



ANGUL ENERGY LIMITED

(Formerly Bhushan Energy Limited)

AEL/SPCB/BE-03/2023-04/109

September 27, 2023

The Member Secretary

State Pollution Control Board, Odisha

Parivesh Bhawan, A/118,

Nilakantha Nagar, Unit-VIII,

Bhubaneswar-751 012

Subject: Environmental Statement for the financial year 2022-23 for Angul Energy Ltd.
Banarpal, Angul.

Reference: Consent Order No.4503/IND-I-CON-6306 dated 23.03.2022

Dear Sir,

In reference to the captioned subject and letter cited above, we are submitting herewith **“Annual Environmental Statement (Form-V)”** duly filled in the prescribed format for Angul Energy Ltd. At: Ganthigadia, PO: Nuahata, Via: Banarpal, Dist.: Angul, Odisha, for the financial year 2022-23.

This is for your kind information and necessary record please.

Thanking you,

Yours faithfully,

For Angul Energy Limited

Shailesh Verma
Managing Director

Encl: As above

Copy to: 1. The Regional Officer, Odisha State Pollution Control Board, Angul, Odisha.
2. Deputy Director General, MoEF&CC, Integrated Regional Office (EZ), A/3, Chandrashekarapur, Bhubaneswar-751023.

[FORM-V]

(See rule 14 of The Environment Protection Act, 1986)

Environment Statement for the financial year ending 31 March 2023

PART – A

General Information		
	Name of the Company	Angul Energy Limited
1.	Name & Address of the owner/occupier of the industry, operation or process	Sri Shailesh Verma, Managing Director Angul Energy Limited At: Ganthigadia PO: Nuahata Via: Banarpal Dist.: Angul Pin: 759128, Odisha
2.	Industry Category	-
	Primary (STC Code),	Coal Based Thermal Power Plant
	Secondary (STC Code)	Category -Red
3.	Production capacity-Units	Production Capacity: 465 MW (2x150 MW + 1x165 MW)
4.	Year of establishment	2010
5.	Date of last environment statement submitted	September 26,2022 vide letter no.- AEL/SPCB/BE-03/2022-04/63

PART – B

Water & Raw material Consumption		
1: Total Water Consumption (m³/d)		
Water Consumption	During the previous Financial Year 2021-22	During the current Financial Year 2022-23
Industrial Consumption (Inside Works as Makeup water)	13278	11762
Domestic Consumption (Inside Works as Drinking water)	90	90

2: Water Consumption per unit of the product (m ³ /MWh)		
Name of the Products	Process Water Consumption per unit of product m ³ /MWh)	
	2021-22	2022-23
Electricity	2.92	2.79

3: Raw Material Consumption (Works):			
Name of Raw materials	Name of Products	Consumption of raw material per unit of product (MT/MW)	
		During the previous Financial Year (2021-22)	During the current Financial Year (2022-23)
Coal	Electricity	0.865	0.875

PART – C

**Pollution discharged to Environment per unit of Output
(Parameters as specified in the Consent issued)**

(i) Works:

Pollutants	Quantity of pollutants discharged (mass/day)		Concentrations of pollutants discharged (mass/volume)		% of variation from prescribed standards
	(Tonnes/day)		(mg/l)		In % (referring CTO)
(a) Water	2021-22	2022-23	2021-22	2022-23	2022-23
TSS	Zero discharge is maintained, and water is being treated and reused.				
COD					
Ammonia as N					
BOD					
Phenols					
Cyanide as CN ⁻					

(b) Air	2021-22	2022-23	2021-22	2022-23	2022-23
	Tons/day		mg/Nm3		In % (referring CTO)
PM	0.5	0.42	21.6	25.3	(-) 49.4%
SO ₂	16.6	13.18	1054	725.6	(+) 20.9
NO ₂	1.5	1.35	70	57.8	(-) 87.1

- As per MoEF&CC notification vide No. G.S.R.682 (E) dtd.05.09.23, SO₂ emission reduction timeline has been extended up to 31st December 2025. Necessary projects are on construction stage.

