PREFEASIBILITY REPORT

FOR

“COAL TAR PITCH & IT’S BYPRODUCTS,
NAPHTHALENE, SULFONATED
NAPHTHALENE FORMALDEHYDE (SNF),
POLYCARBOXYLATE ETHER (PCE) &
CARBON BLACK”

BY

HIMADRi CHEMICALS & INDUSTRIES LIMITED

MAHISTIKRY UNIT, MAHISTIKRY,

HARIPAL, HOOGLY 712223
1. INTRODUCTION

Himadri Chemicals & Industries Ltd., the flagship Company of Himadri Group, was founded to develop, manufacture and market chemical products, with a special emphasis on coal tar and its derivatives. The company was incorporated in the year 1987 as a Private Limited Company under the name of Himadri Castings (P) Limited. Subsequently the name of the company was changed to Himadri Chemicals and Industries Limited and converted into public Limited Company in the year 1991. The Company has diversified into corrosion protection and manufacturing coal tar based pipe-coating products. The company is listed at the Bombay Stock Exchange and National Stock Exchange. The core strength of Himadri lies in its R&D team and which is constantly developing new technologies and products. Coal tar division of M/S Himadri Chemicals & Industries Limited (HCIL) has up a Coal tar pitch, SNF, Crude Naphthalene, carbon black & other byproducts manufacturing unit with a plant capacity to produce the following

Existing Consent to Operate (August 31, 2015)

a.) Coal Tar Pitch - 15587.5 MT/Month
b.) Crude Naphthalene - 1833.33 MT/Month
c.) S.N.F - 4166.67 MT/month
d.) Heavy & light cresote oil - 9412.5 MT / Month
e.) Carbon Black - 10000.33 MT/Month
f.) Tail Gas - 31252500 NM3/Month (for 4167 TPM of Carbon Black Manufacture)
g.) Tail Gas - 47100 NM3/hour (for 5833 TPM of Carbon Black Manufacture)

Proposed Capacity after Expansion (including existing capacity)

a) Coal Tar Pitch - 25,000 MT/Month
b) Naphthalene - 4000 MT/Month
c) S.N.F - 7500 MT/month
d) P.C.E – 2500 MT / month (Proposed)
e) Heavy & light cresote oil - 21000 MT / Month
f) Carbon Black - 15000MT/Month

g) Tail Gas - 7,00,000,00 NM3/Month (for 15000 TPM of Carbon Black Manufacture)

Note: Polycarboxylate Ether PCE is a new product proposed

### 2. RAW MATERIALS

The raw material for coal tar pitch is coal tar, which is sourced from different Steel Plants and Coke Oven Plants as follows.

Names of Sources:

1) Durgapur Steel Plant
2) Durgapur Project Limited
3) Rourkela Steel Plant
4) Bhilai Steel Plant
5) JSW Steel Limited
6) Vizag Steel Plant
7) IISCO
8) MMTC;Jajpur
9) Others

During the distillation process of coal tar pitch manufacturing, various oil fractions such as Light oils, Heavy Creosote Oils are produced & this serves as raw material for Naphthalene Manufacturing. Part of the naphthalene is used for the production of SNF. All other oil fractions generated from pitch plant & naphthalene plant like light & heavy creosote oils are the raw materials for Carbon Black Plant. Coal Tar is also directly used for manufacturing Carbon Black.

### 3. PROJECT LOCATION

The site is situated at Mahistikry, P.O. & P.S. Haripal, Dist- Hooghly, West Bengal at a distance of about 55 Km from Kolkata by Road located between Latitude 22° 52’ 15.91”N and Longitude 88° 12’ 52-56” E..

- The project is connected by a NH-2 and NH-6, which is beside the Durgapur Express way Connecting Kolkata, Delhi, Chennai and Mumbai The connectivity to the site is quite good at present and is expected to be further improved to a great extent shortly
➢ The nearest Railway Station located to the site is Singur Rly St. The project location is about 40 Km from Kolkata-Howrah by rail and is easily approachable through regular suburban trains.

➢ Netaji Subhas Chandra Bose International Airport at Dum Dum is the nearest airport at a distance of about 45 Km. from the site and Netaji Subhas Dock (Sea Port) is about 60 Km away.

