

**SUMMARY ON  
ENVIRONMENTAL IMPACT ASSESSMENT  
REPORT**

**OF**

**Solus Fuels & Minerals Pvt. Ltd.**

Proposed 200 KLPD Grain based Distillery Plant along with 6.0 MW Cogen. Power Plant

*Category – B1 Project*

**at**

**Sandi Village, Mandir Hasaud Tehsil,  
Raipur District, Chhattisgarh**

**Submitted to**

**CHHATTISGARH ENVIRONMENT CONSERVATION BOARD**

## **1.0 PROJECT DESCRIPTION**

Solus Fuels & Minerals Private Limited has proposed for establish 200 KLPD Grain based distillery to produce Rectified Spirit /Extra Neutral Alcohol /Ethanol/ Absolute alcohol and Power Generation capacity of 6.0 MW. at Khasra No: 1534, 1535, 1538, 1539, 1547, 1548/1, 1548/2, 1549, 1550, 1551, 1552, 1553, 1554, 1555, 1556, 1557, 1559, 1560, 1537/3 Village Sandi, Tehsil Mandir Hasaud, District Raipur, Chhattisgarh.

Total land identified for the proposed project is 10.19 Ha. (25.18 **Acres**) and same is in possession of management.

The estimated project cost for the proposed project is **Rs. 120.0 Crores**.

As per the Ministry of Environment, Forest & Climate Change (MoEF&CC), New Delhi, EIA notification dated 14<sup>th</sup> September, 2006 & its subsequent amendments, all Molasses based distilleries <100 KLPD & Non-Molasses based distilleries <200 KLD, are listed under S.No. 5(g) under Category 'B'. The SEIAA, Chhattisgarh has accorded **Terms of Reference (TOR)** for the proposed project vide letter no. 2754/SEAC,CG/Industry/2249 dt. 24-03-2023. The EIA Report has been prepared by incorporating the TOR stipulated by the Hon'ble SEIAA, CG.

*Pioneer Enviro Consultants Private Limited, Hyderabad*, which is accredited by NABET, Quality Council of India, vide certificate No. NABET/EIA/1922/RA0148, for preparing Environmental Impact Assessment (EIA) report for Distillery Units, have prepared Draft Environmental Impact Assessment (EIA) for the proposed project. The report contains detailed description of the following:

- Characterization of status of environment with in an area of 10 km radius from the plant for major environmental components including air, water, noise, soil, flora, fauna and socio-economic environment.
- Assessment of air emissions, liquid waste and solid waste from the proposed project along with the noise level assessment.
- Environmental Management Plan comprising of emission control measures proposed to be adopted in the proposed project, solid waste management, Greenbelt development.
- Post Project Environmental Monitoring & Budget for Environmental Protection Measures.

### 1.1 ENVIRONMENTAL SETTING WITHIN 10 Km. RADIUS OF THE PROJECT SITE

The following is the environmental setting within the 10 Km. radius of the Project site:

