Pre-feasibility report for

Proposed Establishment of Petrochemical based processing manufacturing unit

At
M/s Deepak Fertilisers & Petrochemicals Corporation Limited
Ponnada-532408, Etcherla Mandal, Srikakulam District,
Andhra Pradesh

PROJECT TERMED UNDER SCHEDULE 5 (e)
(Petroleum products and petrochemical based processing)

CATEGORY - A

Prepared By

M/s Deepak Fertilisers & Petrochemicals Corporation Limited
C/o Smartchem Technologies Limited (A 100% subsidiary of DFCPL)
Web: www.dfpcl.com
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1. Executive Summary

1.1 Introduction
Deepak Fertilisers and Petrochemicals Corporation. Ltd. (DFPCL) was incorporated in the year 1979 and commenced commercial production of Ammonia in 1983 at Taloja unit, Maharashtra. The company decided to go for forward integration into various downstream products (like Dilute Nitric Acid, Concentrated Nitric Acid, Ammonium Nitrate and ANP fertiliser) and diversification in Methanol. These projects commenced production in July 1992. DFPCL also implemented projects for diversification to produce Liquid Carbon dioxide, Isopropyl Alcohol (IPA) and Sulphur Bentonite Fertiliser.

This state of art complexes with capital outlay of approximately Rs 5650 million are majorly located at Taloja near Mumbai and rest at Srikakulam through 100% subsidiary M/s Smartchem Technologies Limited, Ponnada, Andhra Pradesh.

As recently as 2011 DFPCL commissioned a 300 KTPA Ammonium Nitrate plant at its Taloja at a cost of around Rs 600 crores.

The company has impeccable record of over 37 years in the industry with excellent reputation and relationship with its Bankers, Customers, Suppliers and Shareholders. The company’s shares are listed and traded on BSE and NSE.

Deepak Fertilisers & Petrochemicals Corporation Limited (DFPCL) is one of the leading Indian Companies in the business of manufacturing and selling of Fertilizers and Chemicals.

In 2003, DFPCL decided to venture into the manufacture of Isopropyl Alcohol as the only operational facility of 27 KTPA run by NOCIL had shut-down. Market studies showed that IPA market in India would grow significantly due to substantial increase in demand in the pharma sector where IPA is a commonly used solvent. Since IPA technology was closely held, DFPCL bought a British Petroleum plant and relocated it from UK to Taloja. Today, DFPCL is the undisputed market leader of IPA in India.

DFPCL wish to set up Iso propyl alcohol (IPA) manufacturing facility at Ponnada, Andhra Pradesh.

Prior Environmental clearance is mandated by Ministry of Environment and Forests, as vide EIA Notification SO 1533, dated September 14, 2006 and its amendments for “Petroleum products and petrochemical based processing”.

The proposed project falls under category ‘A’ and schedule item no. 5(e) i.e. “Petroleum products and petrochemical based processing (processes other than cracking and reformation and not covered under the Complexes)”

The plot allotment order is attached as Annexure – I.
The site & surrounding study area of 10 km and Proposed Layout Plan for new establishment is attached as **Annexure-II & III respectively.**

The project brief is summarized in the table below.

### Project summary at a glance

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Particulars</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Name of Company</td>
<td>Deepak Fertilizers and Petrochemicals Corporation Limited</td>
</tr>
<tr>
<td>2</td>
<td>Proposed Product</td>
<td>Iso Propyl Alcohol</td>
</tr>
<tr>
<td>3</td>
<td>Location</td>
<td>C/o Smartchem Technologies limited, Ponnada 532408, Etcherla Mandal, Srikakulam District, Andhra Pradesh.</td>
</tr>
<tr>
<td>4</td>
<td>Name of the project</td>
<td>Proposed establishment of Petroleum products and petrochemical based processing unit</td>
</tr>
<tr>
<td>5</td>
<td>Total land area of the plot</td>
<td>393576.928 sq m</td>
</tr>
<tr>
<td>6</td>
<td>Total proposed built up area for the IPA expansion</td>
<td>89,012 sq m</td>
</tr>
<tr>
<td>7</td>
<td>Major raw material</td>
<td>Propylene (refer Chapter 3 of this PFR)</td>
</tr>
<tr>
<td>8</td>
<td>Water</td>
<td>Total net fresh water requirement of ~ 3,500 m³/day for the proposed IPA plant will be sourced from GWD/Irrigation department of Andhra Pradesh</td>
</tr>
<tr>
<td>9</td>
<td>Power</td>
<td>Total power requirement of 3.5 MW for the IPA plant will be sourced from APEDCL</td>
</tr>
<tr>
<td>10</td>
<td>Proposed manpower</td>
<td>During construction phase 300 Nos [ During operations 100 Nos ]</td>
</tr>
<tr>
<td>11</td>
<td>Waste water quantity (estimate) and disposal pathway</td>
<td>1230 m³/day of waste water would be treated through ETP and recycled after treatment. There will not be any discharge outside. Unit will be ZERO LIQUID DISCHARGE UNIT.</td>
</tr>
<tr>
<td>12</td>
<td>Air emissions</td>
<td>There will be no direct gaseous emissions from IPA process plant. Gaseous emission shall be routed to Flare.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boiler: It is proposed to install 2 boilers of 60 TPH steam each, based on Coal / FO as fuel.</td>
</tr>
<tr>
<td>13</td>
<td>Solid Waste</td>
<td>Refer Chapter 3 of this PFR for details</td>
</tr>
<tr>
<td>14</td>
<td>Project cost estimate</td>
<td>~ 500 Cr.</td>
</tr>
</tbody>
</table>

The land will be used as “industrial “land thus there will be no change in the land use. The industrial plot is allocated/owned by M./s Smatchem Technologies Limited (STL) which is a 100% subsidiary of DFPCL.

