Technical Feasibility Study Report of Proposed Sulfuric Acid and Phosphoric Acid Unloading Facilities, Acid Storage Tanks at the existing Wharf and Acid Transfer Pipeline Falling within the CRZ area & Environmental Management plan

Prepared and Submitted by

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Executive Summary

M/s. Coromandel International Limited (Coromandel), a Murugappa group company and India's second largest Phosphatic fertilizer player, is in the business segments of Fertilizers, Specialty Nutrients, Crop Protection and Retail. The company’s manufacturing plant at Visakhapatnam Andhra Pradesh is involved in the manufacture of NP, NPK and water soluble fertilizers. The facility was largely expanded in the year 2007 from a production capacity of 8 lakh MTPA to the current production capacity of 12 lakh MTPA. Prior Environmental Clearance was obtained from the Ministry of Environment and Forest & Climate Change (MoEF&CC) for the same.

The raw materials required for the manufacturing of NP/NPK fertilisers include Ammonia, Potash, Urea, rock phosphate and sulphur. Coromandel International limited is operating a dedicated jetty within the Visakhapatnam port limits which is leaded from Port Authorities. Ammonia is currently imported at the wharf and transferred to the plant through a dedicated pipe line. Similarly other raw materials like Potash, Urea and Sulfur, and Rock Phosphate are imported and transferred to the plant through trucks. Wharf is located 5 km away from plant premises and is connected through a dedicated road owned by Coromandel and built in with adequate infrastructure.

Currently the phosphoric and sulfuric acid required for the plant are stored in leased storage tanks of private vendors (within the port premises but outside the facility) and transported to the plant through road tankers passing through public road. In order to avoid the risks associated with the transportation of toxic acids through the public roads, Coromandel International Ltd has proposed to install storage tanks and associated facilities for the storage and handling of sulfuric acid and phosphoric acid in their own premises. Accordingly, the tanks will be installed at the existing wharf of Coromandel International Ltd which was leased by Visakhapatnam Port trust. Thus no additional land will be acquired or leased for this project. As a part of current proposal, necessary unloading facilities and transfer pipelines will be installed at all the existing three berths at the wharf. The stored phosphoric acid will be transferred to plant by road tankers through a dedicated road of Coromandel, while Sulfuric acid is pumped to the storage tanks in the plant through a dedicated line laid along the road.

The Andhra Pradesh State Coastal Zone Management Authority (CZMA) has already recommended the project for Environmental clearance under the provisions of CRZ Notification 2011. Andhra Pradesh
State Pollution Control Board has issued no objection certificate for the proposed acid storage tanks. The design of the systems will be undertaken as per the applicable guidelines and good engineering practices. Adequately design spill control systems and safety systems will be adopted while designing and operating the proposed facilities.

The total capital cost of the proposal is envisaged as INR 27 Crores and the project is expected to be completed in 18 months time after obtaining all necessary permits and approvals.
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Annexure 3: No objection certificate from APPCB for the proposed pipelines

Annexure 4: Recommendation by the APCZMA for installation of proposed facilities within the CRZ area
1.0 Introduction

M/s. Coromandel International Limited (Coromandel), a Murugappa group company and India’s second largest Phosphatic fertilizer player, is in the business segments of Fertilizers, Specialty Nutrients, Crop Protection and Retail. In its endeavor to be a complete plant nutrition solutions company, Coromandel has also introduced a range of specialty nutrient products including organic fertilizers. The company manufactures a wide range of fertilisers and markets around 3.2 Million tonnes, making it a leader in its and addressable markets. The company’s history goes back to 1960’s when it commissioned India’s first integrated complex fertilizer plant in private sector. The company currently has four fertilizer manufacturing plants with two plants located in Andhra Pradesh (Visak and Kakinada) and two plants in Tamilnadu (Ennore and Ranipet) and four crop protection nutrient manufacturing plants across India.