Photograph satellite image shows the Location of Himadri Chemicals & Industries Limited situated beside the Durgapur expressway (National Highway-2)
4 PROJECT FINANCIAL DETAIL AND BREAK UP

The cost of the project is given below

<table>
<thead>
<tr>
<th>Project Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(A)Capital Cost</strong></td>
</tr>
<tr>
<td>Land and Building</td>
</tr>
<tr>
<td>Plant and Machineries</td>
</tr>
<tr>
<td>Other misc.</td>
</tr>
<tr>
<td><strong>Total (A)</strong></td>
</tr>
<tr>
<td><strong>(B)Environment management cost with split up</strong></td>
</tr>
<tr>
<td>Pollution Control Equipments</td>
</tr>
<tr>
<td><strong>Total (B)</strong></td>
</tr>
<tr>
<td><strong>(C)Operational Cost</strong></td>
</tr>
<tr>
<td>Environmental Operational Cost</td>
</tr>
<tr>
<td>Plant Operational cost</td>
</tr>
<tr>
<td><strong>Total (C)</strong></td>
</tr>
</tbody>
</table>

5. PRODUCT DETAILS

5.1 Coal Tar Pitch

Coal tar pitch is a complex chemical with 22 chemical and physical properties obtained through coal tar distillation, which involves the conversion of coal tar into a variety of intermediate chemical products. At Himadri coal tar pitch is derived from the processing of high temperature coal tar using state-of-art technologies. The various applications of coal tar pitch are as follows

<table>
<thead>
<tr>
<th>Grade</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum grade pitch</td>
<td>In pre-baked anode and Soderberg in aluminum manufacture</td>
</tr>
<tr>
<td>Graphite Grade binder pitch</td>
<td>In graphite electrode manufacture</td>
</tr>
<tr>
<td>Graphite Grade zero Q1 coal tar impregnating pitch</td>
<td>In graphite electrode, nipple impregnation and UHP grade electrode manufacture</td>
</tr>
<tr>
<td>Mesophase pitch</td>
<td>In needle coke, carbon/carbon composites, advanced carbon material and carbon fibres</td>
</tr>
</tbody>
</table>
5.2 **Naphthalene**

During the distillation process of coal tar pitch manufacturing, various oil fractions such as Light oils, Heavy Creosote Oils are produced & this serves as raw material for Naphthalene. Naphthalene is used in the manufacture of SNF, beta naphthol, phthalic anhydride, tanning agents, moth balls and domestic disinfectants.

5.3 **A. Sulfonated Naphthalene Formaldehyde / Dispersing agent Phenol based**

Naphthalene is used for the production of SNF.

DISPERING AGENT PHENOL BASED  The process remains same as above other than Phenol is used as the raw material instead of Naphthalene.

At Himadri sulfonated naphthalene formaldehyde condensate sodium salt is produced in liquid and powdered form, its major applications are as follows

<table>
<thead>
<tr>
<th>Products</th>
<th>Applications</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benton SP-011-</td>
<td>• High performance concrete</td>
<td>• Improves flow properties; enables the fast mixing of the concrete</td>
</tr>
<tr>
<td>Liquid and Powder</td>
<td>• High- fluidity concrete</td>
<td>• Assures higher resistance of concrete by improving the rheological properties such as compressive, flexural strength and modulus elasticity</td>
</tr>
<tr>
<td>Form</td>
<td>• High-strength concrete for dams, bridges and high buildings</td>
<td>• Environment friendly and non-hazardous product for application even in contact with drinking water</td>
</tr>
<tr>
<td></td>
<td>• Self-compacting concrete</td>
<td>• Is cost efficient; supports increased use of cementitious supplementary material such as silica, fly ash and slag</td>
</tr>
<tr>
<td></td>
<td>• Highly durable concrete</td>
<td>• Excellent product formulators compatible with admixture; versatile for formulations</td>
</tr>
<tr>
<td></td>
<td>• Fly ash concrete, slag concrete</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Pre-casting</td>
<td></td>
</tr>
</tbody>
</table>
B. Polycarboxylate Ether
Polycarboxylate ether is a copolymer of macro monomer and organic unsaturated acid. As macro monomer different chemicals can be used. One of it is Methallyl Polyethylene Glycol. As unsaturated acid mostly used is Acrylic Acid.
It is used for less water consumption in concrete. Faster curing, long thixotropic behavior.

