The Ramco Cements Limited

Proposed Addition of 3rd Packer in Ramasamyraja Nagar Cement Plant
(for Operational Advantage)

No change in Consented Quantities of Clinker & Cement Production
Village Tulukkapatti, Taluk & District Virudhunagar, Tamil Nadu

Environmental Clearance under Clause 7(ii) of EIA Notification 2006
Non Scheduled Activity proposed in Category ‘A’ Cement Plant- Sl. No. 3(b)

Application/Form-1
Feasibility Report

March 2016

EIA Consultant

Environmental System Consultants &
Ambiente Lab Solutions Private Limited
(Accreditated by QCI-NABET for Sectors 1, 9, 31, 33 & 38 - Category ‘A’&
Assessed for Sector 4; Sl. No. 57 of QCI List dated 08.02.2016)
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Proposed Addition of 3rd Packer in Ramasamyraja Nagar Cement Plant
(for Operational Advantage)
(No Change in Consented Quantities of Clinker & Cement Production)

Project Feasibility Report

1.0 Executive Summary

M/s. The Ramco Cements Limited (RCL) are one of the reputed Cement Companies in India. The cement production of RCL is about 14.45 million tons per annum (MTPA) from their cement plants in South India. RCL is producing Ordinary Portland Cement (OPC), Portland Pozzolana Cement (PPC) and Slag Cement (PSC). The cement produced by RCL is marketed in the brand name of 'RAMCO'. The brand name RAMCO SUPER GRADE is very popular PPC and RAMCO SUPER STEEL is the slag cement brand. The market centres are mainly in Tamil Nadu, Andhra Pradesh, Kerala, Karnataka, Odish and West Bengal States.

R R Nagar Cement Plant has been expanded during 2009-10 vide MoEF&CC Environmental Clearance Letter F.No. J-11011/119/2009 IA.II (I) dated 06.07.2009 for a Clinker production of 1.097 million tons per annum (MTPA) (from earlier 0.61 MTPA Clinker) and the Cement production of 2.00 MTPA @ 6200 tons per day-TPD (from earlier 1.00 MTPA @ 3102 TPD). About 40-45% of cement produced from RR Nagar Cement Plant is being dispatched to the marketing centres in Southern Districts of Tamil Nadu and about 55-60% to the marketing centres in South Kerala including Trivandrum.

The Consents to Operate (CTOs) from the Tamil Nadu Pollution Control Board (TNPCB) are obtained and are being renewed (RCTOs) periodically. RCTOs for the Cement Plant are 15082294874 (Air Act) & 15081294874 (Water Act) dated 10.08.2015 and for CPP are 15082445252 (Air Act) & 15081445252 (Water Act) dated 09.07.2015. The RCTOs are valid upto 31.03.2016.

The Cement Plant & CPP Plant operations are in compliance with MoEF&CC Environmental Clearances and TNPCB Consents conditions. The EC Compliance Reports have been issued for RR Nagar Cement Plant vide MoEF&CC, Regional Office Letter EP 12.8/MIS-I/ROCHN/2014/5 dated 02.02.2015. Periodical Environmental Quality Monitoring Status Reports are being submitted to the Ministry and TNPCB.

RCL is manufacturing OPC and PPC cements at RR Nagar and dispatching by two double discharge packer with the capacity of 180 TPH each. There are 4 RCC Silos for storing the cement. The existing wagon loading system for cement is sufficient for load only 5 wagons at a time and it consumes more time for loading full racks. As per new Railway Loading Norms, the full rack (40 boxes) shall be loaded within 9 hours or otherwise it attracts heavy demerge charges and hampers future allotment of wagons by the Railway.

The existing packers (2 Nos.) capacity is not sufficient to load full rack within 9 hours time and thus, it requires to add 3rd Packer of 120 TPH capacity. The addition of 3rd packer will help to manage efficiently to load different grades of Cement with different types of packing material at a time which will also reduce the Trucks' Turn around time and improve the dispatch logistics.
RCL is establishing a modernized Warehouse at Tamil Nadu-Kerala Border to distribute cement in time to dealers in Kerala. Thus, it needs a Palletizing Unit with loading facility along with 3rd Packer Proposal.

RCL is proposing the addition of 3rd Packer of 120 TPH capacity, a dedicated 1000 Tons Steel Silo for Cement storage in addition to the existing 4 Nos. RCC Silos, the modification of extraction system in such a way that any packer can get cement from any silo, extending the existing wagon loading platform and loading shed for 700 m and a Palletizing Unit.

There is no increase in Clinker or Cement Production capacity of RR Nagar Cement Plant due to the addition of 3rd Packer Proposal.

The Proposal, proposed in a site of 2,536 m², consists of:

**Proposed Builtup Area**:

<table>
<thead>
<tr>
<th>Description</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packer &amp; allied structures - over all Building Size (Packer Building with Bulk Loading)</td>
<td>20.0 m Width x 56.0 m Length – 1120 sq. m</td>
</tr>
<tr>
<td>Truck Loading Bay</td>
<td>10.0 m Width x 74.0 m Length - 740 sq. m</td>
</tr>
<tr>
<td>Palletize Shed</td>
<td>25.0 m Width x 56.0 m Length - 563 sq. m</td>
</tr>
<tr>
<td>Steel Silo (12 m dia)</td>
<td>113 sq. m area.</td>
</tr>
<tr>
<td><strong>Total Builtup Area proposed now</strong></td>
<td><strong>2,536 sq.m</strong></td>
</tr>
</tbody>
</table>

Presently, the Cement Plant Complex requires 1,170 cu.m/day water. Permission/No objection Certificate for tapping 1,170 cum/day ground water from own borewells, dugwells & abandoned mine pit within the Complex has been obtained from the Central Ground Water Authority (CGWA) vide its Letter No. 21-4(294)/SECR/CGWA/2011-3316 dated 22.03.2012. **There will not be any additional water demand for the proposed addition of 3rd Packer during Operation Phase.**

Domestic Sewage of 34 cu.m/day is being generated from the Cement Plant and 9 cu.m/day from CPP. The 43 cu.m/day sewage from the Plants are treated combine in a 100 cu.m/day Sewage Treatment Plant. The Township generates about 170 cu.m/day sewage which is treated in a 200 cu.m/day Sewage Treatment Plant. The Treated Sewage is also used for Green Belt. CPP effluent of 16 cu.m/day is treated in a neutralizing pit and the treated effluent is pumped to the cement plant for equipment cooling. An effluent disposal pump is used for this purpose. Thus, it is a Zero Effluent Discharge Plant. **There will not be any additional effluent generation due to the proposed addition of 3rd Packer during Operation Phase.**

All air pollution control equipments and monitoring equipments are installed in the Cement Plant Complex viz. ESP to cooler and power plant, reverse air bag house to raw mills / kilns and bag filters to coal mills and cement mills. In compliance with MoEF&CC norms, **Online monitoring system is provided** at all major stacks of the Cement Plant and CPP stack and are connected online to Care Air Centre of TNPCB. The emission levels are well within the limit prescribed by MoEF&CC and TNPCB. Additional Bag Filters (3 Nos.) are proposed for the 3rd Packer Unit for dedusting packer silo, Packer, Bulk loading spouts, Belt Bucket elevators & Airslides. **SPM emission levels will be <30 mg/Nm³** from the Plant.

The entire dust collected from the air pollution control equipments are reused in the Cement Process. The entire ash generated from the CPP (0.12 MTPA) is being fully utilized in the Cement Plant for cement manufacture. The entire dust collected from the Bag Filters for 3rd Packer will be recycled in the Process. Thus, **there is no solid waste generation due to the Proposal.**

Ensyscon, Chennai-78.
In the total extent of 70.96 Ha, an effective Green Belt has been developed in 25.00 Ha (35.23% Coverage) and maintained within the Plant and Township. Rain water is being harvested as Roof Top Collection in sumps and used as a raw water source. Surface Runoffs from Plant and Township are connected to a Storage Ponds and used for Green Belt development.