**Table No. 1.1: Environment Setting within 10 Kms. radius of the site**

S.No.	Salient Features / Environmental features	Distance w.r.t. site / Remarks
1.	Type of Land	Agricultural land (Unirrigated) will be converted in to Industrial land.
2.	National Park/ Wildlife sanctuary / Biosphere reserve / Tiger Reserve / Elephant Corridor / migratory routes for Birds	There are no notified National Park/ Wild life sanctuary/Biosphere reserve/Tiger Reserve/ migratory routes for Birds with in 10 Km. radius of the project site.
3.	Historical places / Places of Tourist importance / Archeological sites	Nil
4.	Critically polluted area as per MoEF&CC Office Memorandum dated 13 <sup>th</sup> January 2010	None And also the Plant area does not fall in the areas given in Hon'ble NGT order issued vide dated 10 <sup>th</sup> July 2019.
5.	Defence Installations	Nil
6.	Nearest village	Bodra Village (0.9 Kms. - S)
7.	No. of Villages in the Study Area	49 nos.
8.	Forests	Nil within 10 Km radius
9.	Water body	Sanghari Nallah (Adjacent) Mahanadi Main Canal (2.2 Kms. – W Direction) Kulhan Nallah (5.1 Kms. – W Direction) Mahanadi River (9.1 Kms. –SE Direction)
10.	Nearest Highway	NH # 6 (5.0 Kms by road)
11.	Nearest Railway Station	Lakohti RS (5.7 Kms by Road)
12.	Nearest Port facility	Nil within 10 Km. Radius.
13.	Nearest Airport	Nil within 10 Kms. Radius [Raipur Airport – 18.5 Kms. WSW (Aerial)]
14.	Nearest Interstate Boundary	Nil [Odissa - 58.6 Kms]
15.	Seismic zone as per IS-1893	Seismic zone – II
16.	R & R	There is no rehabilitation and resettlement issue, as there are no habitations present in the site area.
17.	Litigation / court case is pending against the proposed project / proposed site and or any direction passed by the court of law against the project	Nil

## 1.2 PLANT CONFIGURATION AND PRODUCTION CAPACITY

Following is the proposed plant configuration and proposed production capacities:

**Table No.1.2: Proposed Plant Configuration & Production Capacities**

S. No.	Name of Product	Production Capacity
1.	Rectified Spirit /Extra Neutral Alcohol /Ethanol/ Absolute alcohol	200 KLPD
2.	Electricity	6.0 MW*
By-Products		
1.	DDGS (Distillers Dried Grain Solubles)	160 TPD
2.	CO <sub>2</sub> Recovery from Fermentation Process	152 TPD
Note: *The 50 TPH Boiler is proposed to meet the steam requirement of present proposal		

## 1.3 RAW MATERIAL REQUIREMENT

The following will be the raw material requirement for the proposed project:

**Table No.1.3: Raw Material Requirement, Source & Mode of Transport**

S.No.	Raw Material/ Fuel	Source	Quantity (TPD)	Distance from site (in Kms.)	Method of Transport
<b>Raw Material for Grain Based Distillery plant</b>					
1	Multi Grains  (Rice, maize, bajra, jowar, corn, Sorghum grain Waste / damaged broken rice and other starch-based grains, etc.)	Local area  (Chhattisgarh)	533	~ 100 Kms	By Road through Covered Trucks
<b>Fuel for 1 x 50 TPH Boiler</b>					
1.	Biomass	Local	270	~ 100 Kms	By Road through Covered Trucks
(or)					
2.	Indian coal	SECL	230	~ 200 Kms	By Road through Covered Trucks
(or)					
3	Imported coal	Indonesia / Australia	141	~ 600 Kms. (from Vizag Port)	Sea/Rail/Through covered trucks by Road

## 1.4 MANUFACTURING PROCESS

### 1.4.1 ENA / ETHANOL / RECTIFIED SPIRIT

Initially grains will be sent through the milling section to reduce the size, followed by the liquefaction which converts starch into simple molecules of dextrin. Then this dextrin undergoes saccharification process and batch fermentation. Then distillation will be done to produce Rectified Spirit / ENA. Ethanol will be produced through Molecular Sieve Technology

50 TPH boiler will be installed to meet the steam and power requirement.

### 1.4.2 CO<sub>2</sub> RECOVERY PLANT

During the biochemical reaction in fermentation section, CO<sub>2</sub> is generated as by product along with ethyl alcohol. This raw CO<sub>2</sub> gas having 99% v/v purity (DB) is taken for purification followed liquefaction.

### 1.4.3 COGEN. POWER GENERATION (CO-GENERATION POWER PLANT)

The power plant consists of the following.

