

Letter No: RV/24/IM/EE/36

Date : 12<sup>th</sup> Sep 2024

To,

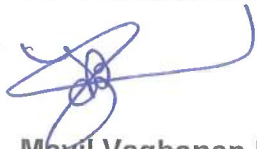
The Environmental Engineer  
Regional Office-Kakinada  
Andhra Pradesh Pollution Control Board  
Plot No.2 IDA, Ramanayya Peta,  
Kakinada, Andhra Pradesh- 533 005

Sir,

**Subject:** Submission of Annual Environmental Statement (Form V) as per Rule 14 of The Environment (Protection) Rules, 1986 for Ravva Operations, Vedanta Limited-Cairn Oil & Gas, Sursani Yanam village, Dr. B. R. Ambedkar Konaseema, Andhra Pradesh -533213

Please find enclosed herewith the Annual Environmental Statement (Form V) for Ravva Operations, PKGM-1 Block Andhra Pradesh for the period from 1<sup>st</sup> April 2023 to 31<sup>st</sup> March 2024

**For Vedanta Limited - Cairn Oil & Gas**



**Mayil Vaghanan K.B**  
**Installation Manager- Ravva**

Enclosure:

1. "Annual Environmental Statements - Form V" for Ravva Operations for FY 2023-24.

**VEDANTA LIMITED**

Cairn Oil & Gas Ravva Onshore Terminal, Surasani Yanam-533212, Uppalaguptham Mandal, Dr. B.R. Ambedkar Konaseema District, Andhra Pradesh, India | Mobile No.9849623600 | [www.cairnindia.com](http://www.cairnindia.com)

**FORM V**  
(See Rule 14)  
**ENVIRONMENTAL STATEMENT**

**ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR ENDING 31<sup>ST</sup> MARCH 2024**  
**FOR**

**RAVVA ONSHORE TERMINAL**  
**PKG-1 BLOCK RAVVA HYDROCARBON FIELD**  
**VILLAGE: S'YANAM DIST: DR. B. R. AMBEDKAR KONASEEMA ANDHRA PRADESH**

**PART - A**

- |  |   |
|--|---|
| I. Name and address of the owner / occupier of the industry operation of process | <b>Installation Manager – Ravva</b><br>M/s Vedanta Limited, Cairn Oil & Gas<br>Village: Surasaniyanam, Mandal: Uppalaguptam<br>District: Dr. B. R. Ambedkar Konaseema, Andhra Pradesh |
| II. Industry category  | Red Category  |
| III. Production capacity – Units   | Ravva Onshore Terminal<br>Crude Oil Processing Capacity 50,000 BoPD<br>Natural Gas-2.3 Standard Million m3/day  |
| IV. Year of establishment  | 1993  |
| V. Date of the last environmental statement submitted                            | 6 <sup>th</sup> September, 2023   |

**PART - B**

Water and Raw Material Consumption:

i) Water consumption m<sup>3</sup>/d

Purpose	Quantity in m <sup>3</sup> /d	Remarks
Process	2623 m <sup>3</sup> /day	Saline Borewell water abstracted to comingle with Produced water for injection purpose to maintain reservoir pressure and void replacement.
Cooling	10.5 m <sup>3</sup> /day	Cooling tower water consumption for cooling of Produced water before feeding it into Effluent Treatment Plant.
Domestic	157.48 m <sup>3</sup> /day	Water for domestic purposes is mainly consumed at the administrative buildings, sanitary purposes and green belt maintenance etc. within and surrounding Ravva Terminal. Sewage Treatment Plant (STP) at Ravva, treated sewage water used for greenbelt maintenance and Fresh water also being used for greenbelt at LQ.
<b>Total</b>	<b>m<sup>3</sup>/day</b>	

Name of products	Process water consumption per unit of product output	
	During the previous financial year	During the current financial year
Crude Oil	0.86 m <sup>3</sup> of water being consumed for one Ton of Hydrocarbon production. The total ground water abstraction for injection purpose during FY 22-23 is 8,77,637 KL to maintain the reservoir pressure. Produced water mixed with saline groundwater.	1.07 m <sup>3</sup> of water being consumed for one Ton of Hydrocarbon production. The total ground water abstraction for injection purpose during FY 23-24 is 1016666 KL to maintain the reservoir pressure. Produced water mixed with saline groundwater.

