profit on sale</td>
<td>20.32%</td>
</tr>
</tbody>
</table>
I] INTRODUCTION

In the modern farming, the use of fertilizers becomes unavoidable. The Indian farmers are fully aware of the importance of fertilizers in the basic need of the farmers in the age of agricultural development. As per available statistics, India has increased the food grains production over the last 4 decades and along with other inputs, the fertilizers consumption per hector has also improved. Since the need is there and the scope is identified, the efforts in this field will further increase the consumption of fertilizers. After partial decontrol of fertilizer, SSP is one of the cheapest fertilizers which farmers can afford to utilize. Looking to the future prospects the existing capacity 45000 MT is insufficient for substantial impact in the market. Accordingly proposed increased the capacity of the existing SSP unit from 45000 MT to 75000 MT per Annum. As Ministry Of Chemicals & fertilizer also stipulated to convert SSP fertilizer from powdered form to Granulated form by 31\textsuperscript{st} May’2013 by all SSP manufacturers. We therefore proposed convert our SSP unit from powdered from to Granulated form.

Similarly with the development in the scientific application modern technique for higher agriculture out, the application complete nutrients is essential which includes application of micronutrient namely sulphate of Zinc, Magnesium, Bron etc. Furthermore application of Zinc is an essential micronutrient considering its deficiencies cause’s major problem in human health. There are two forms of Zinc that has been utilized in agriculture of which Zinc Heptahydrate used as a top dressing in the plant where as Zinc monohydrate applied at the time of preparation field for plantation. Therefore existing Heptahydrate plant of Zinc will not be sufficient to meet the growing demand Zinc Nutrient. Accordingly proposed to modify the existing Zinc Sulphate Heptahydrate plant for Zinc monohydrate as well.
Furthermore, considering the demand of around 50,000 MT powdered Rock Phosphate for direct application in this part of the region due to acidic nature of the soil, it is proposed to installed a separate Rock Grinding Unit separately for demand of Rock Phosphate for direct application.

With the proposed increased in the production capacity of SSP and modification Zinc Sulphate unit, the requirement Sulphuric Acid would also increase. Simultaneously the market demand of sulphuric also raised with the growth in industries which is picking up lately in this part of the region due to adverse geographical location.

Considering the above parameters, PFPL is proposed to increase capacity/ modification of their plants as under:

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Unit</th>
<th>Existing capacity /Annum</th>
<th>Proposed Capacity/ Annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Sulphuric Acid</td>
<td>15000 MT</td>
<td>24000 MT</td>
</tr>
<tr>
<td>02</td>
<td>SSP</td>
<td>45000 MT</td>
<td>75,000 MT</td>
</tr>
<tr>
<td>03</td>
<td>Zinc Hepta Hydrate or Zinc Monohydrate</td>
<td>3000 MT</td>
<td>6000 MT</td>
</tr>
<tr>
<td>04</td>
<td>Grinding Rock Phosphate Unit for Direct Application</td>
<td>--------------</td>
<td>45000 MT</td>
</tr>
<tr>
<td>05</td>
<td>Power Generation from recovery Waste Heat from SAP</td>
<td>300 Amp</td>
<td>500 Amp</td>
</tr>
</tbody>
</table>
II] THE TECHNICAL KNOW HOW

a) The Technical know will be taken for expansion of Sulphuric Acid unit, SSP unit with Granulation and Separate Rock phosphate Grinding unit for Direct application as per FCO.s norms from our existing consultant M/S Abhishek Engineering Consultants, Amravati (M.S.) under following terms and conditions:

i) They will maintain the present status as a “Zero Effluent Unit” from Pollution Control point of view.

ii) They will supply complete plant and machinery on turn-key basis.