There is no sensitive establishment in the vicinity such as Archaeological monuments, sanctuaries etc. within 10 Km radius.
The water and power will be made available by Irrigation dept. of AP and APEDCL and raw material will be made available through tanker transport from a refinery at Vishakhapatnam.
2. Introduction of the Project

2.1 Identification of the project and Project Proponent

Among India’s leading producers of industrial chemicals and fertilizers, a name that spells quality and trust, Deepak Fertilizers and Petrochemicals Corporation Ltd (DFPCL) has established a prime position for itself over the last three decades across Indian and global markets. Set up in 1979 as an Ammonia manufacturer, DFPCL today is a publicly listed, multiproduct Indian conglomerate with an annual turnover of over half a billion USD with a multiproduct portfolio spanning industrial chemicals, bulk and specialty fertilizers, farming diagnostics and solutions, technical ammonium nitrate, mining services & consulting and value added real estate.

DFPCL is clearly focused on actively shaping a promising future in a swiftly and dynamically changing world. We’re building resilience to steer ahead through a changing and challenging world economy, focused on enriching, nourishing and empowering lives. DFPCL has over the years, built its capabilities to finer market nuances like price volatility, speed and strategy, based not just on an analysis of growth trends in both the Indian and the global economy but even deeper, on scale, resources, technology capability, quality and product diversification.

DFPCL has developed a unique business model where synergies and diversities can be mutually inherent, allowing us to build our financial strength, generate free cash flow and invest in growth, both in India and globally. DFPCL is now focused on global growth, drawing strengths from its existing product and plant synergies and adding new product lines, new plants and augmenting manufacturing capacities.

➢ In Technical Ammonium Nitrate (TAN) it’s moving from a domestic market leader to being a global player, while moving further forward into Mining Services and Contract Mining

➢ In Agri-business, DFPCL has moved from bulk fertilizers to specialties/customized products and farm solutions and further into produce management.

➢ In Chemicals, the Company is moving up the value chain from bulk chemical commodities to high-value petrochemicals.

➢ DFPCL has built India’s first true Lifestyle Centre, Ishanya, that re-creates a unique consumer experience that is part retail, part entertainment and part public space.

DFPCL is now planning to set up Isopropyl Alcohol manufacturing at its Srikakulam site in Andhra Pradesh.
2.2 Brief Description of Project
As a forward-looking company with above consideration, DFPCL initiated a project for putting up a 100,000 TPA Isopropyl Alcohol process plant which will also produces by products such as Di iso propyl ether (DIPE), Propane, Lighter ends and Heavier ends.

The project has the provision to build all the utilities and offsite facilities required for the above mentioned products and by products.

The establishment project is planned at the site owned / leased by its 100% subsidiary company M/s Smartchem Technologies Limited at Ponnada, Srikakulam district Andhra Pradesh.

This proposed facility of DFPCL shall be developed at the site and will be independent and fenced from other facilities of M/s Smartchem Technologies Limited.

The DFPCL facility shall have no common utility and there will be no sharing of utilities with existing facilities of M/s Smart Chem. It will establish its own utilities and utility plants.

The Techno Economic Feasibility Report has been prepared in the above perspective on the basis of operating and engineering information available from proposed Process Licensor and study undertaken by DFPCL team using its experience. The details of project, adopted technologies, raw material and utility requirement, manpower requirement, profitability and other financial indices are presented in subsequent chapters of the report.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Product / By product</th>
<th>Proposed capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Iso Propyl Alcohol (IPA)</td>
<td>100,000 TPA</td>
</tr>
<tr>
<td>By Products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Di iso propyl ether (DIPE)</td>
<td>7,500 TPA</td>
</tr>
<tr>
<td>2</td>
<td>Propane</td>
<td>35,000 TPA</td>
</tr>
<tr>
<td>3</td>
<td>Lighter ends</td>
<td>900 TPA</td>
</tr>
<tr>
<td>4</td>
<td>Heavier ends</td>
<td>1,200 TPA</td>
</tr>
</tbody>
</table>

2.3 Need of project with description for region and country
Deepak Fertilizers and Petrochemicals Corporation Ltd. (DFPCL) is currently the sole producers of Isopropyl Alcohol in India. In 2003 DFPCL set up the first IPA plant of 70 KTPA capacity. While scouting for IPA technology in 2003, it was observed that the then existing IPA majors had their own proprietary IPA technologies which they were not willing to make available to others. In view of this, DFPCL bought an existing facility of British Petroleum and relocated it from its UK site to Taloja. DFPCL has been successfully running this plant since its relocation to Taloja.
DFPCL has been the market leader, but hit a ceiling of market share of 70% due to demand growing 40% over the plant capacity by 2011. As an intermediate strategy to improve market share, DFPCL commenced imports of IPA from 2012. Within one year, DFPCL became the biggest importer in India owing to its numero uno position in Indian IPA market.

Since the overall market growth of IPA market is around 8%-10% per annum, DFPCL is planning to set up the additional capacity of 100,000 MTPA IPA at Srikakulam District, Andhra Pradesh.

2.4 Demand Supply Gap
There is large gap between demand and supply within India, hence currently IPA is imported.

2.5 Imports vs indigenous production
Refer above 2.4

2.6 Export Possibility
India is a net importer of IPA with around 50% of the domestic demand being catered through imports. Export possibilities will be considered based on change in the global demand supply situation in future.