5.4 Creosote oils
During the distillation process of coal tar pitch manufacturing, various oil fractions such as Light oil, High molecular oil are generated, these oils are used as one of the feed stock for our carbon black division.

5.5 Carbon Black
Carbon black is defined as elemental carbon with turbostatic structure, derived from the incomplete pyrolysis of fossil oil. Carbon black is produced through the controlled incomplete combustion of hydrocarbons. Carbon black is actually elemental carbon in the form of fine particles with an amorphous molecular structure. Some of the uses of carbon black as follows.

- Reinforcing agent for rubber
- Improved fracture behavior
- Abrasion resistant
- Tear resistant
- Improved dynamic mechanical properties

6. JUSTIFICATION OF THE PROJECT
Eastern region is a significant source of coal and iron ore, Majority of steel plants are located in and around eastern region. Coke oven plants are integral part of steel plant which is a source of coal tar, main raw material of our products.
7. MANUFACTURING PROCESS

8.1 Coal Tar Pitch

Input:
1. Coal Tar

Output:
1. Coal Tar Pitch of different grades
2. Light Oils
3. Naphthalene
4. Creosote Oils

Process:
1. Coal tar pitch is manufactured from coal tar by distillation under vacuum
2. Blending: different grades of coal tar of specified quantities are blended in a blending system
3. Distillation:
   a. Dehydration: In this process, coal tar is heated and distilled to remove the water content in a distillation column
   b. Oil Water Separator: Water dehydrated is processed through oil water separator to segregate oil. Water thereby extracted is sent to CETP and oil to carbon black unit as feedstock
5. Distillation unit: Dehydrated coal tar is further distilled under vacuum and overhead products such as light oils, naphthalene, Creosote Oils are removed. The bottom product from the distillation column is taken out as coal tar pitch as a finished product. All oils recovered from the process of distillation goes to carbon black as feedstock. Naphthalene goes to SNF as feedstock as well as product for sale in the market

8.2 Product Finishing / Granulation: Distillation column bottom residue is finished coal tar pitch. The pitch is dispatched to customers in molten condition as per specification. Part of finished liquid pitch is granulated by cooling through granulator as solid pitch product for specific

8.3 Sulfonated Naphthalene Formaldehyde / Dispersing agent Phenol based

Liquid Sulphonated Naphthalene Formaldehyde (SNF) is manufactured in a batch process. As first step Naphthalene mixed with Sulphuric Acid and Formaldehyde at desired temperature which is then treated with caustic soda solution to achieve desired final product,
Sulphonated Naphthalene Formaldehyde (is known as SNF). Finished product stored in storage tanks.

In the process of production whatever off-gases comes out of process go to Scrubber and clean vent gases before discharged to atmosphere. There is no other waste or effluent from the unit. SNF process is a total recycle process, has no hazardous waste generated from the unit.

SNF powder is produced by spray drying of SNF liquid in a Spray Dryer. Drying air is passed through an air heating system to drying unit for drying the liquid SNF. SNF liquid is fed to atomization system in Dryer for uniform atomization and particle formation. The feed material and hot air come in contact and drying takes place. The exhaust air carries the moisture removed from the product away and passed through cyclone separator for fines removal and recovery. The product is collected at the bottom of cyclone separators. Off-gases is passed through the Bag Filter where fines are collected at the bottom of bag filter. Clean air from the exit of Bag Filter is vented to atmosphere. Product from chamber and cyclone outlet is further pneumatically cooled and conveyed to bagging cyclone to separate the material from conveying air for packing. Multiple Cyclone Separators and Bag Filters functions as pollution control equipments for separating SNF solid particles from post-drying air. There is complete recovery of solid as product from this process so there is no waste generated from the unit.

DISPERSING AGENT PHENOL BASED : The process remains same as above other than Phenol is used as the raw material instead of Naphthalene.