The AEC will enter into an agreement with PFPL for Consultancy, Technical Know-How, supply of detailed engineering specifications of bought out equipment, drawings, operating manuals and the supply of plant and machinery on turnkey basis.

b) M/S Choudhary & Company who has proven record in providing consultancy services for Zinc Sulphate plant will be engaged for proving Technical Knowhow of the proposed modification of Zinc Sulphate unit for production of Zinc Monohydrate as per following conditions:
i) They will maintain the existing status as a “Zero Effluent Unit” from Pollution Control point of view.

ii) They will provide detailed engineering specifications equipment, drawings, and operating manuals and will assist procurement machineries from proven dependable vendors and demonstrate the technology to the full satisfaction of PFPL.

The Choudhary & Co is willing to enter into an agreement with PFPL for complete transfer of technologies and demonstrate to the satisfaction of PFPL.

III] PLANT CAPACITY AND PROCESS DETAILS

PLANT CAPACITY:

**Single Superphosphate (SSP):** Capacity of Existing 150 TPD SSP plant would be increased to 75,000MT @ 200 MT per day for 300 working days in a year in granulated form.

**Sulphuric Acid (SAP): The existing 50 TPD** SAP plant would be increased to the capacity of 24,000 MT/Year @ 80 MT per Day for 300 working days in a year.

**Zinc Sulphate:** Existing Zinc Sulphate plant is diversified for production Zinc Sulphate Heptahydrate and Zinc Monohydrate as well. After diversification, the plant capacity would be 6000 MT Year based 20 MT per Day for 300 working days in a year.

**Rock Phosphate Grinding unit:** Rock Phosphate Grinding unit for direct application will have a capacity of 45000 MT @ 150 MT per Day for 300 Days.

PROCESS: DETAILS
Process for manufacturing of SSP Gr. I (16% P2O5) as per Fertilizer (Control) Order 1985

a) The process consists of Grinding of rock phosphate to the required fineness.
   (90% passing thorough 100 mesh.)

b) Acidulation of the grounds rock phosphate with Sulphuric Acid to produce ‘Green SSP’

c) Curing of green SSP in godown for 10 days.

d) Cured SSP is granulated in the Granulation unit and thereafter packed in SSP in HDPE Bags of 50 kg Net.

A] ROCK PHOSPHATE GRINDING & FEEDING:

   Rock phosphate in size less than ½” chip is fed in rock phosphate hopper by using E. O. T. bucket elevator. From hopper a fixed quantity of rock is drawn with the help of a Pin – Gate and through belt conveyor, It is fed to mill in which grinding takes place and the ground rock phosphate of the fineness 90-95% passing through 100 mesh, is mechanically conveyed to acidulation.

B] ACIDULATION

   The ground rock phosphate from the storage hopper is conveyed to the top of the mixture and fed to the mixer at fixed rate through conveyor. The mixer is Horizontal single shaft fitted with ni-resist Paddles which makes the uniform slurry. This slurry is discharged in slow moving Den Conveyor where 75-80 % of reaction is completed and the mass solidified is cut out by Moving blades of a cutter & discharged in the godown. This mass is lifted by bucket type pay loader/bull dozer and kept in the godown for curing. This whole systems is kept under vacuum by using a blower which sucks in all the reaction gases through chamber scrubber In the Scrubber the gases are washed by spraying water and harmless vapor is forced out of Chimney.
C) POLLUTION CONTROL

As stated earlier the fluorine of the rock phosphate is converted to silicon tetra fluoride in gas form which while passing through ventury scrubber is dissolved in water to from Hydrofluosilic Acid, and silica. This is sent to settling tanks where silica is settled and clear solution of Hydrofluosilic Acid is transferred to storage. This liquor is reused in mixer. Thus no liquid effluent is discharge.

The settled silica is removed from the pit and used as filler after drying. The scrubber is so designed that the fluorine content in the emitted gases will not exceed 25 mg/NM3 and thus following controls will be achieved.

1) The emission through chimney will not exceed 25mg/NM3 of fluorine.
2) The mixer, den & scrubber will operate under suction so that the working place will be free of any reaction gases.
3) The entire liquid effluent will be reused in the Mixer thus ensuring zero liquid effluent and reduced consumption of sulphuric acid for SSP production.
4) The small quantity of liquid effluent coming out of floor washing will be treated with lime for acidity & than discharged for gardening etc.