**Occupational Health Centre** for Out Patient Treatment, Emergency Care, Ambulance with well equipped emergency handling facilities are available (Medical Officer with MBBS, DIH qualification). Periodic medical checkups are carried out to determine the employees' current health status and compared with his previous record. Any deviations are investigated and appropriate preventive and remedial measures are suggested. Records of these examinations are maintained at the OHC.

The Cement plant is well connected by Road and Rail networks. Madurai is the nearest Airport (50 km in the north). National Highway-7 (4-Lane Madurai-Kaniyakumari Section) and Southern Railway BG Line (Chennai-Madurai-Kaniyakumari) run parallel to the Plant. A Road Under Pass has been made for the Plant vehicular traffic. The Railway siding for the Plant is from Tulukkapatti Railway Station (0.5 km in the east). Thus, no additional infrastructure is needed for the proposed activity.

There are no eco sensitive areas like National Parks, Wildlife Sanctuaries, Biosphere Reserves, Reserved Forests, Elephant Corridor, Mangroves, Archaeological/Historical Monuments, Heritage sites, etc. within 10 km from the Plant/site.

The capital cost of the Proposal is Rs.34.00 crores. An EMP Budget of Rs.0.20 crores has been earmarked as Capital Cost and Rs.0.10 crores per annum as Operating Cost for the Proposal. Adequate budgetary provisions will be made for carrying out the CSR activities.

The proposal of Addition of 3rd Packer is proposed within Category ‘A’ Cement Industry Complex but is not a Scheduled Activity. There is no increase in Clinker or Cement Production capacity of Ramasamyraja Nagar Cement Plant due to the addition of 3rd Packer Proposal. Thus, RCL is applying to MoEF&CC with Form-1, Feasibility Report and existing Environmental Quality data for the direct clearance under 7(ii) Clause of EIA Notification 2006.

***
2.0 Introduction of the Project

2.1 Project Proponent

Ramco Group is one of the leading, highly reputed and Second Largest Industrial Group in South India. It is well diversified in the fields of Cement, Ready Mix Concrete, Cement Fibre Products, Cotton and Synthetic Yarn, Software Systems, Wind Farms, Research & Development, Dry Mortar Plants, Cotton Textiles and Surgical. The total employees are about 8,500 and the Turnover of the Group is Rs.6,200 crores. The main companies of RAMCO Group are:

- M/s. The Ramco Cements Limited (formerly M/s. Madras Cements Limited)
- M/s. Rajapalyam Mills Ltd.
- M/s. Ramco Industries Ltd.
- M/s. Ramco Systems Ltd.

M/s. The Ramco Cements Limited (RCL) are one of the reputed Cement Companies in India. The cement production of RCL is about 14.45 million tons per annum (MTPA) from their cement plants in South India:

- Ramasamy Raja Nagar near Virudhunagar, Tamil Nadu (established in 1959) : 2.0 MTPA (2 Lines).
- Kumarasamy Raja Nagar, Jayantipuram near Vijayawada, Andhra Pradesh (1986) : 3.65 MTPA (2 Lines).
- Alathiyur near Viridhachalam, Tamil Nadu (1997) : 3.0 MTPA (2 Lines).
- Mathodu near Chithradurga, Karnataka : 0.3 MTPA (since 2000).
- Govindapuram near Ariyalur, Tamil Nadu : 5.5 MTPA (established in 2009) (2 Lines).

RCL is also having Cement Grinding Units at Kattuputtur (0.75 MTPA) near Chennai, Valapadi (2.0 MTPA) near Salem in Tamil Nadu and Kolaghat (1.0 MTPA) in West Bengal. It is having a Packing Plants at Nagercoil and Hyderabad.

RCL is producing Ordinary Portland Cement (OPC), Portland Pozzolana Cement (PPC) and Slag Cement (PSC). The cement produced by RCL is marketed in the brand name of iRAMCO. The brand name RAMCO SUPER GRADE is very popular PPC and RAMCO SUPER STEEL is the slag cement brand. The market centres are mainly in Tamil Nadu, Andhra Pradesh, Kerala, Karnataka, Odisha and West Bengal States.

RCL which has always been striving for Total Quality, possesses International Certificate ISO:9001, ISO:14001, ISO:18001 and IS/ISO:50001. The company has achieved various awards for ‘Best Performance’ in the Cement Industry and also Green Rating Project Awards 4 Leaves from Centre for Science and Environment for the Year 2005.

The Ramco Cements Limited is managed by a Board of Directors comprising of eminent personalities as its members. The Chairman of the Board is Shri.P.R.Ramsubrahmaneya Rajha, under whose dynamic leadership the company has grown into a massive organization. Shri.A.V.Dharmakrishnan, Chief Executive Officer (CEO) is heading the Cement Division and dealing with the environmental issues and EC compliances. Any non-compliance/violations of environmental norms and the corrective actions taken will be reported by the Unit Heads to CEO and by CEO to the Chairman, the Board and the shareholders.
RCL has the well laid down **Safety, Health and Environmental Policy** approved by its Board of Directors. Each Unit of RCL is having the Unit Head under whom the Environmental Management Plan (EMP) Cell and Corporate Social Responsibility (CSR) Committee are functioning. The Units are having their Integrated Management System (IMS) Policy.

The Contact information of the Corporate Office is:

The Sr. Vice President (Mfg.),
The Ramco Cements Ltd.
5th Floor, Auras Corporate Centre,
No. 98A, Dr.Radhakrishnan Road,
Mylapore, Chennai-600 004.
Tel. No. : 044-28478666/28478661/28478656
Fax No. : 044-28478676
e-Mail : ms@ramcocements.co.in

### 2.2 Identification of the Project

#### 2.2.1 R R Nagar Cement Plant

RCL Ramasamyraja Nagar (R R Nagar) Cement Plant was established in the Year 1959 and started the commercial production from the **Year 1962**. The Cement Plant is located in an extent of **37.47 Ha** in SF Nos. 4-16 Parts of Tulukkappatti Village, Virudhunagar Taluk & District of Tamil Nadu State (**Fig. 1.1**). The Plant has 25 MW coal based Captive Power Plant in an extent of **7.53 Ha** falling in SF Nos. 192, 194, 195, 196 Parts in Thammanayakanappatti (**since 2012**) and 7 MW furnace oil based PP & 14 MW DG sets for standby operation within the Campus. Township is located in an extent of **25.98 Ha** in SF Nos. 1-5 Parts of Tulukkappatti Village and in SF Nos. 112 & 113 Parts of Vachchakkarappatti Village. Township includes **434 Quarters** of various categories (A to F Type), Guest Houses, Schools, Community Hall, etc. There are **466 direct employees** working in the Plant.

Wet Process to Dry Process conversion was carried out in the Year 1977 with commissioning of India’s First Dry Process Kiln of 1200 TPD capacity. An additional Line of 650 TPD Kiln (Line-II) was commissioned in Year 1994 which was upgraded to a 1000 TPD Kiln in the Year 2001. On obtaining the Environmental Clearance from the Ministry of Environment and Forests (MoEF) (now Ministry of Environment, Forests & Climate Change-MoEF&CC) vide F. No. J-11011/119/2009 IA.II (I) dated 06.07.2009 (**Doc-1**), R R Nagar Cement Plant was expanded (with **Line-II**) for a Clinker production of 1.097 million tons per annum (MTPA) (from earlier 0.61 MTPA Clinker) and the Cement production of 2.00 MTPA @ 6200 tons per day-TPD (from earlier 1.00 MTPA @ 3102 TPD) (**Table 2.1**). Imported Clinker or Clinker from RCL’s other Plants @ 0.28 MTPA is also used for the cement manufacturing. **Line-II is in operation since 2011**. The Cement Plant’s Limestone requirements are met from Captive Limestone Mines in Pandalgudi Region (**Table 2.2**). These Mines produces **1.909 MTPA** which is adequate for the expanded Plant.