8.3.1 Carbon Black
Coal Tar / Coal Tar Based Feedstock is used as raw material for the manufacture of Carbon Black. In proposed expansion we intend to use CBFS as such raw material and/or blend of CBFS and Coal Tar / Coal Tar based feedstock. It will be pyrolysed in the reactors at temperature 1900⁰C for manufacturing of Carbon Black & Tail gas. Petroleum based CBFS will be used as fuel oil to heat the reactors at the desired temperature.

This Carbon Black laden gas travels through different heat exchangers and finally the Carbon Black separates out in the bag filters having emergency stack which is always closed as the total gas generation goes to the boiler for generating power. Carbon Black drops at the
bottom and is palletized by molasses in the palletizer. Next it is dried in the rotary kiln dryer via indirect heat conveyed by the combustion of tail gas.

Main portion of tail gas from the bag filter goes to the combustion section of the boiler and is mixed with oxygen and burnt.

This is an exothermic reaction generating heat which in turn produces steam.

This helps in rotating the turbine and generates power.

We are having four types of water quenching:

1. **Pre-Quench** Used to stop further reaction and quality control of Carbon Black (for special grades of carbon)

2. **Primary-Quench** Used to stop further reaction and quality control of Carbon Black (for normal grades)

3. **Secondary-Quench** Used to bring down smoke temp to 950oC for APH.

4. **Quench Tower** Used to control temp to 260oC before going to Bag Filter.

8.3.2 **Separation:**

The Carbon Black is separated from the smoke through Bag Filters. We are having Pulse Jet types of filters (user friendly, efficient, pollution free). In this type of bag house Carbon stay back outside the bag and gas comes out after passing through the bags. In pulse-jet filters, pulses of pressurized air are applied to clean the filter bags. Separated Off-gas is being used partially in dryer combustor for drying the product, and rest is used in making steam in boiler. This Off-gas has calorific value of 650-730 Kcal / m3 depending upon grades.

8.3.3 **Conveying:**

The Carbon Black discharged from the filters will be conveyed pneumatically by cold conveying process. Preheated air (by steam heater) at 120oC will be used as carrier medium and carbon black will be carried to other sections for further processing after being crushed through micro-pulverizer. Pneumatic conveying blower will be used for conveying. The Carbon Black will be separated from the Pneumatic system by Process Bag Filter. Carbon
separated from here will be collected to Accumulator tank for intermediate storage and densification.

All the conveying lines including bag house, which is coming in contact with carbon black is made of stainless steel to avoid metallic contamination in final products.

### 8.3.4 Wet Palletization and Drying:

In the Wet pelletization, the carbon black is mixed with water and binding agent in special pin mixers. In HCIL we will use twin pelletizer for better pellet quality. Here Molasses solution (at pre set ratio of water and molasses, depending upon the grade) will be used to get consistency and homogeneity in binding agents to improve pellet quality and distribution.

After palletizing, wet small spherical particles will be fed into Rotary drum dryer which will be heated up from outside by burning Off-gas generated during process. Dryer bed depth i.e. residence time can be maintained to control some quality (by doing this we can vary product modulus and MST).

### 8.3.5 Storage and Packaging:

From the palletizing section, the palletized black will be transported by Bucket Elevators, through rotating Scalper Screen (to arrest any lumps, foreign materials) to Screw Conveyors to storage Silos.

In HCIL we will have the facilities to pack in 1200 Kg, 1100 Kg, 1000 Kg, 900 Kg, 500 Kg 25 Kg bags. Auto pelletizer with robotics will be used for 25 kg bag stacking.

In each packing machine we will have screen and magnets to arrest any ferrous and nonferrous foreign material during packing.

All silo roof and hoppers are made of stainless steel and vertical portions are internally painted with glass flakes filled type epoxy coating.

### 8.3.6 Boiler and Turbine:

Off gas separated in bag house will be conveyed to boiler for generating 66 bar steam for 12 MW & 8MW Turbo generator. Steam from reactor boiler will be used partly in process and partly in main boiler super heater. Power generated from TG will be used in Process Plant, adjacent existing Pitch / Tar Plant and excess amount will be sold to outside grid.