D) CURING

The discharged SSP from den is lifted and stored in godown for 8- 10days for curing and then lifted by pay loader and supplied for packing after mixing filler. The SSP is discharged to semi automatic bagging and pre - determined weight of SSP 50Kgs, is filled in the bags which is continuously stitched and lifted and stalked manually.

E) GRANULATION & PACKING

CURRED SSP unit Passed through Rotary drump spraying water for granulated and passed through Drum Dryer.
CHEMISTRY OF THE PROCESS:

ACIDULATION

\[
\text{Ca}_3(\text{PO}_4) + 2\text{H}_2\text{SO}_4 + 4\text{H}_2\text{O} = \text{Ca}_4(\text{PO}_4) + 4\text{H}_2\text{SO}_4 + 2\text{(CaSO}_4\cdot\text{H}_2\text{O)}
\]

Monocalcium Phosphate

Gypsum

\[
\text{CaF}_2 + \text{H}_2\text{SO}_4 + 2\text{H}_2\text{O} = \text{CaSO}_4 + 4\text{H}_2\text{O} + 2\text{HF}
\]

4HF + SiO = SiF_4 + 2H_2O

SCRUBBER:

In Water:

\[
3\text{SiF}_4 + (n + 2)\text{H}_2\text{O} = 2\text{H}_2\text{SiF}_6 + \text{SiO}_2 + n\text{H}_2\text{O}
\]

SULPHURIC ACID PROCESS DESCRIPTION:

The Plant is based on the most modern technology DCDA (double conversion and double absorption process)

To make it convenient for understanding, we have split the same in six different sections, namely:

1. Sulphur Melting System.
2. Sulphur Combustion
3. Conversion unit
4. Waste Heat recovery Unit
5. Process Air Drying
6. Sulphur Trioxide Absorption Unit.
**Sulphur Melting System**

Sulphur from storage yard is conveyed to the sulphur melting system. The conveying system can either as a continuous system using conveyors from Sulphur bin/storage or a batch operation using pay loaders or handling manually by wheel trolleys.

The sulphur melting system consists of the following:

a) Sulphur melting pit.

b) Impurities settling pit.

c) Sulphur Transfer pit.

All the pits are provided with steam coils. All pits except sulphur transfer pit are also provided with agitators to keep the solid particles in suspension and for efficient heat transfer. Steam at a pressure of 7.0kg/Cm2g is charged to the coils in melting pit and steam at pressure of 3.5 kg/cm2g is charged to coils in mixing pit.

Solid sulphur is first charged to melting pit where most of the melting operation is completed. The molten sulphur then overflows in to mixing pit where melting is completed. Molten sulphur is pumped from sulphur transfer pit to sulphur combustion furnace.

**Sulphur Combustion:**

Combustion of the sulphur takes place in a horizontal furnace which is provided with brick lining. The reaction is as follows:

S+O2= SO2 + reaction heat. The liquid sulphur from filtered sulphur compartment is pumped to the furnace. The burners are of proprietary design for ensuring complete combustion. Since burning of the sulphur is essentially completed much before the outlet of the combustion chamber. No Sulphur Vapours reaches Downstream Equipment. Gases leave the furnace at about 975 deg. °C for gas concentrations usually employed.
The sulphur to air ratio is controlled by measuring instruments to obtain the desired sulphur dioxide concentration by volume (approx. 10%). The gas is cooled about 425 deg. $^\circ$C in the waste heat recovery system before it enters the converter.