The Ministry has awarded the EC for 25 MW CPP vide F. No. J-13012/112/2011 IA.II (T) dated 06.02.2012 (**Doc-2**). The **Consents to Operate (CTOs)** from the Tamil Nadu Pollution Control Board (TNPCB) were obtained and are being renewed (RCTOs) periodically. RCTOs for the Cement Plant are 15082294874 (Air Act) & 15081294874 (Water Act) dated 10.08.2015 and for CPP are 15082445252 (Air Act) & 15081445252 (Water Act) dated 09.07.2015. The RCTOs are valid up to 31.03.2016 (**Docs-3-6**).
Table: 2.1 R R Nagar Cement Plant Production

<table>
<thead>
<tr>
<th>Line</th>
<th>Kiln Capacity, TPD</th>
<th>Clinker Production, MTPA</th>
<th>Clinker Outsourced, MTPA</th>
<th>Cement Production, MTPA</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line-I</td>
<td>1800</td>
<td>0.61</td>
<td>-</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Line-II</td>
<td>1400</td>
<td>0.48</td>
<td>-</td>
<td>0.70</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>-</td>
<td>-</td>
<td>0.28</td>
<td>0.40</td>
<td>From sister concerns</td>
</tr>
<tr>
<td>Total</td>
<td>3200</td>
<td>1.09</td>
<td>0.28</td>
<td>2.00</td>
<td></td>
</tr>
</tbody>
</table>

Table: 2.2 Captive Mines and their Production

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>MCL Mine</th>
<th>Extent, Ha</th>
<th>Existing Production, MTPA</th>
<th>Clearance/Consent Reference</th>
<th>Proposed Production on Expansion, MTPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pandalgudi (3 Pits) (in operation since 1961)</td>
<td>203.655</td>
<td>0.420</td>
<td>TNPCB Consent Orders 7253 (Air) &amp; 10115 (Water) dated 27.04.2007</td>
<td>0.477</td>
</tr>
<tr>
<td>2</td>
<td>Maravarperungudi (Limestone Kankar)</td>
<td>207.38</td>
<td>0.460</td>
<td>J.11015/185/2005/ IA. II (M) dated 07.10.2005</td>
<td>0.640 (in 198.515 Ha)</td>
</tr>
<tr>
<td>3</td>
<td>Sivalarpatti</td>
<td>150.10</td>
<td>0.690</td>
<td>J.11015/192/2005/ IA. II (M) dated 02.02.2006</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Melvenkateswarapuram (Clearance along with Spatti for 0.406 MTPA)</td>
<td>103.54</td>
<td>0.102</td>
<td>J.11015/6/99/ IA. II (M) dated 22.11.1999</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>664.675</td>
<td>1.672</td>
<td>-</td>
<td>1.909</td>
</tr>
</tbody>
</table>

The hierarchical system of the Company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions is also appended.

Organization Chart

Chairman & Managing Director
Shri P.R.Ramasubramaniya Rajha

Chief Executive Officer
Shri A.V.Dharmakrishnan

Senior Vice President (Mfg.) – Corp. Office
Mr. M. Srinivasan

Senior Vice President (Works) & Unit Head
Mr. N.Ravishankar

Head-Admin.  GM Works  Head-Env. & CSR  Medical Officer  Safety Officer
The Contact Information of R R Nagar Cement Plant is as follows:

Shri. N.Ravi Shankar  
Senior Vice President (Mfg.),  
The Ramco Cements Limited,  
Ramasamyraja Nagar Post,  
Virudhunagar District,  
Tamil Nadu-626 204.  
Tel. Nos. : 04562-256201 to 256203  
Fax : 04562-256268  
e-mail : nrs@ramcocements.co.in

2.2.2 EC Compliance & other Clearances

The Cement Plant & CPP Plant operations are in compliance with MoEF&CC Environmental Clearances and TNPCB Consents conditions. The EC Compliance Reports have been issued for RR Nagar Cement Plant vide MoEF&CC, Regional Office Letter EP 12.8/MIS-I/ROCHN/2014/5 dated 02.02.2015 (Doc-7). Periodical Environmental Quality Monitoring Status Reports are being submitted to the Ministry and TNPCB.

The recently conducted Public Hearing Proceedings for the 25 MW CPP at RR Nagar Plant is given as (Doc-8).

Permission/No objection Certificate for tapping 1,170 cum/day ground water from own borewells, dugwells & abandoned mine pit within the Complex has been obtained from the Central Ground Water Authority (CGWA) vide its Letter No. 21-4(294)/SECR/CGWA/2011-3316 dated 22.03.2012 (Doc-9).

CREP Compliance: It is mandatory to comply with the various regulatory Norms for Prevention and Control of Pollution. Alongside, it is also imperative to go beyond compliance through adoption of cleaner technologies and improvement in Management practices. A series of industry specific interaction meetings had been organized to formulate the Charter on Corporate Responsibility for Environmental Protection (CREP) and action points were enlisted for the Cement Industry. RCL is in full compliance of the Action Points as detailed in the Table.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Action Points in CREP</th>
<th>Compliance Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Implementation of standards in non-complying units</td>
<td>RCL is in compliance with the latest notified norms.</td>
</tr>
<tr>
<td>2</td>
<td>Plants in critically polluted or urban area (5 km distance outside urban boundary) will meet 100 mg/Nm³ SPM Emission</td>
<td>RCL is operating the plant with SPM emissions &lt;30 mg/Nm³.</td>
</tr>
<tr>
<td>3</td>
<td>The new cement kilns to be accorded NOC/EC for complying 50 mg/Nm³ emission limit</td>
<td>RCL is operating the plant with SPM emissions &lt;30 mg/Nm³.</td>
</tr>
<tr>
<td>4</td>
<td>CPCB will evolve load based standards by June 2004</td>
<td>The computed Load Based Emission is found to be in compliance with the load based emission Norm of &lt;227 g/Ton of Kiln Feed.</td>
</tr>
<tr>
<td>5</td>
<td>CPCB and NCBM will evolve SO₂ and NOₓ emission standards by June 2004</td>
<td>Will comply with the Norms.</td>
</tr>
</tbody>
</table>
2.2.3 Existing Land Use

The existing land use of the Plant/Site is as detailed below:

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement Plant with its infrastructures</td>
<td>37.47 Ha</td>
</tr>
<tr>
<td>25 MW CPP &amp; its Infrastructures</td>
<td>7.53 Ha</td>
</tr>
<tr>
<td>Township</td>
<td>25.98 Ha</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>70.98 Ha</td>
</tr>
</tbody>
</table>

A Truck Parking area over an extent of 3.00 Ha has been earmarked outside the Cement Plant near its eastern boundary. The Plant in the Regional Map is shown as Plate-I. Cement Plant & CPP and their environs are shown in Plates II-III.
2.2.4 Process

The raw materials consumption (Table 2.3) and Material Balance for 2.0 MTPA Cement production are appended.

Table: 2.3 Raw Materials for 2.0 MTPA Production

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Raw Material</th>
<th>For 2.0 MTPA, Tons/Annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Limestone</td>
<td>16,31,277</td>
</tr>
<tr>
<td>2</td>
<td>Iron Ore</td>
<td>8,197</td>
</tr>
<tr>
<td>3</td>
<td>Coal Ash</td>
<td>15,628</td>
</tr>
<tr>
<td></td>
<td>Unit’s Clinker Production</td>
<td>10,90,400</td>
</tr>
<tr>
<td>4</td>
<td>Clinker from other Units/Imported</td>
<td>2,79,600</td>
</tr>
<tr>
<td>5</td>
<td>Gypsum</td>
<td>70,019</td>
</tr>
<tr>
<td>6</td>
<td>Fly Ash</td>
<td>5,40,075</td>
</tr>
<tr>
<td>7</td>
<td>Slag</td>
<td>20,000</td>
</tr>
</tbody>
</table>

Material Balance for 2.0 MTPA of Cement
The mined out Limestone from the Captive Mines in Pandalgudi Region is fed to hammer Crusher at Pandalgudi (2.0 MTPA Crushing Capacity on Expansion). All the material are crushed to -25 mm size and stored in hoppers. From hoppers, the material is passed through Cross Belt Analyser (Gamma Matrix), get analysed and dispatched to the plant.