## (ii) Raw material consumption

Name of Raw Materials	Name of Products	Consumption of raw material per unit of output	
		During the previous financial year	During the current financial year
There are no raw materials involved in the production of Crude Oil. The well fluids consisting of oil, water and associated gas is extracted from the hydrocarbon subsurface reservoir and flows directly to the Ravva for phase separation and processing.  Few chemicals are used for fluid separation and raw water treatment.		NA	NA

Note: For upstream industry, chemicals are consumed at various concentrations and depending on the subsurface behavior, such as to control the corrosion, emulsification, oxygen level, bacterial growth etc. Therefore, refer Annexure – 1 for the various chemical consumption details.

## PART - C

POLLUTANTS	QUANTITY OF POLLUTANTS DISCHARGED (MASS/DAY)	CONCENTRATIONS OF POLLUTANTS IN DISCHARGES (MASS / VOLUME)				PERCENTAGE OF VARIATION FROM PRESCRIBED STANDARDS WITH REASONS
		Parameter	Max	Min	Prescribed Std.	
A) Treated Effluent	Average 1265 KL/Day Effluent being discharged to Marine outfall	TSS (mg/l)	48	35	100	Within the specified limits of APPCB.
		BOD (mg/l)	12.7	28	30	
		Oil and Grease (mg/l)	7.49	BDL (DL: 4.0)	10	
B) Air Emissions from Gas Turbines & DG Sets	Name of Source			Concentration of Pollutant (mg/ Nm3)		The stack emissions are within the prescribed limits of APPCB.
	Quantity of Pollutant (KG/Day)			PM	Stand.,	
	PM	SO2	NOx			
	G 850 A	10.17	<10	16.83	115	
	G 850 B	16.4	<10	36.5		
G 850 C	16.57	<10	19.43			
G 850 A			15.32	115		
G 850 B			16.19			
G 850 C			18.1			

## PART - D

## HAZARDOUS WASTE

(As specified under Hazardous & Other Wastes (Management, Handling and Transboundary Movement) Rules 2016)

Hazardous Waste	Total Quantity			
	During the previous financial year		During the current financial year	
a) From Processes	Hazardous Waste Description	Generation Quantity (Kgs/ Liters)	Hazardous Waste Description	Generation Quantity (Kgs/ Liters)
		Oily Sludge (1.3 Schedule 1)	530000	Oily Sludge (1.3 Schedule 1)

Hazardous Waste	Total Quantity			
	During the previous financial year		During the current financial year	
	Waste oil (Tank bottom oil/ Sludge, oil emulsions) (3.3. Schedule 1)	Nil	Waste oil (Tank bottom oil/ Sludge, oil emulsions) (3.3. Schedule 1)	Nil
	ETP Sludge containing hazardous constituents (34.5 Schedule 1)	59860 Kgs	ETP Sludge containing hazardous constituents (34.5 Schedule 1)	15430 Kgs
	Used Oil/ Spent Oil (5.1 Schedule 1)	13470 KL	Used Oil/ Spent Oil (5.1 Schedule 1)	16130
	Filters contaminated with oil/chemicals (3.3 Schedule 1)	570 Kgs	Filters contaminated with oil/chemicals (3.3 Schedule 1)	1210 Kgs
	Waste/Residues containing Oil (5.2 Schedule 1)	Nil	Waste/Residues containing Oil (5.2 Schedule 1)	Nil
	Waste chemical (PPD, glycol)	Nil	Waste chemical (PPD, glycol)	Nil
	Paint Sludge (21.1 Schedule 1)	100 Kgs	Paint Sludge (21.1 Schedule 1)	450 Kgs
	Spent Carbon (34.2 Schedule 1)	Nil	Spent Carbon (34.2 Schedule 1)	Nil
	Oily rags (5.2 Schedule 1)	6770 Kgs	Oily rags (5.2 Schedule 1)	4450 Kgs
	Discarded containers/ barrels/ liners contaminated with hazardous waste chemicals (33.3 Schedule 1)	2735 nos.	Discarded containers/ barrels/ liners contaminated with hazardous waste chemicals (33.3 Schedule 1)	Nil
	Insulation wool/ thermocol/ PUF	Nil	Insulation wool/ thermocol/ PUF	Nil
	Drill Cuttings containing Oil (2.1 Schedule 1)	Nil	Drill Cuttings containing Oil (2.1 Schedule 1)	Nil
	Sludge Containing Oil (2.2 Schedule 1)	Nil	Sludge Containing Oil (2.2 Schedule 1)	Nil
	Drilling mud and Other Drilling waste (2.3 Schedule 1)	853360	Drilling mud and Other Drilling waste (2.3 Schedule 1)	Nil
(B) From pollution control facilities	Sludge Generated from ETP Operations	59860 Kgs	Sludge Generated from ETP Operations	15430 Kgs
(C) From Other sources	NIL		NIL	