**Conversion System**

Conversion of Sulphur dioxide to Sulphur trioxide takes place in a 4 pass converter according to double absorption process. Intermediate absorption is envisaged after the third pass. The catalytic oxidation of sulphur dioxide with oxygen in the presence of Vanadium Penta-Oxide, containing catalyst to form sulphur trioxide, is explained by the following reaction:

$$\text{SO}_2 + 0.5 \text{O}_2 = \text{SO}_3 + \text{reaction heat}.$$

After a predetermined first stage conversion of sulphur dioxide to sulphur trioxide (after the third pass), the sulphur trioxide formed is absorbed from the gas in intermediate absorption tower. Thus the chemical equilibrium of the conversion of the sulphur dioxide, still present in the gas, is shifted in favour of more sulphur trioxide formation. As a result of the sulphur trioxide removal in intermediate absorption tower, the total conversion efficiency of sulphur dioxide is highly improved compared with single catalysis process. In order to operate the converter under optimum equilibrium conditions the gases are cooled between each pass by means of separately arranged waste heat recovery units after passes 1 and 4, and by a gas/gas heat exchanger system after passes 2 and 3, before intermediate absorption.

In the converter vessel, the catalyst is divided into four passes. To isolate the catalyst from the metal parts of the converter, the shell is brick lined and the supporting trays are covered with a layer of refractory stoneware.

The sulphur dioxide/sulphur trioxide gas leaves first bed of the converter and is cooled to the required inlet temperature for second bed of converter by boiler II. The temperature can be controlled by a bypass provided around the boiler. The hot gas
leaving the 2nd bed is cooled to the optimum temperature in an intermediate exchanger. The gas leaving the 3rd bed is cooled in the final heat exchanger by the gas leaving the intermediate absorption tower. The cooled gas leaving the intermediate absorption tower is heated up in the final and intermediate heat exchanger respectively before entering the fourth pass of the converter.

As described above, the sulphur dioxide gas leaving the absorber is heated up in the intermediate and final heat exchangers and enters the fourth bed of the converter. After the conversion of the sulphur dioxide to sulphur trioxide in the fourth catalyst layer, the gas leaves the converter and enters an economizer to recover the heat before being led to the atmosphere via final absorption tower and stack.

**Waste Heat Recovery System**

To arrive at the inlet gas temperatures requirement of the four beds of the converter and to utilize the heat generated both by sulphur dioxide to sulphur trioxide, waste heat recovery system is envisaged.

The waste heat recovery system is used to recover heat from hot gases at outlet of sulphur furnace and converter passes 1,2,3 and 4. Heat is recovered in the form of steam. Steam conditions shall be commensurate with heating needs in the pits and would be supplied to Turbine for Generation of power. With the increased capacity, the waste heat recovery would also increase which will generate additional power.

**Process Air Drying**

Atmospheric air is sucked by the main air blower through an air filter and delivered to Air Drying Tower(ADT). In the air drying tower, moisture in the air is absorbed by circulating sulphuric acid flowing counter current to the air flow. For the removal of acid mist and droplets, the outlet of the drying tower is equipped with a mist eliminator. The dry air goes to the sulphur combustion furnace.
The circulating acid of the drying tower is pumped by the ADT acid circulation pump via the ADT acid cooler. The concentration of the circulating acid is maintained by the acid transfer from the Intermediate Absorption Tower (IAT).

**Sulphur Trioxide Absorption and Product Withdrawal**

The reaction gas coming out of the 3rd bed of the converter goes to the intermediate absorption tower (IAT) after cooling in the final heat exchanger. Major quantity of acid production takes place in the intermediate absorption tower. The reaction heat is removed by pumping the circulating 98.4% sulphuric acid from the pump tank of Absorption Tower by the acid circulation pump through the Absorption Tower acid cooler before putting back to the top of the absorption tower.

The concentration of the IAT circulation acid is maintained by acid transfer from Air drying tower and by water addition. The sulphur trioxide containing gas out of the fourth bed of the converter after being cooled in economiser is fed to the final absorption tower (FAT), where residual sulphur trioxide absorption takes place. The final absorber is connected to the pump tank which is provided with acid circulation pump.