1. Surface Water Quality

Parameter	Unit	Kisinda Nalla		Lingra Nalla	
		U/S	D/S	U/S	D/S
pH Value	-	6.95 - 8.11	6.82 - 8.21	7.66 - 8.21	7.1 - 8.33
Colour	Haze n	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
Temperature	Deg C	25 - 31	25 - 33	25 - 29	24 - 25
Total Suspended Solids	mg/l	3.2 - 20.4	2 - 26.8	< 14.8	< 26
Ammoniacal Nitrogen	mg/l	-	-	BDL (DL:0.1)	BDL (DL:0.1)
Arsenic as As	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
BOD, 3days at 27°C	mg/l	BDL (DL:2.0)	< 3.4	BDL (DL:2.0)	< 2.7
Boron as B	mg/l	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)
Cadmium as Cd	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
Calcium as Ca	mg/l	40 - 110.88	11.88 - 54.88	31.68 - 48	28 - 102.96
Chlorides as Cl	mg/l	24.74 - 89.97	14.7 - 146.4	19.59 - 49.98	14.11 - 119.96
COD	mg/l	7.2 - 16.7	6.98 - 15.4	6.85 - 12	7.2 - 16
Copper (as Cu)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)

Cyanide as CN	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
Fluoride as F-	mg/l	0.35 - 4.7	0.22 - 2.4	0.24 - 1.06	0.33 - 2.17
Free Ammonia	mg/l	-	-	BDL(DL:0.1)	BDL(DL:0.1)
Hexa Chromium as Cr ⁺⁶	mg/l	0 - 0.052	< 0.088	< 0.032	BDL (DL:0.01)
Iron as Fe	mg/l	0.09 - 0.89	0.06 - 2.01	0.11 - 0.38	0.08 - 1.58
Lead (as Pb)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
Manganese (as Mn)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
Mercury (as Hg)	mg/l	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)
Nickel (as Ni)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
Nitrate as N	mg/l	0.52 - 1.02	0.61 - 1.01	0.5 - 0.92	0.62 - 1.45
O&G	mg/l	BDL (DL:1.4)	BDL (DL:1.4)	BDL (DL:1.4)	BDL (DL:1.4)
Phenolic Comp	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
Phosphate as P	mg/l	0.09 - 0.46	0.07 - 0.62	< 0.32	< 0.4
RFC	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
Selenium (as Se)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
Sulphate mg/l	mg/l	-	-	BDL(DL:0.02)	BDL(DL:0.02)
TKN	mg/l	BDL (DL:0.3)	BDL (DL:0.3)	BDL (DL:0.3)	BDL (DL:0.3)
Total Chromium (as Cr)	mg/l	-	-	BDL(DL:0.01)	BDL(DL:0.01)
Total Nitrogen Content	mg/l	-	-	0.84 - 3.6	1.02 - 5.1
Vanadium (as V)	mg/l	-	-	BDL(DL:0.05)	BDL(DL:0.05)
Zinc (as Zn)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)

NB: U/S: Upstream; D/S: Downstream; BDL: Below Detection Limit; DL: Detection Limit

2. ETP Treated Water Quality

Parameter	UOM	ETP-1		
		Min	Max	Avg
pH	-	7.3	8.3	7.8
Total Suspended Solid	mg/l	5.4	65.0	39.0
Oil & Grease	mg/l	<5	<5	<5
Chemical Oxygen Demand (COD)	mg/l	20.0	80.0	39.4
Biochemical Oxygen Demand (BOD)(27 ° C for 3 days)	mg/l	4.3	8.8	6.5
Iron as Fe	mg/l	0.1	0.5	0.2

3. Sewage Treatment Plant -Treated outlet quality

Parameter	UOM	AEL STP			Colony STP		
		Min	Max	Avg	Min	Max	Avg
pH	-	7.2	8.0	7.6	7.0	8.3	7.5
TSS	mg/l	17.0	58.0	42.6	22.0	74.0	39.6
BOD	mg/l	10.0	24.0	16.5	7.2	22.0	15.0