**PART - E**  
**SOLID WASTE**

Solid Waste	Total Quantity																					
	During the previous financial year	During the current financial year																				
(a) From process	Mentioned in other waste category	Refer Part D for Hazardous Waste and other solid waste mentioned below																				
(b) From Pollution control facility (STP Sludge)	The Bio-sludge generated is used as manure for greenbelt maintenance.	The Bio-sludge generated is used as manure for greenbelt maintenance.																				
(C) Other wastes from Health Center, Warehouse, Living quarters and plant housekeeping etc.,	Quantity wise details of different scrap material for FY 2022-23 is given as below	Quantity wise details of different scrap material for FY 2023-24 is given as below																				
		<table border="1"> <thead> <tr> <th>Waste type</th> <th>Quantity in Kgs</th> </tr> </thead> <tbody> <tr> <td>Food waste</td> <td>1980</td> </tr> <tr> <td>Metal scrap</td> <td>3730</td> </tr> <tr> <td>Paper waste</td> <td>1770</td> </tr> <tr> <td>Plastic waste</td> <td>670</td> </tr> <tr> <td>Construction and demolition waste</td> <td>0</td> </tr> <tr> <td>Glass</td> <td>660</td> </tr> <tr> <td>Rubber</td> <td>850</td> </tr> <tr> <td>Wood</td> <td>2400</td> </tr> <tr> <td><b>Total</b></td> <td><b>12,060 Kgs</b></td> </tr> </tbody> </table>	Waste type	Quantity in Kgs	Food waste	1980	Metal scrap	3730	Paper waste	1770	Plastic waste	670	Construction and demolition waste	0	Glass	660	Rubber	850	Wood	2400	<b>Total</b>	<b>12,060 Kgs</b>
Waste type	Quantity in Kgs																					
Food waste	1980																					
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	<table border="1"> <thead> <tr> <th>Waste type</th> <th>Quantity in Kgs</th> </tr> </thead> <tbody> <tr> <td>Food waste</td> <td>2460</td> </tr> <tr> <td>Metal scrap</td> <td>2020</td> </tr> <tr> <td>Paper waste</td> <td>2060</td> </tr> <tr> <td>Plastic waste</td> <td>1710</td> </tr> <tr> <td>Construction and demolition waste</td> <td>4300</td> </tr> <tr> <td>Glass</td> <td>440</td> </tr> <tr> <td>Rubber</td> <td>500</td> </tr> <tr> <td>Wood</td> <td>2080</td> </tr> <tr> <td><b>Total</b></td> <td><b>15,570 Kgs</b></td> </tr> </tbody> </table>	Waste type	Quantity in Kgs	Food waste	2460	Metal scrap	2020	Paper waste	2060	Plastic waste	1710	Construction and demolition waste	4300	Glass	440	Rubber	500	Wood	2080	<b>Total</b>	<b>15,570 Kgs</b>	Category wise quantity of biomedical waste generated in the Health Center is provided in <b>Annexure 3</b>
Waste type	Quantity in Kgs																					
Food waste	2460																					
Metal scrap	2020																					
Paper waste	2060																					
Plastic waste	1710																					
Construction and demolition waste	4300																					
Glass	440																					
Rubber	500																					
Wood	2080																					
<b>Total</b>	<b>15,570 Kgs</b>																					
(1) Quantity recycled or re-utilized within the unit.	Nil	Nil																				
(2) Sold (Wastepaper, metal waste, plastic wastes, packaging material, wooden pallets, drinking water bottles etc. are handover to recyclers)	Nil	Nil																				
(3) Disposed	Segregated solid waste sold to scrap dealers through auction basis time to time.	Segregated solid waste sold to scrap dealers through auction basis time to time.																				