In order to remove the reaction heat in the circulating acid of this tower, acid is pumped via FAT acid cooler to the distribution system of the tower. The acid concentration is controlled by

the addition of process water into the sump of the tower. For discharge of the product acid, the acid produced in FAT is led into the pump tank of absorption towers.

In order to remove acid droplets and acid mist, there are high efficiency candle type filters installed in the top of the intermediate absorber. Acid drain from these candles is returned internally. The gas leaving the final absorption tower is sent to the stack.
The acid level in the tower and the concentration of the circulation acid are controlled. The three towers are conventional packed towers made of carbon steel lined with asbestos sheeting and acid proof bricks and packed with ceramic intallox saddles. Product acid is drawn from the IAT circulation system. The product acid is maintained at a strength of 98.4%.

It is to be highlighted that company has make provision for expansion of most of its Plant & machenaries. Only some modification required in the existing plant.

**ROCK PHOSPHATE GRINDING UNIT FOR DIRECT APPLICATION:**
Processes is similar to that of grinding of Rock for SSP Unit. However, a separate unit will be installed separately.

**ZINC MONOHYDRATE, HEPTAHYDRATE PROCESS:** Capacity 6000 MT per year basis the process envisages the following steps:

1. Preparation of mother liquor.
2. Washing of mother Liquor
3. Crystallization
4. Centrifuged
5. Spray Drying

**Preparation of mother Liquor:**

Required amount of water in taken in a reaction Tank and thereafter added measured quantity of Sulphuric acid from storage tank. Measured quantity of Zinc Dust added in the reaction and allowed to react with the sulphuric acid for 05 Hours to form liquor. Washing of mother liquor:

Mother liquor is passed through Filter Press and the filtrate is move to the Crstilization Chamber. The Solid materials is transferred to mud washer wherein un reacted acid is removed through fitter press from other impurities and recycled to the reaction tank.
**Crystallization**

Mother liquor separated through filter allow to crystallize of Zinc Sulphate. Crystallization accelerated through circulation cooled waster (temperature of $-1^0$ to $1^0$ C). Crystallized Zinc is collected and transferred to Centrifuged for production Zinc Heptahydrate or to the Spry Dryer for production of Zinc Monohydrate. Non crystallized liquor is transferred to the reaction tank for reprocessing.

**Centrifuged:**

In the Centrifuged moisture is separated to form Zinc Heptahydrate and thereafter packed.

**Spray Drying:**

Liquor from crystallization is allowed to pass through Spry Drier where water molecules of Zinc Sulphate would be removed from seven water molecules to one molecule. The finished product so formed is packed as per required capacity.

**UTILITES REQUIREMENT**

a) Water : Total water requirement would 1.30 M$^3$ after expansion /modification which would be through bored well l

b) Power : Nil

**REQUIREMENT OF RAW MATERIAL**

A. The raw Material required per ton of SSP is as follows:

- Rock phosphate : 0.55 M.T.
- Sulphuric Acid : 0.35 M.T. as 98.4%.
- Filler : 0.05 M.T.
- HDPE bags : 20.00 Nos.
B. The raw material required per ton of Sulphuric Acid:
   Sulphur : 0.33 M.T.

C. Raw material required for Zinc Sulphate Plant
   Zinc Dust : 0.500MT at 60% purity
   Sulphuric Acid: 0.580 MT at 98.4% Conc.

D. Rock Phosphate for Direct Application 150 MT Par Day

SPECIFICATIONS OF FINISHED GOODS

A. **SSP** shall confirm to IS 294 : 1974
   1) Water soluble phosphate : 16.00
      (P2O5 % of by wt)
   2) Moisture % by mass max. : 12.00
   3) Free phosphoric acid % max. : 4.00

B. **SULPHURIC ACID** Shall confirm to IS 266 (Latest)
   of Technical Grade of the strength : 98.40 %

C. Zinc Sulphate Heptahydrte
   Zinc (as Zn), per cent by weight : 21%

D. Zinc Sulphate Mono Hydrate
   Zinc (as Zn), per cent by weight : 33%

E. Rock Phosphate
   Total Phosphate (as P2O5) per cent by weight : 18%
   Pass through IS sieve 0.25mm : 90% Minimum
**Schedule of implementation**

01. The major milestone in the project implementation have been arranged sequentially and time allowance for each Activity has been based on its nature, volume, availability of resources and delivery schedule to be meet by the supplier of machinery and equipment. The time required for competition the project and making it ready for commercial establishment has been estimated to be within 15 months from date of commencement of the project.