### 8.4 Polycarboxylate Ether:

The polymerization can be in aqueous medium or in bulk. We are following bulk polymerization. The polymerization is done under heat and in presence of an appropriate initiator. The polymerization temperature is around 90deg C. It is polymerized in a jacketed reactor under mechanical agitator. After the desired level of polymerization the mass is
cooled to a lower temperature and then diluted with water. Finally it is cooled to an ambient temperature and is stored either in storage tank or in 200L HDPE carboy.

**FLOW DIAGRAM OF POLYCARBOXYLATE ETHER**
HIMADRI’S PROCESS FLOW CHART
RECYCLING OF PROCESS WATER FOR CARBON BLACK QUENCHING

**ORGANIC SUBSTANCE** $\Delta H$ $C + CO + CO_2 + C_2H_2 + H_2 + H_2O$

- **Carbon Black**
- **Tail Gas**
8. **UTILITY**

**A. Electricity Demand**

- Total power requirement of the entire plant is 5.512 MW (both carbon black & coal tar division)
- During normal operation plant will be self supported with its own generation unit/s and will export power to WBSEB grid as per the government norms.
- After expansion, the Carbon Black Production Plant/Carbon black division of M/s Himadri Chemicals & industries Ltd shall be capable of producing required demand of power. There shall be Co-Generation Plants with an output of 12 +8+ 8 MW. After captive consumption, Balance available shall be exported/ sold to WBSEB.
- Backup DG of 2 x725 KVA

**B. WATER DEMAND**

The total water requirement for industrial use is 2506 KLD & domestic use is 12 KLD, and the waste water generated are treated & reused in the process. Even the reject from the RO system is used for Quenching in carbon black manufacturing division. Sewage is treated in ETP’s Bio treatment & reused.
Water Requirement for the project

<table>
<thead>
<tr>
<th>Sl.no.</th>
<th>Process</th>
<th>Water requirement (KLD)</th>
<th>Wastewater generation (KLD)</th>
<th>Evaporation loss (KLD)</th>
<th>Reject/ Blowdown (KLD)</th>
<th>Treatment system</th>
<th>Disposal/ use</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CTP</td>
<td>292</td>
<td>18</td>
<td>190</td>
<td>102</td>
<td>CETP- 18 KLD &amp; WRP- 102 KLD</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>Considering the coal tar contains 1.5-2% moisture, which produces 18 KLD wastewater.</td>
</tr>
<tr>
<td>2</td>
<td>SNF</td>
<td>115</td>
<td>0</td>
<td>24</td>
<td>47</td>
<td>WRP- 47 KLD</td>
<td></td>
<td>Approx 44KL product as moisture</td>
</tr>
<tr>
<td>3</td>
<td>CBD &amp; CPP</td>
<td>2093</td>
<td>1674</td>
<td>419</td>
<td></td>
<td>CETP- 165 KLD &amp; WRP- 254 KLD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Plant Washing</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>CETP- 6 KLD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>2506</td>
<td>24</td>
<td>1888</td>
<td>568</td>
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</tr>
</tbody>
</table>
WATER BALANCE