1.1. Background of Coromandel international ltd, Visakhapatnam unit

The company’s manufacturing plant at Visak was the first in the country to manufacture Urea Ammonia Phosphate (UAP) and was commissioned during the year 1967 with a production capacity of 2.50 lakh MTPA. It presently produces NP, NPK and water soluble fertilizers. The fertiliser complex at Visak has streams of granulation plants, one stream of Phosphoric Acid Plant (700 MTPD), two streams of Sulphuric Acid Plant (1 X 1400 MTPD, 1 X 300 MTPD), raw material storage & handling and wharf facility. The facility was largely expanded in the year 2007 from a production capacity of 8 lakh MTPA to the current production capacity of 12 lakh MTPA. Prior Environmental Clearance was obtained from the Ministry of Environment and Forest (MoEF) for the same.

The raw materials required for the manufacturing of NP/NPK fertilisers include Ammonia, Potash, Urea, rock phosphate and sulphur. Sulfur is the raw material for manufacturing of Sulfuric acid which is sourced either as solid Sulfur or liquid Sulfur. Rock phosphate is the raw material for manufacturing Phosphoric acid. Ammonia is currently imported, transferred to the plant from the ship through a dedicated pipe line and stored in two no of atmospheric Ammonia storage tanks of total capacity 12500MT (1x5000MT and 1x7500MT). Similarly other raw materials like Potash, Urea and Sulfur, and Rock Phosphate are imported and transferred to the plant through trucks. All the imported solid and liquid materials are handled in the wharf belonging to Coromandel. Wharf is located 5.0km away from plant premises and is connected through a dedicated road owned by Coromandel and built in with
adequate infrastructure to facilitate receipt, storage & handling of solid and liquid raw material which includes silos, storage tanks, unloading systems and pipe conveyors etc.

Coromandel had always taken the lead in adopting environment friendly technology in fertiliser manufacturing and as part of the above, Coromandel had up graded their technology and revamped their plants with state art of technology such as DCDA in Sulfuric acid plant, Dry disposal and storage of gypsum on line pond in Phosphoric acid plant, improved design Effluent treatment plant, Air preheater in granulation plants in place of fuel oil based hot air generators, screw unloader in place of grab bucket in wharf for unloading solid raw materials and usage of molten Sulfur in place of solid Sulfur etc.

The total requirement of phosphoric acid is about 2,90,000 MTPA, of which about 1,90,000 MTPA is manufactured internally (700MTPD Phosphoric acid manufacturing plant) and the balance requirement (2,00,000MTPA) is met through imports. Similarly, the total requirement of sulfuric acid is about 8,10,000 MTPA, of which about 5,40,000 MTPA is manufactured internally (1 X 1400 MTPD, 1 X 300 MTPD) and the balance (2,50,000 MTPA) requirement is met through imports. The phosphoric acid and sulfuric acid are stored in dedicated tanks within the facility. About 7 Nos. of phosphoric acid storage tanks and 4 Nos. of sulfuric acid storage tanks with total storage capacities of 7000 MT and 11,000 MT respectively are installed within the facility.

Currently the imported phosphoric and sulfuric acid are stored in leased storage tanks of private vendors (within the port premises but outside the facility) and transported to the plant through road tankers passing through public road. At present about 50 road tankers of 22 MT capacity each are utilized to transfer the phosphoric acid, while about 40 road tankers of 20 MT capacity each are utilized to transfer sulfuric acid.

1.2. Proposed Project and its Justification

In order to avoid the risks associated with the transportation of toxic acids through the public roads, Coromandel International Ltd has proposed to install storage tanks and associated facilities for the storage and handling of sulfuric acid and phosphoric acid in their own premises. Accordingly, the tanks will be installed at the existing wharf of Coromandel International Ltd which was leased by Visakhapatnam Port trust. Thus no additional area requirement has been envisaged for this proposal. It is proposed to install two dedicated storage tanks of 12,500 MT capacity each for sulfuric acid storage
and two tanks of 10,000 MT capacity each for phosphoric acid storage with no increase in fertiliser production and pollution load. Once the storage tanks are in place, the sulfuric and phosphoric acid will be imported from vessels through the existing fertilizer berth and the adjacent oil berths (OR-1 and OR-2). As a part of current proposal, necessary unloading facilities and transfer pipelines will be installed at all three berths. The stored phosphoric acid will be transferred to plant by road tankers through a dedicated road of Coromandel, while Sulfuric acid is pumped to the storage tanks in the plant through a dedicated line laid along the road.