2.7 Domestic / Export Markets
Refer 2.2 above

2.8 Employment Generation due to Project (Direct and indirect)
During construction, approximately 300 persons will be hired and later there will be indirect labour also. About 100 nos. of manpower is envisaged for the project which will include supervision, panel operations and non-supervisory level; same will be recruited based on skill requirement from the surrounding/local areas.
3. Project Description

3.1 Type of Project:

The project is a Petroleum product & petrochemical based processing plant as mentioned in Chapter 2.

3.2 Location of the Project

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Destination</th>
<th>App. Distance of Project Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nearest Highway</td>
<td>National Highway No 16 which is 3.5 Km away from the project site</td>
</tr>
<tr>
<td>2</td>
<td>Nearest Airport</td>
<td>Visakhapatnam International Airport, 90 Kms</td>
</tr>
<tr>
<td>3</td>
<td>Nearest Railway station</td>
<td>Srikakulam road railway station, 16 km</td>
</tr>
<tr>
<td>4</td>
<td>Nearest Port</td>
<td>Visakhapatnam port, 90 Kms</td>
</tr>
</tbody>
</table>

The proposed IPA plant will on set up at the location – Smartchem technologies Limited, Ponnada -532408, Etcherla Mandal, Srikakulam District, Andhra Pradesh.

The geographical coordinates of this location are at coordinates 18°15’54.86”N Latitude and 83°52’56.87”E Longitude and at an elevation of above mean sea level of 33 meters.

The site is in vicinity of Ponnada village.

**Land form:** Gravel land, Barren and Hillock

Site coordinates are as follows:

<table>
<thead>
<tr>
<th>Direction</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>North east corner</td>
<td>18° 15’ 49”N</td>
<td>83° 53’ 23”E</td>
</tr>
<tr>
<td>North west corner</td>
<td>18° 16’ 02”N</td>
<td>83° 52’ 55”E</td>
</tr>
<tr>
<td>South east corner</td>
<td>18° 15’ 43”N</td>
<td>83° 53’ 21”E</td>
</tr>
<tr>
<td>South west corner</td>
<td>18° 15’ 50”N</td>
<td>83° 52’ 47”E</td>
</tr>
</tbody>
</table>

**Land Ownership:** Land ownership is with DFPCL’s 100% subsidiary M/s Smartchem technologies Limited.

Project proponent are M/s Deepak Fertilizers and Petrochemicals Corporation Limited.

**Existing Land use Pattern:** The Land is reserved for Industrial use & the proposed project shall be at the same plot.

**Existing Infrastructure:** Presently there is an existing Infrastructure around the site which is sufficient for the existing plants.
Infrastructure like water, power, telephone facility, roads are available for the proposed operation.

Infrastructure like hospital, school, housing, entertainment, daily needs are available within 5-10 km radius.

There is no sensitive establishment in the vicinity such as archaeological monuments, Wild Life Sanctuaries, National Parks etc.

The locational justification for the project is as under

- Availability of required land and infrastructure for locating the expansion of the synthetic organic chemical manufacturing.
- Suitability of land from topography & geological aspects, synergy and business point of view
- Nearby refinery for raw material supply.
- Proximity to rail / road to facilitate transport of equipment / materials/ product
- Availability of adequate quantity of water to meet water requirements.

Lay-Out: Refer Annexure III for the proposed plant site layout plan

3.3 Details of alternative site considered

No alternative site is considered for the project.

3.4 Size or magnitude of operation

It is proposed to manufacture 100,000 TPA Isopropyl alcohol and its byproducts.

3.5 Project Description with Processes Details:

**Manufacturing Process:** Broad manufacturing processes, reaction chemistry of the chemicals is described at Annexure IV.

3.6 Raw Material required
The basic raw material for the proposed production capacity is submitted herein below.

Source for Raw Material Procurement: Major raw material chemical/polymer or Refinery Grade Propylene will be procured from Refinery in Andhra Pradesh (HPCL) and BPCL (Kochi).

Mode of Transport of Raw Materials: Mode of transport of raw material to site is by road truck/tankers/containers.
### List of Major Raw Material

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Raw material</th>
<th>Proposed consumption MTPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Propylene (100% basis)</td>
<td>80,000</td>
</tr>
<tr>
<td>2</td>
<td>Caustic lye (100%)</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>Sulphuric acid (100%)</td>
<td>50</td>
</tr>
</tbody>
</table>

The storages for raw materials as well as finished goods will be set up as part of the Project as follows

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Name of Chemical</th>
<th>Unit</th>
<th>No of tanks</th>
<th>Proposed liquid storage capacity of each tank</th>
<th>Total storage capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Propylene</td>
<td>MT</td>
<td>2</td>
<td>1,200</td>
<td>2,400</td>
</tr>
<tr>
<td>2</td>
<td>Propane</td>
<td>MT</td>
<td>1</td>
<td>700</td>
<td>700</td>
</tr>
<tr>
<td>3</td>
<td>Crude Di-Isopropyl Alcohol (Crude DIPE)</td>
<td>MT</td>
<td>2</td>
<td>70</td>
<td>140</td>
</tr>
<tr>
<td>4</td>
<td>Iso Propyl alcohol</td>
<td>MT</td>
<td>2</td>
<td>1,500</td>
<td>3000</td>
</tr>
<tr>
<td>5</td>
<td>Furnace Oil</td>
<td>MT</td>
<td>1</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>6</td>
<td>Caustic Lye (48%)</td>
<td>KL</td>
<td>1</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>Conc. Sulphuric Acid (For DM Plant)</td>
<td>KL</td>
<td>1</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

### 3.7 Resource Optimization / recycling
DFPCL desirous to establish the manufacturing facility of IPA as indicated above. The resource optimization shall be carried out at the site and with existing site operations in order to reduce wastage and minimum transport needs.