- a) 1 x 50 TPH FBC boiler with ESP (outlet particulate emission < 30 mg/Nm<sup>3</sup>)
- b) 1 x 6.0 MW Triple extraction cum condensing back pressure type steam turbines
- c) Mechanical auxiliaries like fuel handling system.
- d) Water cooled condenser system.
- e) Electrical auxiliaries
- f) The boiler will be designed to operate with Coal/ Biomass

## 1.5 Water Requirement

- Water requirement for proposed project will be 800 KLD. Water required for proposed project will be sourced through Ground Water resources.

### BREAK-UP OF WATER REQUIREMENT

S.No.	Section	Consumption (in KLD)
1	Process	335
2	Soft water for CT makeup	185
3	DM water for Boiler Makeup & distillation dilution	270
4	Domestic	10
	<b>Total</b>	<b>800</b>

## 1.6 Wastewater Generation

The total effluent generation for the proposed project will be 1658 KLD. The following is the breakup of wastewater generation from the proposed plant.

**Table No.1.5: Breakup of Wastewater Generation**

S.No.	Type of wastewater	Generation (in KLD)
1.	Spent wash	1200
2.	Spent leese	233
3.	CT & Boiler blowdown	150
4.	Boiler blowdown	40
5.	DM plant regeneration	27
6.	Sanitary wastewater	8
	<b>Total</b>	<b>1658</b>

## 1.7 Wastewater Characteristics

The following are the Characteristics of wastewater.

### Characteristics of Effluent

PARAMETER	CONCENTRATION				
	Spent wash	Cooling Tower blowdown	DM Plant Regeneration	Boiler Blowdown	Sanitary waste water
pH	4.5 to 5.0	7.0 – 8.0	5.0 – 10.0	9.5 – 10.5	7.0 – 8.5
BOD (mg/l)	30,000-35,000	--	--	--	200 – 250
COD (mg/l)	55,000- 60,000	--	--	--	300 – 400
TDS (mg/l)	25,000-30,000	1000	5000 – 6000	1000 mg/l	800 – 900
Oil & Grease (mg/l)		--	10	--	5 - 10
TSS (mg/l)		--	--	--	150-200

## 2.0 DESCRIPTION OF ENVIRONMENT

Base line data has been collected on ambient air quality, water quality, noise levels, flora and fauna and socio-economic details of people within 10 km radius of the plant.

### 2.1 Ambient air quality

Ambient air quality was monitored for PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub> & CO at 8 stations including project site during **1<sup>st</sup> December 2022 to 28<sup>th</sup> February 2023**. The following are the concentrations of various parameters at the monitoring stations:

**Table No. 2.1 : AAQ Data Summary**

S.No.	Parameter	Concentration range	Standard as per NAAQS
1.	PM <sub>2.5</sub>	20.7 to 33.6 µg/m <sup>3</sup>	60
2.	PM <sub>10</sub>	23.2 to 55.1 µg/m <sup>3</sup>	100
3.	SO <sub>2</sub>	7.5 to 15.6 µg/m <sup>3</sup>	80
4.	NO <sub>x</sub>	9.2 to 16.7 µg/m <sup>3</sup>	80
5.	CO	387 to 875 µg/m <sup>3</sup>	2000

## 2.2 Water Quality

### 2.2.1 Surface Water Quality

Sanghari Nallah (Adjacent), Mahanadi Main Canal (2.2 Kms. – W Direction), Kulhan Nallah (5.1 Kms. – W Direction), Mahanadi River (9.1 Kms. –SE Direction) are present within 10 Km. radius of the Project site. 2 no. of samples i.e. 60m Upstream & 60 m Downstream from Mahanadi River each, one sample from Mahanadi Main Canal and one from Kulhan Nallah have been collected and analyzed for various parameters. The analysis of samples shows that all the parameters are in accordance with BIS-2296 specifications.

### 2.2.2 Ground Water Quality

8 No. of ground water samples from open wells / bore wells were collected from the nearby villages to assess ground water quality impacts and analyzed for various Physico-Chemical parameters. The analysis of samples shows that all the parameters are in accordance with BIS: 10500 specifications.