02. The key activities listed are placement of order and arrival of plant and machineries which is estimated to be taken 3 months to 15 months by the suppliers as most machineries required fabrication. The period has been estimated to be approximately 15 months.

03. The implementation schedule has been worked out particular of each activity and its commencement and completion is envisaged to be as follows.

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Activities</th>
<th>Start (Month /Year)</th>
<th>Completion (Month &amp; Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Acquisition of Land</td>
<td>Already done</td>
<td>Already done</td>
</tr>
<tr>
<td>02</td>
<td>Development of Land and civil Works</td>
<td>September’2012</td>
<td>September’2012</td>
</tr>
<tr>
<td>03</td>
<td>Plant &amp; Machineries placement of order</td>
<td>October’2012</td>
<td>December’2012</td>
</tr>
<tr>
<td>04</td>
<td>Delivery at site</td>
<td>December’2012</td>
<td>February’2012</td>
</tr>
<tr>
<td>05</td>
<td>Installation at site</td>
<td>January’2012</td>
<td>March’2012</td>
</tr>
<tr>
<td>06</td>
<td>Arrangement of Power</td>
<td>March’2012</td>
<td>March’2012</td>
</tr>
<tr>
<td>07</td>
<td>Commissioning</td>
<td>April’2012</td>
<td>April’2012</td>
</tr>
<tr>
<td>08</td>
<td>Procurement of Raw Material</td>
<td>March’2012</td>
<td>April’2012</td>
</tr>
<tr>
<td>09</td>
<td>Trial Run</td>
<td>May’2012</td>
<td>May’2012</td>
</tr>
<tr>
<td>10</td>
<td>Commencement of Production</td>
<td></td>
<td>May’2012</td>
</tr>
</tbody>
</table>

On the basis of the schedule of implementation as detailed above, the final commissioning of the project is expected to be possible by May’2012 and project is expected to start the commercial production from May’2012.
Plant Economics
(After expansion)

Rated Capacity:

- Sulphuric Acid Plant: 80 MT per day/ 24,000 MT per annum
- Single Super Phosphate: 250 MT per day/ 750,000 MT per annum
- Zinc Sulphate Monohydrate: 20 MT per day/ 6000 MT per annum

Basis:

Nos of Working Days:

- 25 days / Month
- 300 days/ Annum

No of Shift:

- 3 shift per day
### COST OF LAND & BUILDING

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of land development including boundary wall, approach Road etc.</td>
<td>25,53,849.00</td>
</tr>
<tr>
<td>Cost of Factory building including storage etc.</td>
<td>1,20,00,000.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,45,53,849.00</strong></td>
</tr>
</tbody>
</table>

### COST PLANT AND MACHINERIES

<table>
<thead>
<tr>
<th>Plant</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSP including Granulation</td>
<td>1,80,00,000.00</td>
</tr>
<tr>
<td>Sulphuric acid</td>
<td>1,00,00,000.00</td>
</tr>
<tr>
<td>Zinc Sulphate</td>
<td>3,00,00,000.00</td>
</tr>
<tr>
<td>Rock Phosphate Grinding Unit for Direct Application</td>
<td>2,00,00,000.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,50,00,000.00</strong></td>
</tr>
</tbody>
</table>