TOTAL WATER REQUIREMENT
2518 KLD

INDUSTRIAL WATER
2506 KLD

DOMESTIC WATER
12 KLD

From Raw Material

CTP
292 KLD

PROCESS EFFLUENT
18 KLD

UTILITY EVAPORATION
190 KLD

UTILITY BLOW DOWN
102 KLD

SNF
115 KLD

UTILITY BLOW DOWN
24 KLD

UTILITY BLOW DOWN
47 KLD

CBD &CPP
2093 KLD

Plant washing
6 KLD

TREATED WATER
279 KLD + 189 = 468 KLD

RECYCLED-MAKEUP WATER

TREATED WATER

165 KLD to CETP

254 KLD

124 KLD RO Reject to carbon black quenching

254 KLD

UTILITY BLOW DOWN
102 KLD

UTILITY EVAPORATION
24 KLD

UTILITY BLOW DOWN
47 KLD

SNF
115 KLD

UTILITY BLOW DOWN
190 KLD

UTILITY EVAPORATION
18 KLD

WFP - 403

CETP - 189 KLD

TREATED WATER

279 KLD + 189 = 468 KLD
### 9. DETAILS OF EMISSION & POLLUTION CONTROL MEASURES

<table>
<thead>
<tr>
<th>Stack ID</th>
<th>Location</th>
<th>Shape of Stack</th>
<th>Capacity</th>
<th>Height of Stack from G.L. (Meter)</th>
<th>Stack I.D. at sampling point (Meter)</th>
<th>Height of Sampling Port from G.L. (Meter)</th>
<th>Fuel consumed</th>
<th>POLLUTION EQUIPMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

#### CARBON BLACK DIVISION

<table>
<thead>
<tr>
<th>Stack ID</th>
<th>Location</th>
<th>Shape of Stack</th>
<th>Capacity</th>
<th>Height of Stack from G.L. (Meter)</th>
<th>Stack I.D. at sampling point (Meter)</th>
<th>Height of Sampling Port from G.L. (Meter)</th>
<th>Fuel consumed</th>
<th>POLLUTION EQUIPMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>C.P.P. Boiler</td>
<td>Circular</td>
<td>40 MT/hr</td>
<td>73</td>
<td>3</td>
<td>24</td>
<td>Tail Gas</td>
<td>PCME</td>
</tr>
<tr>
<td>S-1</td>
<td>CBD Drier Line - I</td>
<td>Circular</td>
<td>160MT/Day</td>
<td>54</td>
<td>1.8</td>
<td>14.4</td>
<td>Tail Gas</td>
<td>OPACITY METER</td>
</tr>
<tr>
<td>3</td>
<td>CBD Drier Line - II</td>
<td>Circular</td>
<td>160 MT/Day</td>
<td>54</td>
<td>1.8</td>
<td>14.4</td>
<td>Tail Gas</td>
<td>OPACITY METER</td>
</tr>
</tbody>
</table>

#### COAL TAR DIVISION

<table>
<thead>
<tr>
<th>Stack ID</th>
<th>Location</th>
<th>Shape of Stack</th>
<th>Capacity</th>
<th>Height of Stack from G.L. (Meter)</th>
<th>Stack I.D. at sampling point (Meter)</th>
<th>Height of Sampling Port from G.L. (Meter)</th>
<th>Fuel consumed</th>
<th>POLLUTION EQUIPMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>NDU</td>
<td>Circular</td>
<td>20,00,000 KCAL/HR</td>
<td>43</td>
<td>0.85</td>
<td>11.25</td>
<td>CBFS/Petroleum Based FO/LSF/HSD/Producer Gas</td>
<td>SCRUBBER,VAC UUM SYSTEM &amp; OPACITY METER</td>
</tr>
<tr>
<td>S-2</td>
<td>Main Shed</td>
<td>Circular</td>
<td>10,00,000 Kcal/hour</td>
<td>33</td>
<td>0.85</td>
<td>11.25</td>
<td>CBFS/Petroleum Based FO/LSF/HSD/Producer Gas</td>
<td>SCRUBBER,VAC UUM SYSTEM &amp; OPACITY METER</td>
</tr>
<tr>
<td>S-3</td>
<td>PM Shed</td>
<td>Circular</td>
<td>T.F.H - 10,00,000 kcal/hour</td>
<td>31</td>
<td>0.85</td>
<td>11.25</td>
<td>CBFS/Petroleum Based FO/LSF/HSD/Producer Gas</td>
<td>SCRUBBER, &amp; OPACITY METER</td>
</tr>
<tr>
<td>Stack ID</td>
<td>Location</td>
<td>Shape of Stack</td>
<td>Capacity</td>
<td>Height of Stack from G.L. (Meter)</td>
<td>Stack I.D. at sampling point (Meter)</td>
<td>Height of Sampling Port from G.L. (Meter)</td>
<td>Fuel consumed</td>
<td>POLLUTION EQUIPMENTS</td>
</tr>
<tr>
<td>----------</td>
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<td>------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>S-4</td>
<td>TP 10 (1 &amp; 2) attached to common stack with 2 nos fired heaters NEAR VACUUM SHED</td>
<td>Circular</td>
<td>10,00,000 Kcal/hour</td>
<td>33</td>
<td>0.85</td>
<td>7.62</td>
<td>CBFS/Petroleum Based FO/LSF/HSD/Producer Gas</td>
<td>SCRUBBER, VAC UUM SYSTEM &amp; OPACITY METER</td>
</tr>
<tr>
<td>S-5</td>
<td>Naphthalene Plant</td>
<td>Circular</td>
<td>T.F.H - 10,00,000 Kcal/hour (× 4 Nos.)</td>
<td>33</td>
<td>0.85</td>
<td>6.8</td>
<td>CBFS/Petroleum Based FO/LSF/HSD/Producer Gas</td>
<td>SCRUBBER, VAC UUM SYSTEM &amp; OPACITY METER</td>
</tr>
<tr>
<td>DG</td>
<td>DG(2 Nos)</td>
<td>Circular</td>
<td>725 Kva</td>
<td>10.6</td>
<td>-</td>
<td>0.203</td>
<td>HSD</td>
<td>-</td>
</tr>
<tr>
<td>DG</td>
<td>DG(2 Nos)</td>
<td>Circular</td>
<td>725 Kva</td>
<td>10.6</td>
<td>-</td>
<td>0.203</td>
<td>HSD</td>
<td>-</td>
</tr>
</tbody>
</table>