## 2.3 Noise Levels

Noise levels were measured at 8 locations during daytime & Night time. The equivalent day-night noise levels in the study zone are ranging from **48.75 dBA to 53.69 dBA**.

## 2.4 Soil Characteristics

Eight (8) no. of soil samples were collected and for analyzed for various parameters like texture, infiltration rate, bulk density, pH, Ca, Mg, Na, K, Zn, Mn etc. The Soil samples are taken from depth of 15 to 90 cm will be collected. The Physio-chemical characteristics of soil were analyzed using standard methods.

**Table No. 2.4: Soil Characteristics**

S.No.	Parameters	:	Concentration range
1.	pH	:	7.2 to 7.5
2.	Total nitrogen	:	124 to 265 kg/ha
3.	Phosphorous	:	66 to 73 kg/ha
4.	Potassium	:	181 to 234 Kg/ha
5.	Porosity	:	43.3 % to 68.2%.

### 3.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

#### 3.1 Prediction of impacts on air quality

The likely emissions from the proposed project are PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub> & CO. The predictions of Ground level concentrations have been carried out using Industrial Source Complex (ISC-3) model. Meteorological data such as wind direction, wind speed, max. and min. temperatures collected at the site have been used as input data to run the model.

#### NET RESULTANT MAXIMUM CONCENTRATIONS DURING THE OPERATION OF THE PROPOSED PROJECT

Item	PM <sub>10</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	CO (µg/m <sup>3</sup> )
Maximum baseline conc. in the study area	55.1	15.6	16.7	875
Maximum predicted incremental rise in concentration due to proposed project (Point Sources)	0.1	0.3	0.3	--
Maximum predicted incremental rise in concentration due to proposed project (Vehicular emissions)	0.4	--	2.8	1.8
<b>Net resultant concentrations during operation of the proposed project</b>	<b>55.6</b>	<b>15.9</b>	<b>19.8</b>	<b>876.8</b>
<b>National Ambient Air Quality Standards</b>	<b>100</b>	<b>80</b>	<b>80</b>	<b>2000</b>

The net resultant Ground level concentrations during operation of the proposed project are within the NAAQS. Hence, there will not be any adverse impact on air environment due to the proposed project.

#### 3.2 Prediction of impacts on Noise quality

The major sources of noise generation in the proposed project will be STG, boiler, compressors, DG set, etc. Acoustic enclosures will be provided to the STG. The ambient noise levels will be within the standards prescribed by MoEF vide notification dated 14-02-2000 under the Noise Pollution (Regulation & Control), Rules 2000 i.e. the noise levels will be less than 75 dBA during day time and less than 70 dBA during night time. 3.65 Ha. (9.04 Acres) of extensive greenbelt will be developed to further attenuate the noise levels. Hence there will not be any adverse impact due to noise on population in surrounding areas due to the proposed project.



### **3.3 Prediction of impacts on Water Environment**

Spent wash from mash column bottom will be fed to decanter and wet cake with 30 % solids will be separated. The Thin slop generated from the decanter will be evaporated in multiple effect evaporators to concentrate the solids to 30% and then to dryer to concentrate to 90% solids (DDGS) and then will be sold as cattle feed. This is totally a zero discharge based technology. This technology is already approved by CPCB for treatment of spent wash.

Condensate & non-process effluent will be treated in ETP and will be recycled back into process and as cooling tower make up. DM Plant & Softener regeneration will be neutralized and utilized for greenbelt development, ash conditioning and dust suppression. Hence there will not be any adverse impact on environment due to the proposed project.

### **3.4 Prediction of Impacts on Land Environment**

The effluent will be treated to achieve SPCB standards. Zero effluent discharge will be adopted. All the required air pollution control systems will be provided to comply with CPCB / SPCB norms. All solid wastes will be disposed / utilized as per CPCB / SPCB norms 3.65 Ha. (9.04 Acres covering 35.91 % of the total area) of extensive greenbelt will be developed as per guidelines. Hence, there will not be any adverse impact on land environment due to the proposed project.