**Raw Materials Receipt & Storage**: The Limestone quarried from different mines situated about 25 to 30 kms from the plant, is crushed in the crushing plant at Pandalgudi and brought to the plant by trailer trucks of 40 tons capacity. The limestone is filled in to the receiving hopper by a 50 tons capacity overhead crane. From the receiving hopper the material is taken to the covered stockpile by means of belt conveyor. The normal capacity of stockpile is 15000 T. From the stockpile the limestone is retrieved and transported by belt conveyors passing through the upper ground tunnel to the raw material hoppers. There are five RCC hoppers, 3 hoppers for limestone and 2 steel hoppers for additives like Laterite, Bauxite and Iron Ore etc.

**Raw Grinding**: From the Raw Material hoppers the limestone and additives are taken to the Horizontal Impact Crusher for pre grinding. After this, it is taken for grinding in ball mill. There is a drying chamber in the mill inlet to dry moisture from the incoming material. Hot air from kiln is used for drying chamber normally, when it is in operation.

The inlet material, which is 100% passing 25 mm, is pulverized to a fine powder in the ball mill. The mill has an internal dynamic classifier that helps to effectively control the fineness of the ground powder and it separates fine and coarse material. The course material is automatically taken back to the mill for further grinding through a closed circuit arrangement. The fine powder known as raw meal is conveyed to the silos for blending and storage.

**Clinkerisation** is essentially a burning process. The raw meal powder is extracted from blending/storage silos and fed to kiln through preheater and precalciner.

**Kiln-I**: This is a four stage suspension pre heater kiln with extended pyroclone and planetary cooler. The feed is passed through the pre heater. The gas temperature in I stage is between 380 to 400 °C, II stage 560 to 600 °C, III stage 740 to 760 °C and IV stage 840 to 860 °C. The clinkerisation takes place partly in the pre burning and party in the burning zones. In the burning zone, the temperature of the gases will be at 1500 °C. The secondary air is taken through the cooler, because of the heat transfer between the material and gas the clinker is cooled to around 250-300 °C in the planetary cooler. At the cooler outlet, clinker of 25 mm size will go directly to clinker storage and cement mill. Whereas bigger size clinker nodules are fed through crusher and crushed down to small size nodules.

**Kiln-II**: From CF silo, the raw meal powder extracted in a systematic way from the extraction ports for a uniform quality of raw meal is fed to the kiln through pre heater and calciner. This kiln has five stage preheater and an inline precalciner. The gas temperature is 360-380 °C in the I stage, 540-560 °C in the II stage, 650-680 °C in the III stage, 780-820 °C in the IV stage and 900-930 °C in the V stage. The kiln is fitted with a grate cooler. It is a four compartment cooler with a single drive. Tertiary air from the cooler is injected to the pre calciner and fine coal powder from the coal mill which is the fuel is fired into the calciner through the secondary firing circuit. The feed that gets well mixed up with raw meal ignites...
spontaneously due to the fuel gas temperature. After passing through the precalciner the process of calcination of this raw meal is completed to the extent of 90%.

The calcined raw meal is then taken to the V stage cyclone of the pre heater where it gets separated from the gas stream and fed in to the Rotary kiln. Further calcination followed by sintering takes place in the rotary kiln. The calcined material is progressively heated to a temperature of 1450 °C. The firing at this high temperature leads to certain complex chemical reactions and the material gets converted to gray coloured nodules, which is known as clinker.

The hot clinker, which is at a temperature of about 1150–1200 °C, is then passed through grate cooler for rapid cooling by of forced air cooling and is cooled down to 150 °C. The kiln and the cooler de-dusting is through ESP’s. After the cooler outlet, clinker of 25 mm size is conveyed directly to clinker storage and cement mill. Whereas bigger size nodules are crushed down to small size nodules as it passes through the clinker hammer mill.

**Cement Grinding** : After clinkerisation, the next process is cement grinding. To pre grind the mill feed clinker, vertical roller mill is introduced in the circuit. There are separate concrete hoppers for clinker, gypsum and a concrete silo for Fly ash. Each hopper is provided with electronic weighing system to control the flow of materials to the ball mill. The ball mill grinds the clinker, gypsum and fly ash to cement. It has got internal cooling arrangement and the entire process is controlled by PLC system. The cement is then conveyed to the silos through elevators.

**Packing** : There are two electronic packers with two discharges for automatic weighing and packing the cement in HDPE and paper bags. Facilities are available to dispatch cement bags through lorries and Rail wagons.

**25 MW CPP** : The Captive Power Plant is a conventional Rankine Steam Cycle Thermal Power Plant with Fluidised Bed Combustion Boiler. The Configuration of CPP is :

- one no. 110 TPH AFBC Boiler capable to generate steam at 89 ata 515±5 °C.
- one no. 25 MW Steam Turbine Generator with generating capacity of 25 MW (maximum).
- one no. Air-cooled Condenser with extruded aluminium fins to condense the exhaust steam from turbine.
- one no. Coal Handling System of 50 TPH Capacity.
- Dense Phase pneumatic Ash Handling System for conveying the Bed Ash and Fly Ash generated in the boilers to respective Concrete Ash silos.
- Water System includes Raw water & firewater system, Auxiliary Cooling Water system and Water Treatment Plant.
- Electrical System includes the Generator, 11kV CPP HT switchgear, LT Switchgear. DC System, AC UPS System, Lighting system, Grounding and lightning system, Illumination system.
- Distributed Control System (DCS) is envisaged for the operation and monitoring of main power plant equipment.
**Imported Coal** (@ 230 TPD) from Indonesia is the main fuel. The boiler together with its associated auxiliaries produce superheated steam at 89 kg/cm² and 515 °C. The super heated steam is taken to the steam turbine generator, air cooled condensers and associated auxiliaries. The steam is used for running the turbine generator to produce total 25 MW electricity. Air cooled condensers are used to condense the steam at 0.20 kg/cm² with an inlet temperature of 35 °C. Forced draft fans are used to supply cooling air. The generated electricity is connected to the Cement Plant by the cable network.

The *fly ash* (29.3 TPD) produced from coal combustion and that collected at various units of the power plant such as economiser, air preheater, electrostatic precipitators, etc. and *bottom ash* (5.2 TPD) are transported pneumatically with the help of dense phase pneumatic pumps to the RCC storage silos. The ash is evacuated from silo and transported to Cement Plant for Portland Pozolana Cement (PPC) manufacturing.

An effective ESP Systems of 99.98% efficiency is installed to control the dust emission <50 mg/Nm³ from the Power Plant. Bag filters are provided at all transfer points from one conveyor to other conveyor and at top of the hoppers. The collected coal dust is taken back into the system.

**2.2.5 Existing Project Cost**

Project Cost of the existing Cement Plant (Lines I & II) is Rs.410.00 crores. Project Cost of the 25 MW CPP is Rs.150.00 crores. Thus, the **total cost is Rs. 560.00 crores** (Table 2.4).

**Table : 2.4 Existing Project Cost & EMP Budget**

<table>
<thead>
<tr>
<th>Description</th>
<th>Rs. Crores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Cost</td>
<td>233.00</td>
</tr>
<tr>
<td>Capital Cost for EMP Measures</td>
<td>3.00</td>
</tr>
<tr>
<td>Recurring Cost per Annum</td>
<td>2.30</td>
</tr>
<tr>
<td>Occupational Health Budget per Annum</td>
<td>0.15</td>
</tr>
<tr>
<td>CSR Budget per Annum</td>
<td>0.50</td>
</tr>
<tr>
<td>CSR Budget (for Plant Life of 30 yrs.)</td>
<td>15.00</td>
</tr>
</tbody>
</table>

A budget Rs.9.00 crores (1.60% of Project Cost) was earmarked for EMP Measures Capital Cost and Rs.3.30 crores/annum as Recurring Cost. About Rs.33.00 crores for the life of the Project (5.90% of total Project Cost) was earmarked for CSR Activities.

About Rs.4.50 crores was already spent on the EMP measures for the Cement Plant and another Rs.4.50 crores for CPP EMP measures.
2.3 Need for the Proposal

RCL is manufacturing OPC and PPC (occasionally PSC) cements at RR Nagar and dispatching by two double discharge packer with the capacity of 180 TPH each. The total Cement Grinding and Dispatch capacity is 6200 Tons and there are 4 RCC Silos for storing the cement. The existing wagon loading system for cement is sufficient for load only 5 wagons at a time and it consumes more time for loading full racks. As per new Railway Loading Norms, the full rack (40 boxes) shall be loaded within 9 hours or otherwise it attracts heavy demerit charges and hampers future allotment of wagons by the Railway.