The following factors were considered to justify the proposal:

i. Import of acids and installation of storage tanks at the existing wharf is a cost effective option

ii. The legal liability for leased acid storage tanks can be eliminated.

iii. The proposed storage facility is falling under the leased area of Port trust (leased to Coromandel International Ltd) and is located close to plant site. The site can be accessed directly through a dedicated road of Coromandel.

iv. The associated risk of transporting sulfuric and phosphoric acid can be eliminated as the road tankers are using the public road in the current scenario.

v. The vehicular emissions and traffic related issues will be minimized to some extent.
2. Existing Facilities at Wharf Area

The existing facility is located within the premises of Visakhapatnam Port Trust and is an integral part of Visakhapatnam port. The area including the manufacturing process plant and the Wharf area are leased to Coromandel International Ltd by Visakhapatnam Port Trust through a lease agreement. No objection certificate from the Port Authorities was obtained for proposed tank farm and pipeline in the wharf area and copy of the letter is enclosed as Annexure #1 to this report. The total area leased to Coromandel International Ltd is about 436.47 Acres.

The CRZ map showing the existing and proposed facilities at the wharf in port premises is attached as Annexure #2 to this report. Typical photograph of the fertilizer wharf is shown in Figure 2.1. Google image of the wharf and the pipeline corridor are shown in Figures 2.2, 2.3 and 2.4.

Figure 2.1: Photograph of Existing Fertilizer Wharf dedicated to Coromandel International Ltd
Figure 2.2: Google Image Showing the Existing Facilities at Fertilizer Wharf of CIL
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Figure 2.3: Google Image of the Fertilizer Wharf of CIL and Oil Wharf of other Users

- Crude oil pipelines from Oil wharf
- Fertilizer wharf
- Oil wharf 1 (OR-1)
- Oil wharf 2 (OR-2)
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Figure 2.4: Google Image of the Existing Pipeline Corridor
2.1. Existing Environmental Approvals

As the existing wharf facility in port premises has been developed from 1964 and put into operation in the year 1967. Environmental approvals for various expansion & modernization activities undertaken in the past within the existing plant facility including wharf were obtained from MoEF. Besides above, the plant has also obtained Consent to Operate under Air (Prevention and Control of Pollution) Act, 1981 and Water (Prevention and Prevention and Control of Pollution) Act 1974 valid up to March 2016. The chronological order of various environmental clearances and other environmental permits obtained by the facility is highlighted in the Table 2.1 below.