## PART - F

Please specify the characterizations (in terms of composition and quantum) of Hazardous and non-hazardous wastes and indicate disposal practice adopted for both these categories of wastes.

Hazardous Waste: As per Hazardous Waste Authorization. **Refer Part D** for details.

Non-hazardous waste: Domestic waste is generated from the operation and development facilities which mostly consist of bio-degradable organic matter and recyclable wastes. The recyclable wastes are handover to scrap vendor for further recycling process. Food waste is treated in Organic Waste Converter for composting and manure is being used in green belt development.

## PART - G

### **Impact of the pollution abatement measures taken on conservation of natural resource:**

Details of pollution abatement measures have been described in a separate document (**Refer Enclosure -1**).

Sewage Treatment Plant of capacity 175 KLD at Ravva Terminal is operational for the treatment of sewage water generated at terminal and living quarters.

Organic Waste Converter for the treatment and conversion of food waste into bio-manure is available at Operation Base.

Water produced in crude extraction process is treated in water filtration unit and re-injected into the reservoir to aid in reservoir pressure support.

Recharge pit of capacity 35000 m<sup>3</sup> is available at Ravva for the rainwater and ground water recharge.

Green belt development: 136 Acres of green belt developed in and around the facility to control the noise and air pollution levels generated from Ravva and associated facilities.

## PART - H

### **Additional measures/investment proposal for environmental protection including abatement/prevention of pollution.**

There are several voluntary environmental initiatives that have been taken by Cairn to promote environmental protection and prevention of pollution for operations and drilling activities. Description of these initiatives has been provided in **Enclosure-1**.

## PART - I

### **Any other particulars for improving the quality of environment:**

We have undertaken a project to increase the reinjection rate of produced water by optimizing the Induced Gas Flotation (IGF) operation, we successfully raised the reinjection rate from 90% to 91%, which has led to a substantial reduction in Wastewater disposal into the environment.



**Installation Manager - Ravva**

**Date: 12.09.2024**

**ANNEXURE – 1: CHEMICAL CONSUMPTION FOR FY 23-24**

Chemicals - Monthly consumption 2023-2024													
Chemical Description	UOM	Apr'23	May'23	Jun' 23	Jul'23	Aug'23	Sep'23	Oct'23	Nov'23	Dec'23	Jan'24	Feb'24	Mar'24
Emulsifier	Kgs	2429	2592	2434	1966	1662	1434	1586	1495	1589	1639	1617	1691
Biocide I	Kgs	5956	5949	6796	6357	5855	7734	5264	7113	4216	4334	3970	4476
Biocide II	Kgs	2128	2766	5214	3192	426	0	4469	2447	2128	2341	4682	2022
Corrosion inhibitor	Kgs	9127	9240	7833	5505	7346	5894	6345	5945	6012	6547	6087	6028
Gas Corrosion Inhibitor	Kgs	151	146	246	171	-	-	-	-	-	-	-	-
Scale Inhibitor	Kgs	16393	15526	11522	14172	13838	11075	11712	10967	11206	12266	11530	11260
Oxygen Scavenger	Kgs	540	643	432	512	652	553	579	522	471	561	273	54
H2S Scavenger	Lit	23698	30572	20076	37812	26041	27621	24953	21233	28617	17942	15713	22162
Hydrochloric Acid	Lit	100	100	100	100	100	100	100	100	100	100	100	100
Soda Ash	Kgs	10.0	10.0	10.0	20.0	10.0	10.0	10.0	10.0	20.0	10.0	10.0	10.0
Caustic Soda	Kgs	50	50	50	50	50	50	50	50	50	50	50	50
Anti Scalent	Kgs	30	35	30	35	35	30	35	30	35	35	25	35
Flogard MS-6209 (corrosion inhibitor)	Kgs	12.0	15.0	12.0	15.0	15.0	12.0	15.0	10.0	15.0	15.0	10.0	15.0
Flogard MS-6201(corrosion inhibitor)	Kgs	8.0	10.0	8.0	10.0	10.0	8.0	10.0	8.0	10.0	10.0	8.0	10.0
Gengard GN-7004(Dispersant)	Kgs	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Spectrus NX-1100(Non-Oxidising Biocide)	Kgs	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Spectrus NX-1103(Non-Oxidising Biocide)	Kgs	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Urea	Kgs	745	775.0	750	775.0	775	725	775	750	765	775	775	725	775	775	725	775	775
DAP	Kgs	441	465.0	450	465.0	465	435	465	450	475	465	465	435	465	465	435	465	465
Water clarifier	Kgs	1253	1271	1040	1058	883	895	620	631	780	867	1032	1133					