The effluent shall be treated and fully recycled within the site.

### 3.8 Availability of Water, energy, power, its source

**Power:** The proposed power requirement for the facility is ~ 3.5 MW which will be sourced from APEDCL. The existing dedicated 33 KV feeder line from Chilakapalem Sub-station to the plant site will be sufficient to draw the power at 33 KV rating.

**Fresh Water Requirement**

The fresh water for the project is ~ 3,500 m³/day for the process and utilities purpose. The water will be sourced from the in-filtration wells in Nagavali River at Tepparevu village by obtaining from GWD/ Irrigation department of Andhra Pradesh.

### Fresh Water requirement

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Description</th>
<th>For Proposed IPA (cmd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Domestic / Canteen</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Industrial cooling/boilers</td>
<td>3000</td>
</tr>
<tr>
<td>3.</td>
<td>Processing whereby water gets polluted and pollutants are easily biodegradable</td>
<td>490</td>
</tr>
</tbody>
</table>
Steam / Process heat Requirement: About 120 TPH medium pressure steam is expected to be required for the proposed establishment project. This will be made available from the proposed two boilers.

Details of Proposed Boilers, stacks and fuel details are as follows:

<table>
<thead>
<tr>
<th>No</th>
<th>Stack attached to Proposed APC system</th>
<th>Ht. in meter</th>
<th>Type of fuel &amp; Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Boilers (2 x 60 TPH steam capacity)</td>
<td>Cyclone separator / Bag Filter</td>
<td>Coal: 525 TPD Or Furnace Oil: 185 TPD</td>
</tr>
<tr>
<td>2</td>
<td>Flare stack</td>
<td>Flare</td>
<td>NA</td>
</tr>
</tbody>
</table>

Note: Above fuel quantities are initial estimate, shall be firmed up during EIA study.

Manpower: Expected manpower requirement for the IPA shall be as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Proposed for establishment, Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent</td>
<td>75</td>
</tr>
<tr>
<td>Contract</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

3.9 Waste Generation and its treatment, disposal

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Description</th>
<th>From the proposed establishment (cmd)</th>
<th>Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Domestic effluent</td>
<td>8</td>
<td>It will be treated onsite and recycled / reused within the site</td>
</tr>
<tr>
<td>2</td>
<td>Trade effluent</td>
<td>1222</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1230</td>
<td></td>
</tr>
</tbody>
</table>

Hazardous and nonhazardous waste:
The quantification of Non Hazardous and Hazardous waste generated from present activity and proposed activities is presented as follows:

Non- Hazardous waste

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Type of Waste</th>
<th>Category</th>
<th>Quantity</th>
<th>Mode of Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Used Cation Resin Process Water Treatment Unit</td>
<td>-</td>
<td>20 M3 every year</td>
<td>Will be sold to authorized agencies.</td>
</tr>
<tr>
<td>2</td>
<td>Used Anion Resin Process Water Treatment Unit</td>
<td>-</td>
<td>23.5 M3 every year</td>
<td>Will be sold to authorized agencies.</td>
</tr>
</tbody>
</table>
3 | Used empty steel drums | - | Later | Decontaminate and sell as scrap
4 | Used Activated Carbon, Process Water Treatment Unit | - | 53 M3 every 2 years | Will be sold to authorized agencies.

Note: above are estimates, shall be firmed during EIA study.

### Hazardous waste

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Type of Waste</th>
<th>Category</th>
<th>Quantity</th>
<th>Mode of Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Used Desulphurizer agent</td>
<td>1.6</td>
<td>30 M3 every 2 yrs.</td>
<td>Will be sold to authorized agencies.</td>
</tr>
<tr>
<td>2</td>
<td>Used Hydration catalyst</td>
<td>1.6</td>
<td>106 M3 each year</td>
<td>Will be sold to authorized agencies.</td>
</tr>
<tr>
<td>3</td>
<td>Used filter elements</td>
<td>36.2</td>
<td>Later</td>
<td>Decontaminate and sell as scrap</td>
</tr>
<tr>
<td>4</td>
<td>Chemical sludge from water treatment – MEE salts</td>
<td>35.3</td>
<td>1000 kg/month</td>
<td>Sent to CHWTSDF</td>
</tr>
</tbody>
</table>

Note: above are estimates, shall be firmed during EIA study.

**3.10 Schematic representation of the feasibility drawing which gives information of EIA purpose**
Pre-Feasibility Report

Deepak Fertilizers and Petrochemicals Corporation Ltd

Project Concept & Site Identification

Form -1, Prefeasibility project report with proposed ToR to SEAC

Scoping by SEAC (site visit by sub group of SEAC, if necessary)

ToR approved by SEAC

Draft EIA to SPCB by PP

Public consultation process by SPCB

Public consultation proceedings

Appraisal & recommendation by SEAC

Approval by SEAC / SEIAA

Rejected

Approved

Post EC monitoring

Submission on half yearly compliance

Display of compliance report on MoEF website

Display on SEAC / SEIAA website and PP website

Display at Panchayat, ZP, DM/DC/ Dy Com and on SPCB website

To PP for submission of final EIA/suppl. Report to draft EIA

Referred back to SEAC under communication to the PP

Summary EIA & form I display on the SPCB website

EC rejected by SEAC/SEIAA

Display on MoEF website
4. Site Analysis

4.1 Connectivity
This proposed DFPCL establishment facility shall be located at its existing Plot of Smartchem Technologies Limited, Ponnada village, Srikakulam District, Andhra Pradesh. The land is already available and infrastructure is made available by AP Industries department and the raw material is easily available through the easy transport via road connectivity.