Table 2.1: List of Environmental Permits Obtained by Coromandel International Ltd from Inception (Existing Facilities Only)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Details of Permits Obtained</th>
<th>Agency according permit</th>
<th>Details of Permit letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commissioning of manufacturing plant, fertilizer wharf, rock phosphate and sulphur unloading facilities</td>
<td>-</td>
<td>-</td>
<td>Came into operation in the year 1967, during which no environmental approvals were required</td>
</tr>
<tr>
<td>Setting up atmospheric ammonia storage facility consisting of (a) Phase –I – 1x5000MT atmospheric storage tank in plant premises (b) Phase –II – ammonia unloading facility at the wharf, ammonia import pipeline with transfer pumps and a second atmospheric ammonia storage tank of 1x5000MT capacity in the plant premises</td>
<td>No Objection Certificate</td>
<td>Andhra Pradesh Pollution Control Board</td>
<td>Lr. No. 18/PCB/NOC/TO/VSP/AEE-N/95/-3071 dated 27th September 1995.</td>
</tr>
<tr>
<td>Laying of pipeline and unloading facilities for transport of liquid ammonia from fertilizer berth to factory</td>
<td>No Objection Certificate</td>
<td>CZMA</td>
<td></td>
</tr>
<tr>
<td>Ammonia tanks and transfer pipeline</td>
<td>Consent to Operate</td>
<td>Andhra Pradesh Pollution Control Board</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Details of Permits Obtained</td>
<td>Agency according permit</td>
<td>Details of Permit letter</td>
</tr>
<tr>
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<td>-------------------------</td>
</tr>
<tr>
<td>Laying of pipeline for transport of liquid ammonia from fertilizer berth to factory</td>
<td>No Objection Certificate</td>
<td>Environment Forest Science and Technology Department, Govt of AP (MoEF)</td>
<td>Letter No:11455/SADA/97 dated 28th May 1999.</td>
</tr>
<tr>
<td>Installation of molten sulphur tanks (2x1,00,000MTPA) and transfer pipelines</td>
<td>-</td>
<td>-</td>
<td>Environmental Clearance is not applicable as per EIA Notification 1994 as the cost of the project was less than 50 Cr. The tanks were not falling under CRZ area.</td>
</tr>
<tr>
<td>Molten sulphur tanks and pipelines</td>
<td>No Objection Certificate</td>
<td>Andhra Pradesh Pollution Control Board</td>
<td></td>
</tr>
<tr>
<td>Molten sulphur tanks and pipelines</td>
<td>Consent to Operate</td>
<td>Andhra Pradesh Pollution Control Board</td>
<td></td>
</tr>
<tr>
<td>Setting up of customized fertilizer plant in two streams each of 300MTPD to manufacture different grades of customized fertilizers containing primary, secondary and micro nutrients within existing fertilizer plant campus</td>
<td>Environmental clearance</td>
<td>Ministry of Environment &amp; Forests</td>
<td>F.No. J-11011/548/2008-IA II (I) dated 10th June 2009.</td>
</tr>
</tbody>
</table>
3. Details of Proposed Facilities

The current proposal is for the installation of four storage tanks, unloading facilities and transfer pipelines at the existing fertilizer wharf. The details of proposed tanks are given below:

1. 2 x 10000 MT tanks for Phosphoric acid (25m ID and 16.5m Ht)
2. 2 x 12500 MT tanks for Sulphuric acid (26.50m ID and 16.25m Ht)

Tanks will be fabricated using SS/Carbon steel which is highly durable in handling highly concentrated acids. The location of the proposed storage tanks in the fertilizer wharf is presented in Figure: 3.1.

Figure 3.1: Location of Proposed Storage Tanks in the Fertilizer Wharf
3.1 Unloading Facilities and Transfer Pipelines