4. Ambient Air Quality

Parameters	UoM	Norm	CAAQMS-2			CAAQMS-3			CAAQMS-4		
			Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
PM10	µg/m ³	100	37.4	211.0	126.3	27.1	143.4	74.3	58.1	192.8	102.6
PM2.5	µg/m ³	60	12.0	87.6	49.8	8.5	58.7	31.1	21.0	78.9	43.9
SO2	µg/m ³	80	11.4	29.1	17.8	9.2	25.7	12.8	5.6	10.1	6.9
Nox	µg/m ³	80	9.2	12.7	10.0	16.9	23.7	18.7	8.9	24.6	20.5
CO	mg/m ³	2	0.3	0.9	0.64	0.3	0.9	0.42	0.2	0.6	0.36

Parameters	UoM	Norm	CAAQMS-5			CAAQMS-6			CAAQMS-7		
			Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
PM10	µg/m ³	100	31.0	153.0	84.4	55.9	207.5	122.0	59.8	258.7	129.4
PM2.5	µg/m ³	60	14.9	118.4	50.8	21.8	106.8	45.7	23.0	102.8	52.1
SO2	µg/m ³	80	7.6	22.2	12.7	5.7	32.5	16.5	8.2	24.1	15.8
Nox	µg/m ³	80	6.4	24.9	17.5	12.0	29.2	20.0	22.7	33.1	31.0
CO	mg/m ³	2	0.4	1.1	0.61	0.4	0.9	0.66	1.1	1.2	1.16

CAAQMS 2: Near AEL Boundary; CAAQMS 3: Near CRM; CAAQMS; 4: Near Water Complex; CAAQMS 5: Near Coke Oven 2; CAAQMS 6: Near Wagon Tippler; CAAQMS 7: Near Material Gate

Values are derived from 24 hourly average data except CO values are derived from 8 hourly average data.

PART – D

Hazardous Wastes (As specified under The Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016)		
Hazardous waste	Total Quantity (MT)	
	During the previous Financial Year (2021-22)	During the current Financial Year (2022-23)
(a) From Process		
Used Oil	2.7	20.7
Waste residue containing oil	0.12	0.012
Insulation Material	7.6	19.03 T
Discarded Container Barrel/Liners contaminated with Hazardous waste chemicals	394 Nos.	456 Nos.
(b) From Pollution Control Facilities: NIL		

PART – E

Solid Wastes

Total Quantity Generated

Name of the Waste	Total Quantity Generated (MT)	
	During the previous Financial Year (2021-22)	During the current Financial Year (2022-23)
(a) From Process		
Bottom Ash	199352	151886
(b) From Pollution Control Facilities		
Fly Ash	465154	422061

(c) (1). Quantity Recycled/Reutilized within the Unit

Name of the Waste	Total Quantity Recycled/Reutilized within the Unit (MT)	
	During the previous Financial Year (2021-22)	During the current Financial Year (2022-23)
1. Ash (internal and external brick manufacturing unit)	73413	91138

(c) (2). Quantity Sold

Name of the Waste	Total Quantity Sold (MT)	
	During the previous Financial Year (2021-22)	During the current Financial Year (2022-23)
Fly Ash (Cement Manufacturing unit)	65306	79628

(c) (3). Total Quantity Disposed/Stored

Name of the Waste	Total Quantity (MT)	
	2021-22	2022-23
1. Ash (Used for quarry filling and low lying area reclamation)	470242	192784
2. Ash (Used for road making)	55545	207245
3. Stored in interim ash pond	-	3152

PART – F

Chemical Composition of majority of waste as produced in process of Angul Energy Ltd. operation is given below:

Name of the Wastes	Chemical Composition (%)				Disposal Method
Fly Ash	SiO ₂	55.30	Na ₂ O	0.07	<ul style="list-style-type: none"> • Supply to cement plant and to bricks manufacturing unit free of cost on door delivery model. • Supply to NH construction. • Reclamation of stone quarry.
	Al ₂ O ₃	28.93	K ₂ O	0.28	
	Fe ₂ O ₃	3.70	Cr ₂ O ₃	0.02	
	TiO ₂	1.25	NiO	0.01	
	MnO ₂	0.05	CuO	0.01	
	CaO	0.02	ZnO	0.016	
	MgO	0.10	BaO	0.061	
	P ₂ O ₅	0.04	S ₀ ₃	0.10	
	Cl ⁻	0.50	LoI	3.00	
	F	4.8			
Bottom Ash	SiO ₂	55.51	Na ₂ O	0.07	<ul style="list-style-type: none"> • Supply to cement plant. • Supply to NH construction. • Reclamation of stone quarry.
	Al ₂ O ₃	16.30	K ₂ O	0.25	
	Fe ₂ O ₃	11.84	Cr ₂ O ₃	0.01	
	TiO ₂	0.80	NiO	0.01	
	MnO ₂	0.23	CuO	0.01	
	CaO	0.40	ZnO	0.01	
	MgO	1.37	BaO	0.01	
	P ₂ O ₅	0.17	S ₀ ₃	0.12	
	Cl ⁻	6.05	LoI	1.55	
	F	1.76			

PART – G

Sl.No	Pollution abatement measures taken in 2022-23.	Impact of pollution control measures on conservation of natural resources and cost of production.
1	LED Lights	2256 nos. LED lights installed to reduce carbon footprint.
2	Installation of CCTV	Installed CCTV camera for continuous monitoring of stack emissions.
3	Green Belt Development	Greenbelt has been developed in 33.94% of plant area (including outside area).
4	Dust Suppression	High Frequency Transformer Rectifier (HFTR) and Micropulse installed to further reduce stack emissions
		Pneumatic conveying of ash from ESPs to silos to reduce fugitive emissions
		All conveyors and junction houses are fully covered.
		All internal roads made pucca and regular cleaning of roads with sweeping machine.
5	Analyzer Installed	Installed Continuous Emission Monitoring System (CEMS), Continuous Effluent Quality Monitoring System (CEQMS) and Continuous Ambient Air Quality Monitoring System (CAAQMS) for continuous monitoring of stack emissions and effluent quality.

Cost expenditure of Pollution Control	
Description	Expenditure in crores during 2022-23 (in Rs. Crores)
Air Pollution Control	9.7
Water Pollution Control	2.6
Solid Waste Management	19.1
Hazardous Waste Management	0.09
Total	31.49

PART – H

Additional measures/investment proposals for environmental protection including abatement of pollution, and prevention of pollution.

- Upgradation of the existing pollution control equipment to further bring down particulate matter levels.
- Improvement in water recycling facility for reducing the specific water consumption.
- New pollution control equipment is with more stringent design emission value.
- Installation of more IP cameras and Mercury analyzer.
- Installation of roof Rainwater harvesting Project.
- Installation of roof top solar panel for harnessing 50 kWp solar power.
- Installation of De-SO_x project to limit the SO₂ level <600 mg/Nm³.
- Installation of decanter to reduce the freshwater consumption by 800 m³/day.
- Installation of additional COG/Natural gas based burner along with the existing coal fired burner to facilitate the simultaneous dual firing of by product COG along with coal to reduce PM emission, ash generation and other environmental parameters.

PART – I

Any other undertaken project for improving the quality of environment:

- Installed 05 Nos. of portable bag filter at conveyor line to minimize fugitive dust.
- Installed industrial vacuum cleaner (IVC) at Junction house and material transfer point.
- Installed GPS based IT system to track the movement of fly ash trucks on real time basis including its loading and unloading geo fenced.
- Installed High Frequency Transformer Rectifier (HFTR) in 1st field of ESP to further improve the performance of ESP and to further control particulate matter emissions.