### INVESTMENT ON OTHER FIXED CAPITAL

<table>
<thead>
<tr>
<th>Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office Equipment , Furnisher and other accessories</td>
<td>2,00,000.00</td>
</tr>
<tr>
<td>Installation cost of water</td>
<td>10,00,000.00</td>
</tr>
<tr>
<td>Preoperative expenses</td>
<td>5,00,000.00</td>
</tr>
<tr>
<td>Electrification</td>
<td>10,00,000.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27,00,000.00</strong></td>
</tr>
</tbody>
</table>
### FIXED CAPITAL AFTER EXPANSION

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>01. Land &amp; Building</td>
<td>Rs. 1,45,53,849.00</td>
</tr>
<tr>
<td>02. Plant &amp; Machinery</td>
<td>Rs. 7,50,00,000.00</td>
</tr>
<tr>
<td>03. Other Fixed Assets</td>
<td>Rs. 27,00,000.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Rs. 9,22,53,849.00</strong></td>
</tr>
</tbody>
</table>
### Requirement Working Capital after Expansion

#### UTILITY AND OVERHEAD COST/ PER MONTH

<table>
<thead>
<tr>
<th>Description</th>
<th>Total (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption @ 5.50 per Kwatt.</td>
<td>55,00,000.00</td>
</tr>
<tr>
<td>Water consumption</td>
<td>1,05,000.00</td>
</tr>
<tr>
<td>Stationary, Postage, Telephone etc.</td>
<td>2,00,000.00</td>
</tr>
<tr>
<td>Conveyance &amp; transportation</td>
<td>3,70,000.00</td>
</tr>
<tr>
<td>Publicity &amp; Self promotion</td>
<td>18,00,000.00</td>
</tr>
<tr>
<td>Mise Expenses</td>
<td>1,50,000.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Rs. 81,25,000.00</strong></td>
</tr>
</tbody>
</table>

#### SALARY & WAGES

<table>
<thead>
<tr>
<th>Position</th>
<th>Existing</th>
<th>Additional Proposed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Manager</td>
<td>01 30,000.00</td>
<td>---</td>
<td>01 30,000.00</td>
</tr>
<tr>
<td>Manager</td>
<td>03 60,000.00</td>
<td>01 20,000.00</td>
<td>04 80,000.00</td>
</tr>
<tr>
<td>Plant In charge</td>
<td>01 18,000.00</td>
<td>01 18,000.00</td>
<td>02 36,000.00</td>
</tr>
<tr>
<td>Shift Incharge</td>
<td>06 90,000.00</td>
<td>02 30,000.00</td>
<td>08 1,20,000.00</td>
</tr>
<tr>
<td>Supervisor</td>
<td>05 40,000.00</td>
<td>02 16,000.00</td>
<td>07 56,000.00</td>
</tr>
<tr>
<td>Skilled Worker</td>
<td>35 2,45,000.00</td>
<td>10 70,000.00</td>
<td>45 3,15,000.00</td>
</tr>
<tr>
<td>Unskilled Worker</td>
<td>46 1,84,000.00</td>
<td>15 60,000.00</td>
<td>61 2,44,000.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>97 Rs. 6,67,000.00</strong></td>
<td><strong>31 Rs. 2,14,000.00</strong></td>
<td><strong>128 Rs. 8,81,000.00</strong></td>
</tr>
</tbody>
</table>
CAPITAL REQUIREMENT OF RAW MATERIAL FOR 1 MONTH AFTER EXPANSION

01. Rock Phosphate quantity Requirement for SSP
    4125 MT @ 10500/- PMT  Rs. 4,33,12,500.00
02. Sulphur quantity Requirement after expansion
    792 MT @ 11000/- PMT  Rs. 87,12,000.00
03. Filler quantity Requirement after expansion
    330 MT @ 3000/- PMT  Rs. 9,90,000.00
04. HDPE bags Requirement after expansion
    120000 Pcs @ 11.50/- per Pcs  Rs. 13,80,000.00
05. Zinc Ash/ Dust quantity Requirement after expansion
    200 MT @ 55000/- PMT  Rs.1,10,00,000.00
06. Rock Phosphate requirement for Direct Application
    4500 MT @ 4000/- PMT  Rs.1,80,00,000.00