It is proposed to utilize both the fertilizer wharf and the oil wharfs (OR-1 & OR-2) for unloading the acids from cargo vessels. Thus unloading facilities (loading arms) will be installed at all the three wharfs. While the fertilizer wharf is dedicated for Coromandel International Ltd, the oil wharfs will be utilized whenever they are available for acid unloading. Two aboveground pipelines with a diameter of 16 inches (fabricated with SS316 L) and of 0.525 km length each will be installed from OR-1 and OR-2 wharfs to transfer the acids from the vessels to the storage tanks in the fertilizer wharf. The Consent to Establish (CFE) for the two transfer pipelines has already been obtained from APPCB and the same is attached as Annexure # 3. The Phosphoric acid stored will be transported to the plant by trucks through the dedicated road of Coromandel, while Sulfuric acid is transferred through a dedicated pipe line thus avoiding the transportation risk in the public roads. The area proposed for the installation of storage tanks partly falls under CRZ area as per the CRZ notification. The Andhra Pradesh State Coastal Zone Management Authority (CZMA) has already recommended the project for Environmental clearance under the provisions of CRZ Notification 2011. The same is enclosed as Annexure # 4 and the HTL/LTL map of the area is attached as Annexure # 2. The list of environmental approvals obtained by Coromandel for the proposed installations is presented in Table 3.1.
Table 3.1: List of Environmental Permits obtained by Coromandel International Limited for the Proposed Facilities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Details of Permits Obtained</th>
<th>Agency according permit</th>
<th>Details of Permit letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation of 2x7500 T sulphuric acid tank and 2x10000 T Phosphoric acid tank</td>
<td>Consent for Establishment (CFE)</td>
<td>Andhra Pradesh Pollution Control Board</td>
<td>Order No. APPCB/VSP/65/CFE/HO/200 5-886 dated 29-06-2010</td>
</tr>
<tr>
<td>Laying of two proposed pipelines from OR-1 &amp; OR-2 wharfs</td>
<td>No objection certificate</td>
<td>Visakhapatnam Port Trust</td>
<td>Letter No: EHS/GEN/12-08 dated on 21/5/2012</td>
</tr>
<tr>
<td>Laying of two 16” aboveground proposed pipelines from OR-1 &amp; OR-2 wharfs</td>
<td>Consent for Establish (CFE)</td>
<td>Andhra Pradesh Pollution Control Board</td>
<td>Order No APPCB/VSP/65/CFE/HO/201 2-3436 dated 30/10/2012</td>
</tr>
<tr>
<td>Installation of Sulphuric acid and Phosphoric acid storage facilities along with unloading pipelines connecting OR-1 and OR-2 to fertilizer berth at wharf area of western arm</td>
<td>Recommended for Environmental Clearance</td>
<td>Andhra Pradesh State Coastal Zone Management Authority (CZMA)</td>
<td>Letter No: 3499/ENVV/CZMA/2014 dated on 5/9/2014</td>
</tr>
</tbody>
</table>

3.2. Spill Collection System

To prevent the spillage of acids into the environment, necessary dyke wall arrangements will be constructed in the tank farm area. The dimensions of the proposed dyke wall will be 124.9m L x 32m B x 0.6m Ht.
Safety and Control Systems for Proposed Tank Farm

The proposed tank farm facility will be equipped with necessary control systems and mechanisms as given below:

1. Level control systems
2. Radar gauge with alarm
3. Closed roof tanks with vapour control systems
4. High-High level alarm on tankers to trigger the manual control of the feed pump
5. Dyke spill control sump
6. Acid absorbing materials such as calcium carbonate and bicarbonate will be stored at the tank farm area.
7. Spill collection system will be made available at the wharf area to avoid any spill into marine environment.
8. Existing fire safety systems like hydrants will be extended to the proposed tank farm area as per guidelines of NBC
9. Existing Disaster Management Plan (DMP) for the wharf area will be upgraded for the tank farm proposal.

The fertilizer wharf is already equipped with safety systems like fire pumps, fire hydrants, ammonia detectors, fire water sprinklers, dust collectors etc.

3.3 Environment Management Programs for the Existing Facilities at the Fertilizer Wharf

In addition to the proposed safety management programs for the new facilities, Coromandel International Ltd has already implemented various environmental management programs in the fertilizer wharf such as:
The existing wharf is equipped with four number of bag filters to control the dust generated from handling of rock phosphate.

Closed type pipe conveyors are used for the transfer of rock phosphate thereby preventing dust emissions.

3.4 Safety Systems for the Existing Facilities at the Fertilizer Wharf

The following safety systems are already installed at the fertilizer wharf:

- Two diesel fire pumps of 120m³/hr and 23m³/hr capacities with 125m and 52m head respectively. These pumps are operated with fresh water.
- One electrically driven fire pump of 85m³/hr capacity with 150m head is operated on sea water.
- 4 Nos. of fire hose reels are placed at appropriate locations.
- Fire water sprinklers are installed at the molten sulfur tanks in order to suppress the leaked vapors if any.

A comprehensive Disaster Management Plan (DMP) is already available for the wharf area.

4 Project Cost and Implementation Schedule

The total capital cost of the proposal is envisaged as INR 27 Crores and the project is expected to be completed in 18 months time after obtaining all necessary permits and approvals.