The existing packers (2 Nos.) capacity is not sufficient to load full rack within 9 hours time and thus, it requires to add 3rd Packer of 120 TPH capacity. The addition of 3rd packer will help to manage efficiently to load different grades of Cement with different types of packing material at a time which will also reduce the Trucks¡ Turn around time and improve the dispatch logistics. RCL is establishing a modernized Ware House at Tamil Nadu-Kerala Border to distribute cement in time to dealers in Kerala. Thus, it needs a Palletizing Unit with loading facility along with 3rd Packer Proposal.

2.4 The Proposal

RCL is proposing the addition of 3rd Packer of 120 TPH capacity, a dedicated 1000 Tons Steel Silo for Cement storage in addition to the existing 4 Nos. RCC Silos (Table 2.5), the modification of extraction system in such a way that any packer can get cement from any silo, extending the existing wagon loading platform and loading shed for 700 m and a Palletizing Unit.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Silos</th>
<th>OPC-43 Gr.</th>
<th>OPC-53 Gr.</th>
<th>PPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4000 Tone RCC silo (Existing)</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8000 Tone RCC silo (Existing)</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1000 Tone Steel silo (Proposed)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The extracted cement will be transported by bucket elevator and air slide and feed to Packer feeding silo through a Vibrating screen. At bottom of packer silo, four extraction systems will be provided to feed Packer and three Bulk loading points. The packer is single discharge electronic packer have a capacity of 120 TPH will feed packed cement bags to Truck loading, Wagon loading and Palletizing plant. Two nos of Semi automatic truck loader is provided to load truck and additional 8 Nos. of wagon loading machine is provided to load Railway Wagon.

In Palletizing plant, there will be two line of 120 TPH capacity each and a Over head electric operated Fork lift for load the palletize to truck. The exiting packer is also connected to this palletizing unit so that a maximum of 250 TPH cement can be loaded.

The proposed 3rd Packer Unit in the existing Cement Plant Complex Layout is given as Fig. 2.1.
**Proposed Builtup Area:**

- Packer & allied structures - over all Building Size
  - Packer Building with Bulk Loading: 20.0 m Width x 56.0 m Length – 1120 sq. m
  - Truck Loading Bay: 10.0 m Width x 74.0 m Length - 740 sq. m
  - Palletize Shed: 25.0 m Width x 56.0 m Length - 563 sq. m
  - Steel Silo (12 m dia): 113 sq. m area.
  - **Total Builtup Area proposed now**: 2,536 sq.m

**Equipment Sizing:**

- Packer Silo Feeding: 250 TPH
- Packer Silo Extraction: 250 TPH
- 3rd Packer Capacity: 120 TPH
- Truck loading system: 120 TPH x 2 Nos.
- Bulk Loading: 250 TPH x 3 Nos.
- Wagon Loading Machine: 120 TPH x 8 Nos.
- Wagon Loading Platform: 700 m.

There is no increase in Clinker or Cement Production capacity of RR Nagar Cement Plant due to the addition of 3rd Packer Proposal.

The Civil, Mechanical and Electrical units/requirements and specifications are appended.

### I. Civil Works

#### i. 1000 Tons Steel silo for OPC

| No. of Unit | 1 No. |
| Material To be stored | OPC |
| Capacity of silo | 1 x 1000 Tones for Density of 1.2 Tons/m³ |
| Type of Silo | Bottom aerated cone silo in Steel |
| Silo dia / Effective height | 12 m ID / 13.7 m |
| Over all Silo height | 40 m (including silo top Pent house) |
| No. of Extraction | 4 Nos. |
| Extraction capacity | 250 TPH |
| Silo feeding system | Air slide |
| No. of platform Below silo | 3 Nos. |
| No. of platform above silo | 1 No. |
| Equipment Involved | Airslide, Bagfilter, Fans, Dozing surge hopper, Blower, Elevator |

#### ii. Packing House-3 (3rd Packer, Bulk & Truck loading and Palletizing unit)

| No of Building | 1 No. |
| Purpose | To Pack cement and Dispatch by Truck, Bulk, Wagon and by Pallet. |
| Material To be stored | OPC/PPC |
| Capacity | 1 x 120 TPH |

- Total Structural Steel Construction
- Total Builtup Area
- Over All Building Size
  - 20.0 m W x 56.0 m Length - Packer Building with Bulk Loading.
  - 10.0 m W x 74.0 m Length - Truck Loading Bay
  - 25.0 W x 56.0 m Length - Palletize Shed
The Ramco Cements Limited

Proposed Addition of 3rd Packer in R R Nagar Cement Plant, Virudhunagar Dist., TN

Building Floors
(-) 1.1 m for Elevator pit-Packer Building
Floor Level +5, +6.6., +10.35M, +15.335, +28.3, +32.4, +35.6 m

Equipment Involved
Packer, Truck Loader, Bag filter, Airslide, Belt conveyor, Screen, Bin elevator and EOT crane, and main Process Fan

iii. Wagon Loading Shed

No of Building 1 No.
Purpose To Load Packed cement to Wagon
Material To be stored OPC/PPC
Capacity 40 Wagons in 9 hrs.
Over All Building Size 11.8 m W x 700 m Length

The Civil works will involve:

- Excavation: 35,000 cu.m
- RCC: 20,000 cu.m
- Form Work: 55,000 sq.m
- Tor Steel: 2,800 Tons
- Cement requirement: 7,700 Tons
- Structural Steel Work: 3,400 Tons
- Structural Levels: -3.0 m to +50 m

II. Mechanical

Equipment Sizing :-

Silos
Cement Silo Feeding - 350 TPH (Mill production is 250 TPH)
Cement Silo Extraction - 250 TPH (Packer capacity is 180 TPH)
3rd Packer Capacity - 120 TPH
Truck loading system - 120 TPH x 2 Nos.
Bulk Loading - 250 TPH x 3 Nos.
Palletize capacity - 120 TPH x 2 Nos.
Pallet Loading - 240 TPH x 1 No.

Wagon Loading
Full Rail rack capacity - 40 boxes x 75 tons = 3000 Tones
Packer -1 Capacity - 145 TPH (80 % efficiency Loading)
Packer -2 Capacity - 145 TPH (80 % efficiency Loading)
Packer -3 Capacity - 95 TPH (80 % efficiency Loading)
Total capacity of Packer - 385 TPH
Time for Loading Full rack - 3000 t / 385 tph = 8 hrs
Wagon Loading Machine - 120 TPH x 8 Nos
Wagon Loading Platform Length - 700 m.

III. Electrical

At present the MCCs are located at four locations closer to packers in different elevation. As per New Electrical Safety Policy, all MCC will be changed into latest configuration with PLC controls and will be located in new 3rd Packer MCC room. Total Power requirement is 1400 kw.