    TOTAL  Rs. 8,33,94,500.00
**TOTAL REQUIREMENT WORKING CAPITAL AFTER EXPANSION**

<table>
<thead>
<tr>
<th>01</th>
<th>RAW MATERIAL</th>
<th>Rs. 8,33,94,500.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>SALARY &amp; WAGES</td>
<td>Rs. 8,81,000.00</td>
</tr>
<tr>
<td>03</td>
<td>UTILITIES &amp; OVERHEAD</td>
<td>Rs. 81,25,000.00</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>Rs. 9,24,00,500.00</strong></td>
</tr>
</tbody>
</table>

**WORKING CAPITAL FOR 2 MONTH:**

RS. 9,24,00,500.00 X 2 = RS. 18,48,01,000.00

**TOTAL COST OF THE PROJECT:**

<table>
<thead>
<tr>
<th>A</th>
<th>TOTAL FIXED CAPITAL</th>
<th>Rs. 9,22,53,849.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>WORKING CAPITAL</td>
<td>Rs. 9,24,00,500.00</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>Rs. 18,46,54,349.00</strong></td>
</tr>
<tr>
<td>C</td>
<td>LESS INVESTMENT ALREADY MADE BEFORE EXPANSION</td>
<td>Rs. (-) 10,00,00,000.00</td>
</tr>
<tr>
<td><strong>ACTUAL INVESTMENT REQUIRED</strong></td>
<td></td>
<td><strong>Rs. 8,46,54,349.00</strong></td>
</tr>
</tbody>
</table>
# COST OF PRODUCTION PER ANNUM

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>RAW MATERIAL, SALARY AND OVERHEAD COST FOR 1 YEAR</td>
<td>Rs. 110,88,06,000.00</td>
</tr>
<tr>
<td>02</td>
<td>DEPRECIATION ON BUILDING @ 6.5%</td>
<td>Rs. 9,46,000.00</td>
</tr>
<tr>
<td>03</td>
<td>DEPRECIATION ON P&amp;M @ 25.5%</td>
<td>Rs. 1,91,25,000.00</td>
</tr>
<tr>
<td>04</td>
<td>DEPRECIATION ON OFFICE EQUIPMENT @ 20%</td>
<td>Rs. 5,40,000.00</td>
</tr>
</tbody>
</table>

**TOTAL** | **Rs. 112,94,17,000.00**
**Turnover per Annum**

By sell of SSP 75000MT @ 10500/- PMT : Rs. 78,75,00,000.00

By sell of Zinc Sulphate 60000MT @ 60000/- PMT : Rs. 36,00,00,000.00

Rock Phosphate for Direct Application 45000 MT @ 6000/- PMT : Rs. 27,00,00,000.00

\[ \text{Rs. } 141,75,00,000.00 \]

**P R O F I T:**

\[
\text{RECEIPT} - \text{COST OF PRODUCTION}
\]

\[
\text{RS.} \ 141,75,00,000.00 \ - \ \text{RS.} \ 112,94,17,000.00
\]

\[
= \text{RS.} \ 28,80,83,000.00
\]

**PROFIT SALES RATIO = PROFIT / SALES X 100**

\[
\frac{\text{RS.} \ 28,80,83,000.00}{\text{RS.} \ 141,75,00,000.00} \times 100
\]

\[
= 20.32 \%
\]
MEANS OF FINANCE

Total Investment Required after Expansion Rs. 18,46,54,349.00
Less: Investment made before proposed Expansion Rs. 10,00,00,000.00
Actual finance required for Expansion Rs. 8,46,54,349.00

Promoter’s own contribution @ 45% Rs. 3,80,94,457.00
Subsidy from NEC @ 25% Rs. 2,11,63,587.00
Interest free contribution from promoters’ associate units @ 30% Rs. 2,53,96,305.00