ANNEXURE - 2

**EFFLUENT WASTEWATER QUANTITY IN KL**

Months	Wastewater
	Treated Effluent (KL)
Apr-23	52696
May-23	49183
Jun-23	41902
Jul-23	39316
Aug-23	32266
Sep-23	34997
Oct-23	24563
Nov-23	26978
Dec-23	36855
Jan-24	35415
Feb-24	42085
Mar-24	45597
<b>Total</b>	<b>461,853 KL</b>

DISCHARGED WATER QUALITY

S. No	Para meter	Unit	Results (ETP Outlet)			CPCB Standard
			Maximum	Minimum	Average	
1	Total Suspended Solids	mg/l	48	35	42	<b>100</b>
2	BOD (3 days at 27 °C)	mg/l	12.7	28	21.68	<b>30</b>
3	COD	mg/l	130	128	129	<b>200</b>
4	Oil & Grease	mg/l	7.49	BDL(DL:4.0)	5.6	<b>10</b>

ANNEXURE - 3

**BIO-MEDICAL WASTE (BMW) GENERATION RECORDS**

Site name: Vedanta Limited – Cairn Oil and Gas

Reporting Period: April 2023 to March 2024

Location: Ravva Onshore Terminal, S. YANAM

Sr. No.	BMW Category	Type of Waste	Unit	Qty. of waste generated from Plant Occupational Health Centre												Disposal Method and Biomedical waste Authorization											
				Apr-23	May-23	Jun-23	July-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24												
1	Yellow	Expired and discarded medicines	grams	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	530	All BMW generated are disposed to Andhra Pradesh Pollution Control Board authorized disposal facility: EVB technologies (Incineration) BMW authorization No-HCE/S.Yanam-14/PCB/RO-KKD/BMWA/2016-1143	
2		Soiled waste	grams	2000	1030	555	460	480	530	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510		0
3		Chemical liquid waste	grams	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
4	Red	Contaminated waste (recyclable)	grams	0	0	90	80	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
5	Blue	Glassware	grams	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
6	White translucent	Waste sharp including metals	grams	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0

## Enclosure-1

### Pollution abatement measures taken on conservation of natural resource:

#### *Air Environment:*

The major air emission sources in the project are Natural Gas (Associated gas) based Gas Engine generators for Captive power generation and emergency DG sets and three flaring stacks. The impact of regular operations of these on air is minimal as observed in monthly environmental monitoring carried out at the site.

Measures to ensure minimise impacts include:

- Appropriate management of power generation source (primarily usage of natural gas-Associated gas) to achieve fuel efficiency and therefore reduce emissions
- The operating philosophy is to utilise all available associated gas to meet the energy demand for the plant. Though during start-up, commissioning and plant stabilisation, there may be a need for flaring. Thereafter, during steady state (normal) operations, the High Pressure (HP) and Low Pressure (LP) flare will be used only for emergency blow down and plant shutdown requirements.
- The Gas Engine Generators (GEG) utilises sweet natural gas (no sulphur) as fuel. Natural gas is a clean fuel and thus does not have any significant particulate or SO<sub>x</sub> emissions. Adequate stack height of 11 m is provided for effective dispersion of pollutants.
- Use of low sulphur diesel (low sulphur content) depending on availability for production of power, only during emergencies
- Any Fuel leaks will be prevented from on-land equipment with provision of secondary containment. Further, installation of leak detection systems and conduction of leak detection tests on fuel systems including distribution lines and tanks
- It is ensured that Hazardous Waste transport vehicles are leak proof and allowed only Hazardous goods carried licence drivers only. In addition, TREM Card and Label system followed, and online manifest system being implemented as per APPCB guidelines.
- Greenbelt is developed around the project site to attenuate fugitive emissions of hydrocarbons, gaseous and dust as well as to reduce noise levels. The proposed scheme of plantation incorporates selected plant species that are resistant to dust and other pollutants. Specifically, Mangroves developed within the terminal have enriched with vast biodiversity and adds significant benefits to ecosystem at Ravva.
- The flare location has been selected based on consideration of wind direction. The flare tower is located at a minimum distance of 90 m (as per the OISD guidelines) from the process equipment.

#### *Water Environment:*

Ravva being an offshore asset with eight Oil and Gas platforms in the sea, and hence significant efforts are made to protect water environment. The salient features for water conservation are.

- **Saline Water Sourcing:** Ravva facility during its operation utilizes the abundant supply of sub-surface saline water to meet its operational and domestic water needs. The saline water reservoir is a massive saline water underground reservoir located within the Ravva terminal. The APWALTA has granted approval for abstracting up to 10,413 m<sup>3</sup>/day of saline water from the ground. A ground water monitoring program is in place to track the behavior of the reservoir due to the proposed abstraction. NGRI has conducted survey during 2007 and 2017, no significant water depletion or quality degradation noticed. As per the recommendation of the regulatory authorities a Land subsidence monitoring program has been initiated.
- **Fresh Water:** The freshwater requirements of the plant are met by the desalination of saline water. The reject from the desalination process using for fire water purposes.
- **Produce Water Treatment & Disposal:** The produced water generated from the well fluid phase separation is treated in the produced water treatment plant to separate any of the carried over sediments and oil traces. The treatment is achieved using induced gas floatation process. The treated produced water is co-mingled with the injection water for re-injection into the oil reservoir.
- **Sewage Treatment Facility:** Sewage from plant related activities is treated in a sewage treatment plant and the treated sewage complying with the APCCB discharge standards is used for greenbelt maintenance. The treatment system consists of physical & biological treatment followed by disinfection.
- **Rainwater Harvesting:** The storm water from the paved areas (non-hazardous operation areas) and rooftops is routed to a rainwater collection tank. Infiltration wells (approximately 10-meter-deep) have been built near the tank area so that water collected in the tank over a certain level will overflow into the infiltration well for recharging the groundwater. Also, rainwater harvesting structures are constructed in the terminal to recharge the ground water.

#### ***Waste Management:***

Solid Waste generated from Ravva segregated into Hazardous and Non-hazardous waste, all hazardous waste has either Incinerable, Landfillable or recyclable stored separately and dispose to Common Hazardous waste treatment storage and disposal facilities located at Visakhapatnam M/s CWMP Ramky Enviro. For high calorific value and large volumes waste dispose through Coprocessing at cement kilns. Used oil/ Lube oil recycle back into system. Waste oil is disposed through authorized recyclers. Hazardous waste being managed in accordance with HOWM Rules 2016. For Non-hazardous waste segregated waste stored separately for dispose with recyclers in auction process periodically.

#### ***Chemicals Management:***

Chemicals used for process stored with proper labeling and identification. Hazardous chemicals are stored separately with firefighting and spill control equipments located at strategic locations. Material Safety Data Sheets (MSDS) are maintained for all chemicals.

#### ***Green Belt Development:***

At Ravva, Greenbelt development is an integral part of our activities for environmental protection and balancing the ecosystem. This also helps us in providing an additional aesthetic look in and around our works including our living quarters and Beach plantation.

We have started planting in various areas since 2002 as per the recommendation of AP Forest department. Overall greenbelt area developed is 136 Acres (includes 86 Acres of Mangrove plantation), the cumulatively greenbelt cover is 57.91 % of total facilities operation areas.