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Proposed Addition of 3rd Packer in R R Nagar Cement Plant, Virudhunagar Dist., TN

Flow Sheet for Silo Section

Flow Sheet for 3rd Packer Section

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2.5 Proposal Project Cost

The Project Cost of the Proposal is Rs.34.00 crores with the following breakup:

- **Land & Infrastructures**: Nil (proposed within the existing Campus)
- **Civil & Structural Works**: Rs.16.00 crores
- **Mechanical Works**: Rs.12.00 crores
- **Electrical Works**: Rs. 1.50 crores
- **Instrumentation Works**: Rs. 0.50 crores
- **Others & Contingencies**: Rs. 4.00 crores

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land &amp; Infrastructures</td>
<td>Nil</td>
</tr>
<tr>
<td>Civil &amp; Structural Works</td>
<td>Rs.16.00</td>
</tr>
<tr>
<td>Mechanical Works</td>
<td>Rs.12.00</td>
</tr>
<tr>
<td>Electrical Works</td>
<td>Rs. 1.50</td>
</tr>
<tr>
<td>Instrumentation Works</td>
<td>Rs. 0.50</td>
</tr>
<tr>
<td>Others &amp; Contingencies</td>
<td>Rs. 4.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Rs.34.00 crores</strong></td>
</tr>
</tbody>
</table>

An EMP Budget of Rs.0.20 crores has been earmarked as Capital Cost and Rs.0.10 crores per annum as Operating Cost for the Proposal.
3.0 Project Description

3.1 Type of Project

The proposal of Addition of 3rd Packer is proposed within Category ‘A’ Cement Industry Complex but is not a Scheduled Activity. There is no increase in Clinker or Cement Production capacity. Thus, RCL is applying to MoEF&CC with Form-1, Feasibility Report and existing Environmental Quality data for the direct clearance under 7(ii) Clause of EIA Notification 2006. RCL has engaged M/s. Environmental System Consultants & Ambiente Lab Solutions Private Limited (Ensyscon), Chennai for the work. The EIA Consultant has been accredited for the Sectors 1 (Mining), 9 (Cement Plants), 31 (Industrial Estates/SEZs), 33 (Ports & Harbours), 38 (Building Proposals) and assessed for Sector 4 (Thermal Power Plants) ñ Category ‘A’ Projects by the National Accreditation Board for Education & Training (NABET), Quality Council of India (Sl. No. 57 in the List of Accredited EIA Consultants-8th February 2016).

3.2 Environmental Setting

R R Nagar Plant area falls in Survey of India Topo Sheet No. 58 G/15 (Fig. 3.1). The coordinates (Latitude and Longitude) details are:

- Latitude : N 09°27'05" to 09°27'44"
- Longitude : E 77°51'31" to 77°55'55"

The elevation of the site area ranges from 85 m to 88 m above MSL. There is no environmental issue about the site. No eco sensitive areas like National Parks, Wildlife Sanctuaries, Biosphere Reserves, Reserved Forests, Elephant Corridor, Mangroves, Archaeological/Historical Monuments, Heritage sites, etc. within 10 km from the Plant/site. Also, no grazing, forest land, etc. exist in the study area. The region falls in Seismic Zone II.

The Cement plant is well connected by Road and Rail networks. Madurai is the nearest Airport (50 km in the north). National Highway-7 (4-Lane Madurai-Kanyakumari Section) and Southern Railway BG Line (Chennai-Madurai-Kanyakumari) run parallel to the Plant. A Road Under Pass has been made for the Plant vehicular traffic. The Railway siding for the Plant is from Thulukkappatti Railway Station (0.5 km in the east).

The Administrative Unit within 10 km radius zone comprises of parts of Virudhunagar, Aruppukottai, Sattur and Sivakasi Taluks of Virudhunagar District (Fig. 3.2). The Cement Plant is located at a distance of 15 km in the south from District Head Quarters Virudhunagar. Nearest Town Sattur is at a distance of 10 km in the south from the Plant. The nearest habitations are:

<table>
<thead>
<tr>
<th>Village</th>
<th>Distance &amp; Direction</th>
<th>Total Population</th>
<th>No. of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thammanaickenpatti</td>
<td>0.2 km in N</td>
<td>3360</td>
<td>883</td>
</tr>
<tr>
<td>Vatchchakaranpatti</td>
<td>0.2 km in NNE</td>
<td>3859</td>
<td>994</td>
</tr>
<tr>
<td>Tulukkappatti</td>
<td>0.5 km in SE</td>
<td>2684</td>
<td>671</td>
</tr>
</tbody>
</table>
Physiography: The study area can be classified into plain land. The general elevation of the study area ranges from 55 m to 150 m above MSL (Fig. 3.3). The elevation contour indicates the area is sloping towards southeast.

Drainage: The structural features mostly control the drainage of the study area. Among the different drainage pattern the well-established drainage systems are parallel and sub-parallel (Fig. 3.4). There is no perennial river in the study area. The seasonal nallas Arjuna River (1.0 km in Southwest) and Mannarkottai Nalla (2.0 km in Northeast) are flowing near the Plant and confluences into River Vippar. The streams are flowing towards south.

3.3 Alternative Sites

The 3rd Packer Unit is proposed within the Cement Plant for operational advantages with existing infrastructures. Therefore, no alternative sites are considered.

3.4 Water Source & Demand

The Unit has been permitted for the drawl of 1500 KLD from the nearby Arjuna River vide Tamil Nadu State Government GO 1446/PWD dated 04.10.1975. Presently, the fresh water demand (EC Stage) of the Cement Plant & Township (900 cu.m/day) and CPP (280 cu.m/day). However, the present water demand of the Complex is 1,170 KLD. Permission/No objection Certificate for tapping 1,170 cum/day ground water from own borewells, dugwells within the Complex & abandoned mine pit has been obtained from the Central Ground Water Authority (CGWA) vide its Letter No. 21-4(294)/SECR/CGWA/2011-3316 dated 22.03.2012.

There will not be any additional water demand for the proposed addition of 3rd Packer during Operation Phase.

3.5 Effluent Generation, Treatment & Disposal

There is no trade effluent from the Cement Plant. Effluents 4 cu.m/day from Workshop and 6 cu.m/day from RO Plant as rejects are generated which are neutralized in a neutralization tank and the treated effluent is taken to the Cement Plant for equipment cooling (where it is evaporated fully).

CPP generates the following effluents:

<table>
<thead>
<tr>
<th>Effluent Type</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler Blowdowns</td>
<td>2.0 KLD</td>
</tr>
<tr>
<td>Cooling Tower Blowdowns</td>
<td>5.5 KLD</td>
</tr>
<tr>
<td>DM/UF/Clarifier Rejects</td>
<td>2.5 KLD</td>
</tr>
<tr>
<td>RO Plant Rejects (with 50% recycling)</td>
<td>6.0 KLD</td>
</tr>
<tr>
<td>(Double RO)</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16.0 KLD</strong></td>
</tr>
</tbody>
</table>
The effluent of 16 KLD effluent from CPP is treated in a neutralizing pit where acid or alkali is dozed depending upon the type and concentration of effluent. Treated effluent is pumped to the cement plant for equipment cooling. An effluent disposal pump is used for this purpose.

Domestic Sewage of 34 cu.m/day from the Cement Plant and 9 cu.m/day from CPP are generated. The 43 cu.m/day sewage from the Plants are treated combinely in a 100 KLD Sewage Treatment Plant. The Township generates about 170 cu.m/day sewage and is treated along with 25 cu.m/day Canteen Wastewaters in a 200 KLD Sewage Treatment Plant. The Treated Sewage of 210 KLD is also used for Green Belt. Thus, it is a Zero Effluent Discharge Plant.

The Water Balance is appended.

There will not be any additional effluent generation due to the proposed addition of 3rd Packer during Operation Phase.

**STP Scheme**: Domestic sewage is passed through the Bar Screen and collected in a Receiving Sump where coarse air bubble diffusion is maintained for constant mixing. The equalized sewage is then pumped into Fluidised Aerobic Bed (FAB) Reactor where BOD reduction is achieved by virtue of aerobic microbial activities. Coarse air bubble diffusers are used for oxygen supply. The excess bio solids are separated in the downstream by a Tube Settler Tank. The clear supernatant is disinfected and used for Green Belt development. The sludge from Tube Settling Tank is drained to the Sludge Drying Beds for
The Ramco Cements Limited

Proposed Addition of 3rd Packer in R R Nagar Cement Plant, Virudhunagar Dist., TN

drying and dewatering. The percolated filtrate is sent back to equalization tank and the dried cake is used as manure for Green Belt.

**Raw & Treated Sewage Characteristics :**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Parameters</th>
<th>Raw Sewage</th>
<th>Treated Sewage</th>
<th>TNPCB Norm*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>pH</td>
<td>6.5-8.0</td>
<td>6.5-8.5</td>
<td>5.5-9.0</td>
</tr>
<tr>
<td>2</td>
<td>Total Suspended Solids, mg/l</td>
<td>100-200</td>
<td>&lt;30</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>BOD-3 days @ 27 °C, mg/l</td>
<td>150-250</td>
<td>&lt;20</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Oil &amp; Grease, mg/l</td>
<td>20-50</td>
<td>&lt;10</td>
<td>10</td>
</tr>
</tbody>
</table>

* : TNPCB Norms-Tamil Nadu Pollution Control Board Norms stipulated for discharge of treated effluent into onland for irrigation.