4.2 Land form, Land use and Land ownership:

**Land Form:** Land is gravel land & Barren and Hillock.

**Land Ownership:** Land ownership is with project proponent.

4.3 Topography
Plant location consists of mixed topographical features. About 20% of the plant area is spread with small hillocks and rocky patches and the balance is almost plain with marginal gradient towards Northeast and Southwest.

The total extent of plant area is 100 acres surrounded by small villages and village hamlets of scanty population at a distance of about 2 Kms. from the plant.

The well-known river “Nagavali” is situated on the eastern side of the plant at 2.5 Kms. The District Headquarters Srikakulam is situated on the northern side of the site at a distance of about 5 Kms.

It was observed that there are no sensitive features like Tourism, Historical Monuments, Places of Religious interests, etc., in the vicinity of plant site.

4.4 Existing Land use pattern
Existing land use is industrial.

4.5 Existing Infrastructure

- **Infrastructure Facilities:** Infrastructure facilities includes Administrative Building, Ammonium Nitrate Plant, Nitric Acid Plant, Workshop, Warehouse, Ammonia Storage Bullets, Canteen, Guest House, Water Storage, Raw water treatment plant, Product Storage Shed, Firewater Reservoir and Hydrant-network system, First Aid Centre, Laboratory, Security Check-posts and Effluent Treatment Plants are presently available at the proposed site.
- **Transportation:** Internal roads were adequately laid down at project stage and being maintained in good condition. These roads are used for human and vehicular movement inside the plant. The 80 feet main road is meant for movement of heavy vehicles carrying ammonia, ammonium nitrate and nitric acid to outside the plant.
• **Water Supply:** The entire requirement of water for process, cooling and domestic purposes is being met by the borewells dug at the bank of river “Nagavali” by supplying through a dedicated pipeline of about 3 Kms. length to the plant premises. A water reservoir having the 3000 m3 capacity to store the water was constructed.

• **Power Supply:** The power requirement of existing plant (1.7 MW) is met by APTRANSCO through a dedicated 33 KV power line from Chilakapalem sub-station. In order to supply power during emergencies and for safe shutdown of the plant, 2 DG sets of 320 KVA and 125 KVA are installed at site.

• **Communication:** Communication facilities include 6 P&T lines, Intercoms to all the functional departments, Internet system, Fax Machine.

• **Guest House:** An air-conditioned Guesthouse was constructed at site to provide lodging and boarding for Company representatives on official tour, consultants and visitors. A centralized canteen was constructed and operated to cater breakfast, lunch and dinner on subsidized chargeable basis to the existing employees.

• **Other Facilities:** Other facilities available at site include an occupational Health Centre which is having facilities like Dressing and Washing rooms, First Aid & Medical Centre. Facilities at Outside the Plant premises

• **Housing:** All the existing employees of STL are provided with house rent allowance for staying at Srikakulam, which is 5 Kms. away from the site. Company busses are provided for picking up of its employees.

• **Medical:** Many nursing homes and full-fledged hospitals are located at Srikakulam where the employees are treated for any health problems, emergency health conditions and occupational injuries etc. Regular health check is conducted on all employees and records are maintained. Mediclaim facility is also provided for all the employees, their spouses and children.

• **Transportation:** A 5 Km stretch of public road is connecting the express highway and plant site.

4.6 Soil Classification

Geomorphologically Srikakulam district can be broadly divided into 4 distinct units, viz., structural hills, pediplains, alluvial plains and coastal plains. Major part of the district in the northern and western parts is represented by structural hills i.e. high topographic relief and is characterized by hills forming the extensions of Eastern ghats and exhibits generally a NW-SE trend.

Prominent hills like Mulegakonda, Gangadakonda, Nagalakonda, Suddalakonda and Antikonda have crescent shape and show NW-SE trend. Pandara hills, west of Kotturu attains a maximum height of 974 m amsl in the district. The hilly terrain is mostly confined to Palakonda, Hiramandalam, Pathapatnam, Tekkali and Amudalavalasa mandals. The pediplains, which occupy a larger part of the district and constitute shallow buried pediplains, deeply buried pediplains, pediments, residual hills and inselbergs.

The thickness of weathered zone in these varies from 5 to 15 m. The occurrence of ground water in this unit is generally poor except along fractures where moderate yields can be expected. The alluvial plains are developed along major river courses, along valleys and at the foothill zones of structural hills. The intermontane valleys are narrow and steep in nature are observed between various hill ranges in the western part and coast.
The general elevation of the plains varies from 60 to 120 m amsl. The plain country is very wide up to 15 km at north of Amudalavalasa and east of Srikakum, it narrows down at south of Ichapuram. The alluvial plains along the major course of rivers form the flood plain deposits. The alluvial plains form shallow to deep fresh water aquifers with good to very good yields. The coastal plains occur parallel and nearer to the sea and are of marine origin.

The predominant soils in Srikakum district are red soils, red loams, sandy loams, sandy soils, black soils and alluvial soils. Red soils which are derived from the weathering of khondalites and gneissic rocks occur mostly along hill slopes. The narrow valleys and low lying areas between the hills are also covered with red loamy soils. Sandy soils are seen occurring in the southern and eastern parts of the district. The deltaic alluvial soil is seen distributed along the banks of the rivers Vamsadhara, Nagavalli and their tributaries. The coastal alluvial soils are seen in the coastal tracts of the district in parts of Ichapuram, Sompeta and Tekkali area. The red sand and lateritic soils are mostly distributed throughout the district.