#### ***Conservation of Flora Fauna:***

Ravva PKGM/01 Block is located on the heartland of Kona Seema known for its rich and lavish green cover with coconut trees, paddy. Godavari Delta region have diverse Biodiversity with known attributes like Coringa Wildlife Sanctuary near to the Ravva Block area. Mangroves are one of protecting features of Coastal and promoting Wetland ecosystems inside the Ravva Terminal is one of the blissful features of the site.

#### ***Mangroves:***

Mangroves are one of the most valuable and threatened ecosystems, which are helping to protect the coasts during cyclones, sheltering wide variety of species, biologically diverse ecosystem, though these are become so fragile. Ravva has identified mangroves adds value to the biodiversity, has made efforts to develop man made mangrove forest at Ravva plant periphery area. At Ravva facility 8 mangrove species and 5 associated species developed over last ten years. Mangroves helped in enhancing ecosystem by attracting various migratory birds besides the other fauna enriched. The complex mesh of roots and the thick canopy of lush green branches spanning over ~56 acres developed inside Ravva terminal back water zone are a sight to behold. The mangrove plantation provides an excellent roosting site for many avifaunal species and refuge for the smooth coated otter. A total of 16 species of trees and 1 climber, 1 Shrub and 4 herbaceous mangrove associates were enumerated from the mangrove habitats. The highest IVI calculated for trees is *Avicenna officianalis* (11.77) while the lowest IVI calculated for trees is *Scyphiphora hydrophyllacea* (1.63).

Recently, we successfully developed a vibrant mangrove plantation spanning 30 acres within the Ravva terminal. This initiative saw the planting of approximately 30,000 mangrove trees, further enriching the biodiversity of the region. The lush green canopy not only enhances the ecological value of the area but also creates a natural sanctuary for various species of birds and marine life, contributing to the overall sustainability of the environment.

#### ***Fishing Cat Conservation project:***

Kona Seema is known for its Ecologically rich and Biological diversified with various unique and sensitive species in the Godavari delta wetlands. Fishing Cat (*Prionailurus viverrinus*) is one of that falls under Endangered species as per ICUN Red list and the species is listed in Appendix 2 of CITES. Cairn has taken up this project in collaboration with Andhra Pradesh Forest Department- Wildlife Division with the support from Wildlife Institute of India-Dehradun for the period of three years. Total project cost this project is INR 74,03,000/- for over three years period starting from 2020 till 2022.

#### ***Biodiversity Conservation:***

We have established an MOU with the Andhra Pradesh Forest Department (APFD), focusing on biodiversity and sustainability development around the Ravva terminal. As part of this initiative, we have launched a project to plant 0.3 million mangroves across 190 hectares, funded through the interest generated from a corpus fund, in collaboration with APFD.

#### ***Ravva Terminal – Minimal Environmental Footprint Facility:***

The Ravva Terminal facility is designed and operated to ensure that it has minimum environmental footprint.

- Process and domestic requirements met with saline water from confined aquifer, thus not utilizing the local freshwater sources

- No adverse stack emission due to utilization of associated gas as fuel source for Gas Engine Generators (GEG)
- Produced water treated and re-injected to maintain reservoir pressure
- High noise emitting equipment's designed with acoustic enclosures
- Best practices adopted for waste collection and storage facility (TSDF)
- Sewage Treatment Plant (STP) treated water reusing in greenbelt applications
- Rainwater harvesting and recharge structures for augmenting groundwater
- Developing green belt exceeding the statutory requirements
- Developed Casuarina plantation at beach for shelter belt
- Periodical monitoring of Marine environment by Andhra University
- Comprehensive monitoring of environmental conditions
- Drill cuttings are treated through Vertical cutting dryer and Centrifuges

***Community Environmental Awareness:***

Even at an early age, the young ones must be taught about recycling, conserving energy, and keeping the surroundings clean. This is because giving children the right foundation on environmental concerns will help them become better citizens, as they will be encouraged to make the planet a better place to live in for generations to come. Cairn has taken initiatives in spreading environmental awareness among local communities and especially to the school children. Every year, Cairn celebrates World Environment Day, Water Day and Earth Hour to renew its commitment to creating awareness.