PROPOSED POLLUTION CONTROL MEASURES
<table>
<thead>
<tr>
<th>Stack ID</th>
<th>Location</th>
<th>Shape of Stack</th>
<th>Capacity</th>
<th>Height of Stack from G.L. (Meter)</th>
<th>Stack I.D. at sampling point (Meter)</th>
<th>Height of Sampling Port from G.L. (Meter)</th>
<th>Fuel consumed</th>
<th>POLLUTION EQUIPMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>CARBON BLACK DIVISION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S-2</td>
<td>CBD Drier Line- III</td>
<td>Circular</td>
<td>160 MT/Day</td>
<td>54</td>
<td>1.8</td>
<td>14.4</td>
<td>Tail Gas</td>
<td>OPACITY METER</td>
</tr>
<tr>
<td></td>
<td><strong>COAL TAR UNIT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S-6</td>
<td>Fire Heater – 2 nos</td>
<td>Circular</td>
<td>2 million kcal/hr</td>
<td>33</td>
<td>0.85</td>
<td>7.6</td>
<td>CBFS/Petroleum Based FO/LSF/HSD/Producer Gas</td>
<td>Opacity meter</td>
</tr>
<tr>
<td></td>
<td><strong>NAPHTHALENE UNIT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S-7</td>
<td>TF Heater – 2 nos</td>
<td>Circular</td>
<td>2 million kcal/hr</td>
<td>43</td>
<td>0.85</td>
<td>11.25</td>
<td>CBFS/Petroleum Based FO/LSF/HSD/Producer Gas</td>
<td>Opacity meter</td>
</tr>
</tbody>
</table>
9.1 Coal tar pitch

Himadri CTP Unit has modern pollution control systems and preventive measures

- Storage tanks are connected to high-efficiency scrubbing system which use wash oil as a medium. Wash oil recycled into plant. Tanks vents are connected to the scrubbing system. Total scrubbing system installed – 5 nos
- Seal Pot to scrub the vapours from the low temperature storage tank
- Distillation is carried in closed loop process at low temperature under vacuum ensuring low emission. Wash oil used as sealing liquid in vacuum pump which is recycled back to the process
- Outlet of vacuum system connected to the scrubbing system
- Opacity Meter to monitor and control the particulate matters. The meter raises an alarm if the particulate matters exceed pre-defined limits

![Schematic drawing- Scrubber system](image)