4.7 Climate data from secondary source

The climate of the district is moderate and characterized by high humidity all through the year along with oppressive summer and good seasonal rainfall. The period from December to middle of February is generally the season of fine weather.

The average annual rainfall of the district is 1067 mm, which ranges from nil rainfall in January and November to 208 mm in September and October. September and October are the wettest months of the year. The mean seasonal rainfall distribution is 745 mm in southwest monsoon (June-September), 214 mm in northeast monsoon (Oct-Dec), 18 mm rainfall in Winter (Jan-Feb) and 90 mm in summer (March–May). The percentage distribution of rainfall, season-wise, is 70% in southwest monsoon, 20 % in northeast monsoon, 2% in winter and 8 % in summer.

The mean monthly rainfall distribution is given in Fig.2. The annual rainfall ranges from 799 mm in 2002 to 1700 mm in 2010. The annual rainfall departure ranges from -25 % in 2002 to 59 % in 2010. The southwest monsoon rainfall contributes about 70% of annual rainfall. It ranges from 557 mm in 2002 to 1100 mm in 2006. The year 2002 experienced drought conditions in the district as the annual rainfall recorded is 25 % less than the long period average (LPA) respectively. The cumulative departure of annual rainfall from LPA is presented in Figure 3. It indicates that, the rainfall departure as on 2011 is positive i.e. 57%, showing rainfall excess. The annual rainfall during 2012 is 1289 mm.

The mean daily maximum temperature in the district is about 34°C in May and the mean daily minimum temperature is about 17.5°C in December/ January. Temperature in the district begins to rise from the middle of February till May. With the onset of southwest monsoon in June, the temperature decreases by about 2°C and is more or less uniform during the monsoon period. From October onwards the temperature steeply declines till December/ January. The mean daily maximum temperature increases from coast to west of the district where as mean daily minimum temperature decreases from coast to western part of the district.
The relative humidity in the district is of the order of 80 percent in the mornings throughout the year, whereas in the evenings the relative humidity varies from about 70 to more than 80 percent. Winds in the district are generally light to moderate in speed with some strengthening during summer and the early part of the southwest monsoon season with directions mostly between south and west.

4.8 Social Infrastructure available

Srikakulam city is about 5 km away. It is a district place and has social infrastructure such as schools, Medical facility, market place, entertainment and recreational facilities.
5. Planning Brief

5.1 Planning Concept

- Establishment is proposed at Company owned land.
- Purified Water supply available from Andhra Pradesh irrigation department
- Well-developed roads and connectivity.
- Infrastructure facilities available within and around the site
- Major raw material (Propylene) is available from nearby refinery.

5.2 Population Projection

In 2011, Srikakulam had population of 2,703,114 of which male and female were 1,341,738 and 1,361,376 respectively. In 2001 census, Srikakulam had a population of 2,537,593 of which males were 1,260,020 and remaining 1,277,573 were females.

Srikakulam District population constituted 3.20 percent of total Maharashtra population. In 2001 census, this figure for Srikakulam District was at 3.33 percent of Maharashtra population.

There was change of 6.52 percent in the population compared to population as per 2001. In the previous census of India 2001, Srikakulam District recorded increase of 9.33 percent to its population compared to 1991.

The proposed site is located in Etcherla Mandal of Srikakulam District, Andhra Pradesh, India. The population of Etcherla Mandal is 87,847 no. Out of the total population, 44,660 no. is the count of Male Population and 43,187 no. is the female population.

The following is the total population in Ponnada village where the plant is located and also in the villages around 5 Km radius of the plant site.

<table>
<thead>
<tr>
<th>Village</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ponnada</td>
<td>5443 no.</td>
</tr>
<tr>
<td>Kongaram</td>
<td>3648 no.</td>
</tr>
<tr>
<td>Thotapalem</td>
<td>3024 no.</td>
</tr>
<tr>
<td>Bonthalakoduru</td>
<td>2451 no.</td>
</tr>
<tr>
<td>Duppalavalasa</td>
<td>1310 no.</td>
</tr>
</tbody>
</table>

5.3 Land use planning

The project shall be constructed on about 89,012 sq m land. Appropriate green belt as per norm shall be maintained at site.
5.4 Assessment of Infrastructure Demand (Physical and Social)

Physical and social infrastructure shall be required. Srikakulam city which is district place is nearby about 4 km from the site.

5.5 Amenities and Facilities

There is adequate amenities such as housing, school, market place, hospitals in nearby area.
6. Proposed Infrastructure

Since the expansion is planned at plant site, no special/specific development is anticipated. Company will have to do site related developmental activities. Company has not planned any residential area at the proposed site. Company employees already have self-owned houses at various villages / cities in the nearby areas. For additional essential manpower company, may decide at later date about construction of a colony.

6.1 Industrial area

DFPCL, proposes to increase capacity of petroleum based product (IPA) manufacturing facility based on demand and market projection.

6.2 Residential Area

No Residential area has been proposed within the plant site.

6.3 Green Belt

In and around the DFPCL Srikakulam plant site, green plantation has been carried out to balance green belt. Adequate green belt is available at the site, and will be augmented for this establishment purpose.

6.4 Social Infrastructure

The proposed project will generate temporary employment for about 300 persons during the construction phase. The direct employment will be generated during operation phase. Hence, there will be significant positive Impact due to the proposed project.