### **3.5 Socio - Economic Environment**

There will be certain upliftment in Socio Economic status of the people in the area & development of the area due to the proposed project. Due to this the economic conditions, the educational and medical standards of the people living in the study area will certainly move upwards which will result in overall economic development, improvement in general aesthetic environment and increase in business opportunities.

#### 4.0 ENVIRONMENTAL MONITORING PROGRAMME

Post project monitoring will be conducted as per the guidelines of SPCB and MoEF&CC are tabulated below:

##### MONITORING SCHEDULE FOR ENVIRONMENTAL PARAMETERS

S.No.	Particulars	Frequency of Monitoring	Duration of sampling	Parameters required to be monitored
<b>1. Water &amp; Wastewater quality</b>				
A.	Water quality in the area	Once in a month except for heavy metals which will be monitored on quarterly basis	Composite sampling (24 hourly)	As per IS: 10500
B.	Effluent at the outlet of the ETP	Twice in a month	Grab sampling (24 hourly)	As per EPA Rules, 1996
C.	STP Inlet & Outlet	Twice in a month	Grab sampling (24 hourly)	As per EPA Rules 1996
<b>2. Air Quality</b>				
A.	Stack Monitoring	Online monitors (all stacks) Once in a month		PM PM, SO <sub>2</sub> & NO <sub>x</sub>
B.	Ambient Air quality (CAAQMS)	Continuous Quarterly Once	Continuous 24 hours	PM <sub>10</sub> , SO <sub>2</sub> & NO <sub>x</sub> PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>x</sub> & CO
C.	Fugitive emissions	Quarterly Once	8 hours	PM
<b>3. Meteorological Data</b>				
	Meteorological data to be monitored at the plant.	Daily	Continuous monitoring	Temperature, Relative Humidity, rainfall, wind direction & wind speed.
<b>4. Noise level monitoring</b>				
	Ambient Noise levels	Quarterly Once	Continuous for 24 hours with 1 hour interval	Noise levels

#### 5.0 ADDITIONAL STUDIES

No Rehabilitation and Resettlement is involved in the proposed project as there are no habitations in the project site. Hence no R & R study has been carried out.

#### 6.0 PROJECT BENEFITS

With the establishment of the proposed project employment potential will increase. Land prices in the area will increase. The economic status of the people in the area will improve

due to the proposed project. Periodic medical checkups will be carried out. Top priority will be given to locals in employment.

## 7.0 ENVIRONMENT MANAGEMENT PLAN

### 7.1 Air Environment

The following are air emission control systems proposed in the proposed project:

S.No.	Source	Control Equipment	Particulate emission at the outlet
1.	Boiler	Electro Static Precipitator	< 30 mg/Nm <sup>3</sup>
		Lime dosing	SOx < 100 mg/Nm <sup>3</sup>
		Low NOx burners with 3-stage combustion, flue gas recirculation and auto combustion control system will be provided	NOx < 100 mg/Nm <sup>3</sup>
<b>Note :</b> An interlocking system will be provided to the boiler in such a way that whenever ESP fails, the fuel feed to the boiler will stop.			

Apart from the above the following air emission control systems/ measures are proposed in the Plant:

- All conveyors will be completely covered with G.I. sheets to control fugitive dust.
- All bins will be totally packed and covered so that there will not be any chance for dust leakage.
- All the dust prone points material handling systems will be connected with de-dusting system with bag filters.
- All discharge points and feed points, wherever the possibility of dust generation is there a de-dusting suction point will be provided to collect the dust.

### 7.2 Water Environment

Spent wash will be centrifuged in decanter. Then spent wash generated from the decanter will be concentrated to 30% solids in Evaporators and Dried in drier along with wet cake to bring solids to 90 % and the DDGS will be sold as cattle feed. Hence it will be a totally zero discharge spent wash treatment as per CPCB norms.