9.2 SNF

- Scrubbing system (primary and secondary column) to scrub all vapours generated throughout the process. All reactor vents connected to scrubber system. Scrubber medium is water which is recycled back to the process
- Dust collector (bag filter) used to arrest powder quantity after passing from quadratic cyclone and product cyclone. 138 nos of bags in the bag filter
- Seal Pot to scrub the vapors from the storage tank
### 9.3 Carbon Black

| Reactors while off-smoking: 5 nos | ▪ Double Scrubber in series to arrest 100% dust emission $4 \times 2 = 8$ scrubbers  
▪ Automated water valve operation with an interlock to avoid human mistake |
|----------------------------------|-----------------------------------------------------------------------------------|
| Carbon dust emission from bag house | ▪ PCME meter in bag filter system to monitor emission level  
▪ Pulse jet technology filtration system: Global standard adopted; best in class in India  
▪ Modular Bag House made with pneumatic operated Knife Gate Valve at smoke inlet to Main Bag Filter enabling isolation when required |
| Drier and Boiler: 1 stack each | ▪ Chimney height much above mandated standards  
▪ Complete burning of all CO to CO$_2$  
▪ No particulate matter emission |
Scrubber in the reactor to ensure no carbon amole, if any, goes down with water and steam.

PCME and Opacity Meters in outlier of Bag Filter Stack to ensure particulate matter is less than 100 mg/m³.
10. WASTE WATER MANAGEMENT

BLOCK FLOW DIAGRAM OF CENTRAL EFLUENT TREATMENT PLANT

OIL & GREASE TRAP → EQUALIZING TANK → API → DAF → MIXER → FLOCULATOR

MGF (SAND-GRAVEL) → HOLDING TANK → STS-1 → BIO REACTOR → PTS 1& 2

MGF

TREATED WATER TO CBD
11. SOLID WASTE MANAGEMENT

Plant generates solid waste in form of:

<table>
<thead>
<tr>
<th>Type of Waste</th>
<th>Rate of Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETP Sludge</td>
<td>1.5 MT PA</td>
</tr>
<tr>
<td>Oil jute, soaked sand</td>
<td>0.700 MT PA</td>
</tr>
<tr>
<td>EMPTY BAG/CONTAINER</td>
<td>0.500 MT PA</td>
</tr>
<tr>
<td>USED OIL</td>
<td>0.840 KL PA</td>
</tr>
</tbody>
</table>

Arrangement with Ramky Enviro Engineers, an approved hazardous waste management agency for disposal of all solid waste has been made and Hazardous waste authorization from WBPCB is also obtained.

12. SOCIO ECONOMIC BENEFIT OF THE PROJECT

Industrialization in India has the Following Effects on the Social Aspects:

- Urbanization - The concentration of labor into factories has brought about the rise of large towns to serve and house the factory workers.

- Change In Family Structures: The family structure changes with industrialization. The sociologist Talcott Parsons noted that in pre-industrial societies there is an extended family structure spanning many generations who probably remained in the same location for generations. In industrialized societies the nuclear family, consisting of only parents and their growing children, predominates. Families and children reaching adulthood are more mobile and tend to relocate to where jobs exist. Extended family bonds become more tenuous.

Industrialization in India has the Following Effects on the Social Aspects:

During the process of industrialization per capita income increases and productivity levels increase.

The advantages of industrialization are as follows:

1. Employment opportunity
2. Affordable price
3. Development of skills
4. Utilization of resources
5. Earning of foreign currency

Explanation:
1. Employment opportunity: - Industries have provided employment to people. As we know an industry requires skilled, semi skilled and unskilled manpower. So people having different abilities are employed
2. Affordable price: - An industry produces goods in large quantities so the production cost is reduced and the price becomes affordable
3. Development of skills: - An industry develops skills and ability in an individual, so we can say industry is a factor which is responsible to built up a country’s manpower. It makes a person specialize in a particular field.
4. Utilization of resources: Industry utilizes the resources present in country, and produce finished products which are of affordable and best quality.
5. Earning foreign currency: - If the goods are produced in bulk quantities then the goods can even be used for export purpose which will help in earning foreign currency.

13. CORPORATE SOCIAL RESPONSIBILITY ACTIVITIES

Himadri is actively engaged in various socioeconomic development such as infrastructure development, flood relief etc., in & around the project site. A socio-economic survey of the villages will be taken up to arrive at the assessment and felt needs of the population who are living in the surrounding villages so as to design and implement programmes to improve their quality of life under Corporate Social Responsibility (CSR).