Local people will be given preference wherever found suitable for all the jobs in the plant, direct as well as indirect. Thus, the project shall have a positive impact on the employment due to increased ancillary / business opportunities, thereby making positive impact in the region. Economic status of the local population will improve with the project.

6.5 Connectivity

The site is well connected for rail and road transport. The project is located at Survey no 25 and 47 of Ponnada Village, Etcherla Mandal, Srikakulam District, Andhra Pradesh.

6.6 Drinking Water Management

Water source is proposed from Andhra Pradesh irrigation department.

6.7 Sewage System
Sewage treatment shall be carried out in proposed combined effluent treatment plant.

6.8 Industrial waste management

Refer 3.9 above

6.9 Solid waste management

Refer 3.9 above

6.10 Power requirement supply and source

Power requirement for the project shall be ~ 3.5 MW which shall be sourced from APEDCL.
7. Rehabilitation and Resettlement (R & R Plan)

The proposed expansion shall be at an existing site of the company which is located at Ponnada, Etcherla Mandal, Srikakulam District, Andhra Pradesh. It does not require acquisition of Land and the Infrastructure so there is no any kind of activity of Rehabilitation and Resettlement proposed to be carried out.
8. Project schedule and cost estimates

8.1 Time schedule of the Project

It is expected that the project shall be completed within 36 months from the grant of Environmental clearance. New proposed IPA Plant (100,000 TPA)

Expected start date January-2018 and completion Dec – 2020

8.2 Estimated project cost (Economic Viability of the Project)

Total estimated project cost is Approx. 500 Crores.
9. Analysis of proposal

9.1 Financial and Social Benefits

DFPCL is having land at Srikakulam and the total land at the site is about 100 acres. The site consists of existing Greenbelt covering about 40 acres having established infrastructure for safe chemical operations. No discharge of any process waste water: the process water effluent will be taken in stripper for separation of organic vapors which will be condensed and separated, stripped water can be taken to bio-reactor for removal of organic traces and water will be recycled to cooling towers.

As existing complex is having facilities of raw water supply, road network, emergency services, better connectivity to Visakhapatnam port, Connectivity to Tamil Nadu, Karnataka and west Bengal states through NH-16 Highway.

Use of existing infrastructure and utilities will help in reducing erection period and additional burden on of infra-structure development.

DFPCL is only manufacturer of IPA, about 50% quantity is being imported today, there is better opportunity for Import substitution. Raw material available at local refineries: Propylene required for processing of IPA is available at Vishakhapatnam based refineries, hence there will be minimum transportation of hazardous raw material.

Generate direct & indirect employment to local people. Many dependent businesses related to conversion to downstream products, packing, transportation will be having huge scope. Hence, it is concluded that the project is viable and beneficial for Nation due to Import substitute and export potential.
Annexure I
Site allotment / ownership record
<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1</td>
<td>10</td>
</tr>
<tr>
<td>Y2</td>
<td>20</td>
</tr>
<tr>
<td>Y3</td>
<td>30</td>
</tr>
<tr>
<td>Y4</td>
<td>40</td>
</tr>
<tr>
<td>Y5</td>
<td>50</td>
</tr>
<tr>
<td>Y6</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
</tr>
</tbody>
</table>

Additional notes and signatures are present on the page, but the content is not legible enough to transcribe accurately.
Sub: Land - Srikakulam district - Pedda Mandal

Proceedings of the Collector, Srikakulam
Present : I. M. Sridhar, I.A.S.

Sub: Land - Srikakulam district - Pedda Mandal

Purpose: setting up of Ammonium Nitrate and Acid Plant by M/s. V.B.V. Chemicals Ltd., Visakhapatnam

Order No. 1

In the circumstances stated by the Managing Director, V.B.V. Chemicals Ltd., Visakhapatnam in his letter dated above M/s. V.B.V. Chemicals Ltd., Visakhapatnam are hereby permitted to enter upon the pachayat lands of No. 186.29 covered by S.No. 39, 41, 45, 49, 53, 56, 62, 67, 44 Part 46, 47, 48 Part, 49, 50 and 57 of Pedda village in Hubala Mandal only for the purpose of taking soil samples etc.

The Mandal Revenue Officer, Hubala is requested to send proposals for alienation of Government land of No. 186.29 in favour of M/s. V.B.V. Chemicals Ltd., Visakhapatnam for setting up of Ammonium Nitrate and Acid Plant at Pedda village on payment of market value through the Revenue Divisional Officer, Srikakulam.

It is also requested to send proposals for alienation of Vatta land No. 47.77 in favour of the above company after obtaining the consent of the adivasi for alienation of the D-Vatta land to the company on payment of compensation.

For Collector,
St. A. Chakravarthy

Logo for Collector.

To
The Managing Director,
M/s. V.B.V. Chemicals Ltd., Visakhapatnam,

Copy to the Mandal Revenue Officer, Hubala
Copy to the Revenue Divisional Officer, Srikakulam.
ప్రీ-ఫసిబిలిటీ రూపాంతర జాబితా అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

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అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.