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**Raw & Treated Effluents Characteristics :**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Parameter</th>
<th>Raw Effluent Characteristics</th>
<th>Treated Effluent Characteristics*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>pH</td>
<td>8.0-10.0</td>
<td>6.5-8.5</td>
</tr>
<tr>
<td>2</td>
<td>TSS, mg/l</td>
<td>50-100</td>
<td>&lt;30</td>
</tr>
<tr>
<td>3</td>
<td>BOD-3 days @ 27 °C, mg/l</td>
<td>10-20</td>
<td>&lt;20</td>
</tr>
<tr>
<td>4</td>
<td>COD, mg/l</td>
<td>500-2000</td>
<td>&lt;250</td>
</tr>
<tr>
<td>5</td>
<td>Oil &amp; Grease, mg/l</td>
<td>&lt;10</td>
<td>Nil</td>
</tr>
</tbody>
</table>

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3.6 Air Pollution Control Measures

All air pollution control equipments and monitoring equipments are installed in the Cement Plant Complex viz. ESP to cooler and power plant, reverse air bag house to raw mills / kilns and bag filters to coal mills and cement mills. In compliance with MoEF&CC norms, Online monitoring system is provided at all major stacks of the Cement Plant and CPP stack and are connected online to Care Air Centre of TNPCB. One Continuous Ambient Air Quality Monitoring Station is also installed in the Premises and connected to Care Air Centre of TNPCB/CPCB.

The emission levels are well within the limit prescribed by MoEF&CC and TNPCB. Periodical monitoring of Fugitive Emissions is also being carried out at raw material storage areas viz limestone, coal, gypsum etc. and are found to be in compliance with CREP guidelines/Norms.

Proposed: Additional Bag Filters (3 Nos.) are proposed for the 3rd Packer Unit for dedusting packer silo, Packer, Bulk loading spouts, Belt Bucket elevators & Airslides.

- Packer and Auxillary equipment venting bagfilter capacity: 30000 m$^3$/hr.
- Packer silo venting bagfilter capacity: 7500 m$^3$/hr.
- Bulk loading venting bagfilter capacity: 20000 m$^3$/hr.

3.7 Solid Wastes

Existing: The entire dust collected from the air pollution control equipments are reused in the Cement Process. The entire ash generated from the CPP (34.5 TPD) is being fully utilized in the Cement Plant for PPC manufacture.
STP Sludge of 10 Tons/year is composted and used for green belt development. Spent/waste oil of 94.62 Tons/year is stored and given to CPCB Authorised Recyclers for recovery and use.

About 750 kg/day MSW is generated from the Plants & Township. About 450 kg/day is Biodegradable wastes and is composted and used as manure for the green belt. About 300 kg/day is inorganic wastes being sold to the authorized recyclers.

**Proposed** : The entire dust collected from the Bag Filters for 3rd Packer will be recycled in the Process. Thus, there is no solid waste generation due to the Proposal.

### 3.8 Power & Fuel Demand

The power demand of existing Plant operations and Township is 22 MW with the Auxiliary consumption of 3.0 MW. RCL is operating 25 MW CPP along with 7 MW Furnace Oil based PP & 14 MW (1x6 MW + 2x4 MW) DG Sets.

Additional **power demand for the 3rd Packer is 1400 KW** which will be met from the existing CPP.

**Fuels :-**

**Existing :** Imported Coal : 230 TPD, Furnace Oil : 10 Tons/day & HSD : 7 TPD.

Furnace Oil is stored 200 KL Tanks (3 Nos.) and 16 KL Tanks (4 Nos.).

Diesel is stored in 50 KL Tank (1 No.) and 1 No. each 8 KL & 5 KL Tanks.

Waste Oils are stored in a 15 KL Tank and Engine Oil Wastes are stored in a 1 KL Tank and fired into the kilns through a metered pumping system.

**Proposed :** Nil

### 3.9 Green Belt

In the total extent of 70.96 Ha, an effective Green Belt has been developed in **25.00 Ha (35.23% Coverage)** and maintained within the Plants and Township (Plates IV-V). A mixture of fruit, fuel, fodder and quick growing timber tree saplings, predominantly local flora/vegetations are planted by keeping in view the agro-ecological and edaphic conditions of the areas. The plant species planted mainly are : Azadiracta indica, Pellothorum pterocarpus, Delanix regia, Millingtonia sp., Derris indica, Samania Saman, Ficus regiliosa, Cocus nucifera, Terminalia arjuna, Magnifera indica, Neem, Rain Trees, etc. Survival Rate of the planted trees is inbetween 90-95%.

### 3.10 Rain Water Harvesting

Rain water is being harvested as Roof Top Collection in sumps and used as a raw water source. Surface Runoffs from Plant and Township are connected to 4 Nos. Storage Ponds and used for Green Belt development.
CPP Campus : 30 m dia & 2 m depth = 1,400 cu.m storage
Sriram School Campus : 27 m dia & 2 m depth = 1,100 cu. m storage
Vidhyalaya School Campus-North : 24 m dia & 2 m depth = 900 cu. m storage
Vidhyalaya School Campus-South : 24 m dia & 2 m depth = 900 cu. m storage.

3.11 Occupational Health Measures

RCL is committed to provide safe and healthy working conditions and continuously improving the occupational health and safety performances. RCL’s SHE Policy objectives are:

- To achieve zero accident and safe work environment,
- To improve moral and health of all employees and
- To maintain the emission levels below the norms.

RCL has also provided ergonomic support for work comfortness with periodical review.

Occupational Health Centre for Out Patient Treatment, Emergency Care, Ambulance with well equipped emergency handling facilities are available (Medical Officer with MBBS, DIH qualification).

OH Surveillance includes:

- Entry level Health Assessment at the time of employment.
- Periodical Health Examination for all employees once in six month.
- Yearly once vision test, audio, & lung function test.
- Maintenance and review of employees medical reports.
Periodic medical checkups are carried out to determine the employee's current health status once in a year and compared with his previous record. Any deviations are investigated and appropriate preventive and remedial measures are suggested. Records of these examinations are maintained at the OHC.

**Spirometry** is carried out at periodic intervals to determine the Lung function; the results are recorded and maintained at the OHC. **Audiometry** is carried out for employees exposed to high levels of noise at the work place. Tie-ups with tertiary health care referral centres ensure that the best possible care is provided in case of any emergency.

### 3.12 CSR Activities

RCL is carrying out in number of social activities in and around the villages of its mines and factory under the **Corporate Social Responsibility (CSR)** Budget. It has been involved in developing health, education, skill development, environment and spiritual development of the society. About 2% of the Profit (in 3 Preceeding Years) will be earmarked as Corporate Social Responsibility (CSR) Budget. RCL has the CSR Committee as per the provisions notified by the Ministry of Corporate Affairs on February 27, 2014. Based on the CSR Committee and declared CSR Policy of the Company, the following CSR activities will be covered and Reported (& also displayed in the Company website):

- Eradicating extreme hunger and poverty.
- Promotion of education & vocational skills.
- Ensuring environmental sustainability.
- Contribution to the Prime Minister’s National Relief Fund or any other fund set up by the Central Government or the State Governments for socioeconomic development and relief.

Three villages are adopted by RCL viz. Thammanayakanpatti, Thulukapatti & Vachakaranpatti. The basic amenities are being developed in coordination with the District Administration. RCL has spent an amount of Rs.4.34 crores during 2011-15 for the CSR activities (Table 3.1).