The Non process effluent such as condensate, CT blowdown, Boiler blowdown, DM plant regeneration wastewater, will be treated in Condensate Polishing Unit (CPU) and after treatment it will be reused to meet the plant water requirement

The treated effluent will be used for dust suppression / ash conditioning & for Greenbelt development within the premises after ensuring compliance with CPCB /SPCB standards.

S.No.	Type of wastewater	Generation (in KLD)	Disposal
1.	Spent wash	1200	Spent wash generated from the decanter will be concentrated to 30% solids in Evaporators and Dried in drier along with wet cake to bring solids to 90 % and the DDGS will be sold as cattle feed
2.	Spent leese	233	Treated in Condensate Polishing unit (CPU) and recycled back to process
3.	CT & Boiler blowdown	150	Treated in Condensate Polishing unit (CPU) and will be utilized for ash conditioning, dust suppression & Greenbelt development
4.	Boiler blowdown	40	
5.	DM plant regeneration	27	
6.	Sanitary wastewater	8	Treated in STP and will be utilized for Greenbelt development
	<b>Total</b>	<b>1658</b>	

**3.659 Ha. (9.04 Acres)** of greenbelt will be developed within the plant premises by using the treated effluent. A dedicated pipe distribution network will be provided for using the treated effluent for greenbelt development.

### 7.3 Noise Environment

The major sources of noise generation in the proposed project will be STG, boilers, compressors, DG set, etc. Acoustic enclosure will be provided. All the machinery will be manufactured in accordance with MoEF&CC norms on Noise levels. The employees working near the noise generating sources will be provided with earplugs. The extensive greenbelt development proposed within the plant premises will help in attenuating the noise levels further. Noise barriers in the form of trees are recommended to be grown around administrative block and other utility units.

### 7.4 Land Environment

The wastewater generated from the proposed project will be treated in the Effluent Treatment Plant to comply with the SPCB standards and will be used for dust suppression, ash conditioning and for greenbelt development. All the required Air emission control systems will be installed and operated to comply with SPCB norms. Solid wastes will be disposed off as per norms. Extensive greenbelt will be developed in the plant premises.

Desirable beautification and landscaping practices will be followed. Hence there will not be any impact due to the proposed project.

**Table No. 7.3: Solid Waste Generation and Disposal**

S.No.	Solid Waste / By Products	Quantity (TPD)	Disposal / Management
1.	DDGS	160	Will be sold as cattle feed / fish feed / prawn feed
2.	Boiler ash		
	when 100% Indian coal is used	92	Ash generated will be utilized for making bricks in the brick making unit
	(or)		
	when 100% Imported coal is used	14.1	Ash generated will be utilized for making bricks in the brick making unit
	(or)		
	when 100% biomass	48.6	Ash generated will be utilized for making bricks in the brick making unit.

**Hazardous waste generation, storage & disposal**

**1. Waste oil: 0.3 KL / Annum**

This will be stored in covered HDPE drums in a designated area and will be given to SPCB approved vendors.

**2. Used Batteries**

Used batteries will be given back to the supplier under buy back agreement with supplier.

**7.5 Greenbelt Development**

Greenbelt of **3.659 Ha. (9.04 Acres)** of extensive greenbelt will be developed in the plant premises. Width of proposed greenbelt ranges from 20 m.

**7.6 Cost for Environment Protection**

Capital Cost for Environment Protection for proposed plant : Rs. 11.46 Crores

Recurring Cost per annum for Environmental protection : Rs. 1.14 Crores

## **7.7 Implementation of CREP Recommendations**

All the CREP recommendations will be strictly followed.

- Continuous stack monitoring system is proposed for stack attached to all the Stacks.
- Online Ambient Air Quality Monitoring Stations will be established in consultation with SPCB during operation of the plant.
- Fugitive emission monitoring will be carried out as per CPCB norms.
- Energy meters will be installed for all the pollution control systems.
- Rain water harvesting pits will be constructed in consultation with CGWB.