అంశాలకు కూడా అవసరం ఉంది.
Annexure II

Location of DFPCL Project site

Srikakulam District
In Andhra Pradesh

Site & surrounding study area of 10 km
Site & surrounding study area of 1 km

Site Area with boundaries
TOPOSPHERE WITH 10 KM RADIUS AREA

Annexure III
Area Statement

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit in sq m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total site area</td>
<td>393,576.928</td>
</tr>
<tr>
<td>Area proposed for IPA Project</td>
<td>89,012</td>
</tr>
</tbody>
</table>
Annexure IV

Process Description & Flow Diagram – Iso Propyl Alcohol

PROCESS DESCRIPTION

PROCESS DESCRIPTION (Resin catalyst Based IPA Process)

For the production of Isopropyl Alcohol and high purity Di-Isopropyl Ether by the direct hydration of Propylene, the Licensor's technology will be employed. This process is indicated through a Block Diagram included in this report. The process uses less power per MT of product and gives high purity Di-isopropyl Ether as a by-product.

The proposed IPA plant shall include facilities for:

Purification of and concentration of a mixture of Refinery and Technical Grade Propylene for removing sulphur, C2 hydrocarbons, C4 hydrocarbons, dienes and propane.

IPA process plant comprising of reaction and distillation sections as main components.

Process Water Treatment Unit to treat all the unreacted feed water and recycle it back fully to reactor as feed.

New storage and handling facilities for DIPE, Light and Heavy Component Off sites and Utilities as required.

Detail Description of Process:

The mixture of Refinery & Technical Grade Propylene from storage shall be pumped to the Propylene Purification Unit for the removal of Sulphur containing compounds, ethane & ethylene, dienes, propane, C4 compounds. The ethane sulphur compounds get adsorbed on the desuphurizer. Ethane and Ethylene are removed as overhead purge from the De-ethanizer column. This purge gas is consumed as fuel in offsite boilers. Methyl acetylene Dienes, Propane and C4 compounds are removed as bottoms from the C3 splitter column and stored in Propane storage bullets. 95% by-product Propane is filled in tankers and sold.

Purified Propylene as overhead product of C3 splitter is sent to the Propylene feed tank from where it is pumped to the Propylene evaporator in the IPA Plant. Demineralized and deoxygenated water from OSBL will be fed to the IPA plant feed water tank where it will be mixed with recycled water from Process water treatment unit and fed to the reactor along with Propylene vapour from evaporator. The evaporator will use the exothermic heat of reaction for evaporating propylene in a feed-effluent heat exchanger.
The reactor is a trickle bed type reactor with a solid catalyzed gas-liquid reaction. The highly active hydration catalyst exists and three or four fixed beds in the reactor. Staged feeding of Propylene vapour and, if required, process water, is used to control the temperature at various locations in the various catalyst beds. The mole ratio of water and propylene in reactor feed is an important parameter and very closely controlled. The per pass conversion of Propylene is about 65% and selectivity to IPA and DIPE is about 95%.

The reactor outlet stream comprising of unreacted propylene, propane, IPA solution, DIPE and impurities shall flashed by lowering pressure twice. The low pressure vapour from LP flash section will be compressed and mixed with HP & MP flash vapour and fed to the DIPE recovery column where DIPE+IPA solution will be removed as bottoms and returned to IPA Dehydration section. Overhead product will be fed to Propane Recovery column. Recovered overhead propylene will be recycled back to propylene feed tank to mix with fresh feed from BL. About 95% pure propane as bottoms from Propane Recovery column is sent back to BL and then to Propane storage. By-product propane will filled in road tankers and sold.

Crude IPA, mixture of IPA, DIPE and Water with impurities, will be fed to the Azeo Distillation column. The bottoms from the Azeo distillation column containing mainly water with traces of organics is cooled and sent to the Process Water Treatment unit. A small part of this is continuously bled and sent to effluent treatment section in the OSBL.

The overhead product of IPA Azeo distillation is an 86% IPA-Water solution. It is mixed with DIPE recovered from DIPE recovery column and fresh DIPE from DIPE storage and fed to the IPA Dehydration Column. Here the DIPE acts as an Azeotropic Entrainer. A water-IPA-DIPE is recovered as the overhead product of this distillation column. This is fed to the DIPE purification section as Crude DIPE stream.

The bottoms from IPA Dehydration column is a dry IPA stream but containing organic impurities. It is fed to the Light Ends distillation column. The overhead product is low boiling stream containing traces of IPA. It is collected as Light Ends and sent to Light Ends storage. It will be loaded into road tankers and to prospective users.

Bottoms from Light Ends column will be fed to the Heavy Ends column. Here pure IPA product will be recovered as overhead product after cooling, stored in IPA day tanks. After quality checking the pure IPA from day tanks will be pumped to the bulk IPA storage tank in OSBL area. It will be loaded in tankers and sold to IPA users.

Crude DIPE from the overhead of IPA Dehydration column will be fed to the first column DIPE Purification Section which is the DIPE extraction column. IPA and other soluble will be removed by extraction into wash water. The extract, bottoms from DIPE extraction column, an aqueous IPA stream, will be sent back to crude IPA stream. The IPA free DIPE will be fed
to the second column which is the DIPE refining column. Purified DIPE is recovered as product from this column and sent to DIPE day tanks in ISBL. After quality checks it is transferred to two bulk DIPE storage tanks in OSBL. From there it will be either loaded into road tankers or sent to the DIPE drumming unit. The impurities stream from this section will be mixed with suitable IPA stream or light or heavy ends.

**Block Diagram for IPA Process**

**PROPOSED ISOPROPYL ALCOHOL PROCESS**
Treated effluent from effluent treatment plan shall be passed through RO/UF unit.

Premeate shall be recycled to cooling tower as make up / used for gardening within site.

Reject from RO UF unit shall be passes through MEE system to recover the condensate and salts generated shall be sent to CHWT SDF site along with chemical sludge from ETP Plant.

The treated water shall be recycled within site. There will not be any liquid effluent discharge outside the plant premises.