#### Table 3.1 CSR Amount Spent

<table>
<thead>
<tr>
<th>YEAR</th>
<th>MOU with Dist. Admin.</th>
<th>CSR</th>
<th>MINES</th>
<th>RSSL</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-12</td>
<td>6,31,900</td>
<td>12,93,111</td>
<td>1,44,000</td>
<td>4,24,474</td>
<td>24,93,485</td>
</tr>
<tr>
<td>2012-13</td>
<td>81,90,229</td>
<td>49,06,242</td>
<td>13,25,435</td>
<td>6,57,453</td>
<td>150,79,359</td>
</tr>
<tr>
<td>2013-14</td>
<td>25,82,256</td>
<td>34,69,180</td>
<td>47,89,078</td>
<td>11,11,811</td>
<td>119,52,325</td>
</tr>
<tr>
<td>2014-15</td>
<td>70,09,992</td>
<td>40,62,474</td>
<td>12,36,400</td>
<td>15,61,929</td>
<td>138,70,795</td>
</tr>
<tr>
<td>TOTAL</td>
<td>184,14,377</td>
<td>137,31,007</td>
<td>74,94,913</td>
<td>37,55,667</td>
<td>433,95,964</td>
</tr>
</tbody>
</table>
4.0 Site Setting & Analysis

4.1 Connectivity

The cement plant is well connected by Road and Rail networks. Madurai is the nearest Airport (50 km in the north). National Highway-7 (4-Lane Madurai-Kanyakumari Section) and Southern Railway BG Line (Chennai-Madurai-Kanyakumari) run parallel to the Plant.

The cement plant material transports are mainly by rail networks and also by road networks. For the existing 2.0 MTPA cement production activities & 25 MW CPP, there are about 474 trucks plying in a day for transporting limestone, correctives, coal, additives/fly ash, finished product cement, etc.

Table: 4.1 Traffic Volume

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Material</th>
<th>Mode of Transportation</th>
<th>Material Quantity for 2 MTPA, Tons/day</th>
<th>No. of Trips/day (Cement Plant)</th>
<th>Increase in Transport Volume due to the Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Limestone</td>
<td>20 Ton Tippers</td>
<td>4730</td>
<td>237</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Iron Ore</td>
<td>20 Ton Trucks</td>
<td>24</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Coal</td>
<td>Rail &amp; Road 15 Ton Trucks</td>
<td>275</td>
<td>19</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Imported Clinker</td>
<td>20 Ton Trucks</td>
<td>810</td>
<td>41</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Gypsum</td>
<td>25 Ton Trucks</td>
<td>203</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Fly Ash</td>
<td>40 Ton Bowsers</td>
<td>1565</td>
<td>39</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Slag</td>
<td>20 Ton Trucks</td>
<td>58</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Cement</td>
<td>Rail (40%) &amp; Road 30 Ton Trucks &amp; Bowsers</td>
<td>6200</td>
<td>124</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Total</td>
<td>Trucks</td>
<td>-</td>
<td>474</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>No. of Vehicles/hr.</td>
<td>-</td>
<td>-</td>
<td>19.75</td>
<td>Nil</td>
</tr>
</tbody>
</table>

As the Plant is located on the National Highway-7 and 0.5 km from Southern Railways BG Lines, there is no significant impact on the local traffic. There will not be any additional vehicles due to the Proposal.

4.2 Land Use Pattern

The crop land occupies the majority of the study area, which is about 58.20%. The land with scrub occupies about 18.73%. Water body occupies about 5.2%. Only 3.55% of the study area is covered by built-up land. The land use of the study area and its percentage is presented below:

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barren Rock</td>
<td>0.09</td>
</tr>
<tr>
<td>Built-up Land</td>
<td>3.55</td>
</tr>
</tbody>
</table>
Crop land 58.20
Fallow land 2.44
Land with scrub 18.73
Land without scrub 4.99
Mine / Quarry 0.24
Plantation 6.56
Water Bodies 5.20

4.3 Environmental Status

In addition to the Continuous AAQ Monitoring & Online Stack Emissions connected to CARE Air Centre of TNPCB, RCL is is periodically monitoring the Ambient Air Quality in and around the Plants, Fugitive Emissions, Noise Levels, Stack emissions, etc. once in a month and submitting the periodical monthly status reports to TNPCB and six monthly compliance reports to MoEF&CC Regional Office, Chennai. The TNPCB Survey Reports are given as Doc-10.

While comparing with the National Ambient Air Quality (NAAQ) Standards revised as per GSR 826(E) dated 16.11.2009, all monitored PM2.5, PM10, SO2, NOx, CO, Particulate Pb, etc. values were found to be well within the respective Norms for 24-hourly periods.

Fugitive emissions are being monitored periodically. Monitored values were found to be in compliance with CREP guideline SPM Norms.

The stack emissions from the main stacks are <30 mg/Nm³. The computed Load Based Emission is found to be less than the Norm of <227 g/Ton of Kiln Feed.

While comparing with the MoEF Leq Norms of 55 dB(A) for day times and 45 dB(A) for night times, the monitored ambient noise levels were well within the limit values for their respective Category Area. Workzone noise levels were found to be well within OSHA Standard of 85 dB(A) for 8-hours exposure.

4.4 Existing Industries

There is no major industries within 10 km radius area of the Plant.

4.5 Soil Classification

The Plant site is located in very deep, imperfectly drained, calcareous, cracking clay soils. It occupies 39.4 % of the study area. Black Cotton soils with medium compaction and loamy texture were dominant in the study area. Soil pH values were found to be neutral and Electrical Conductivity values were ranging between 1.68-2.24 mmhos/cm. Low levels of Nitrogen, Phosphorous and Potassium (NPK) values were monitored at all locations. There was no heavy metals intrusion/leaching into the ground strata. Wilting coefficient in significant levels would mean that these soils would support the vegetation, if amended suitably. The soil water properties reveal that the soil will suit for salt tolerant and semisalt tolerant plants.
4.6 Climatic Data from Secondary Source

Sub-tropical climate prevails over the study area. The temperature is maximum during March to May and it drops from June onwards. The maximum temperature ranges from 40 °C to 44 °C and minimum temperature from 22 °C to 27 °C. The nearest IMD station is Madurai Airport (45 km in north) and nearest rain gauge station is located at Sattur. The seasonwise normal rainfall for the area is given below:

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</tr>
</thead>
<tbody>
<tr>
<td>Transitional Period</td>
<td>27.9</td>
<td>18.6</td>
<td>3.3</td>
<td>65.7</td>
<td>55.3</td>
<td>10.4</td>
<td>24</td>
<td>45.6</td>
<td>159.9</td>
<td>173</td>
<td>158</td>
<td>57.8</td>
<td>799.6</td>
</tr>
<tr>
<td>South West Monsoon</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North East Monsoon</td>
<td></td>
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</table>

(Source: Revenue Department, Virudhunagar)

Around 50% of the rainfall occurs during North East monsoon and the remaining rainfall occurs during Southwest and Transitional periods. The chances of receiving normal annual rainfall is about 40-45%. The project site lies in the 825–835 mm rainfall range.

The yearly rainfall data (1981-2005) of Sattur is presented below:

![Rainfall - 1981-2005](image)

4.7 Social Infrastructure Available

There are good approach roads in the form of panchayat roads, State Highways and National Highways passing through the study area and bus transportation is there to almost all villages. The villages situated on the main road have marketing facilities for their day to day requirements and for major purchases they go to Kovilpatti, Sattur, Virudhunagar and Madurai. Post and Telecommunications facilities are available
in all villages. All the villages in the study area have the basic medical facilities, transport, phone connection, post and telegraph and market facilities.

5.0 Planning Brief
5.1 Planning Concept & Amenities/Facilities

Existing infrastructures in the Cement Plant are adequate for the Proposal.

6.0 Proposed Infrastructure
6.1 Industrial Area

Other than RCL Plant, there is no major industries in the Region.

6.2 Residential Area

RCL is having a Township near the Cement Plant.

7.0 Rehabilitation & Resettlement (R&R) Plan

The Project does not involve any R&R and thus no R&R Plan is envisaged.

8.0 Project Schedule & EMP Budget
8.1 Project Schedule

The proposal will be completed in 6 months after obtaining all statutory clearances.

8.2 Project Cost

The capital cost of the Proposal is Rs.34.00 crores. An EMP Budget of Rs.0.20 crores has been earmarked as Capital Cost and Rs.0.10 crores per annum as Operating Cost. Adequate budgetary provisions will be made for carrying out the CSR activities.

9.0 Analysis of Proposal
9.1 Financial & Social Benefits

The Proposal is for operational advantage of the Cement Plant. Thus, it does not require financial viability analysis/assessment.

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