Verification Report for

Project : SBPIL Waste Heat to Power Project, Borjhara, India.

UCR Project ID : 400

Name of Verifier	SQAC Certification Pvt. Ltd.
Date of Issue	March 12, 2024
Project Proponent	M/s Shri Bajrang Power and Ispat Limited (SBPIL)
UCR Project Aggregator	M/s Carbon Equalizers.
Work carried by	Ms. Sheetal Wader
Work reviewed by	Mr. Santosh Nair

Summary:

SQAC Certification Pvt. Ltd. has performed verification of the "SBPIL Waste Heat to Power Project, Borjhara, India". The project activity is the installation of waste heat recovery boilers (WHRBs) and turbine generators to generate electrical power from the waste heat gases produced during the manufacture of sponge iron. The project activity results in reduced carbon emissions by displacing equivalent amount of power generation in Chhattisgarh State Electricity Board (CSEB) grid.

The project activity meets the following UN SDG's:

Verification for the period: **01/09/2015 - 31/12/2022** (07 years 04 months)

The GHG emission reductions were calculated on the basis of UCR Protocols which draws reference from, UCR Protocol Standard Baseline, CDM UNFCCC Methodology, ACM0012 Waste energy recovery Version 6.0. The verification was done was done remotely by way of video calls / verification, phone calls and submission of documents for verification through emails.

SQAC is able to certify that the emission reductions from SBPIL Waste Heat to Power Project, Borjhara, India, (UCR ID – 400) for the period **01/09/2015** to **31/12/2022** amounts to **5,02,989 CoUs** (**5,02,989** tCO_2eq)

Detailed Verification Report:

Purpose:

The GOEL GROUP of Industries is a leading business conglomerate in Chhattisgarh, India. It operates a Re-Rolling Mill named M/s Shri Bajrang Alliance Ltd. (formerly M/s Shri Bajrang Alloys Ltd) in the Iron & Steel sector. Moreover, M/s Shri Bajrang Power & Ispat Ltd, a part of the group, produces TMT Bars sold under the brand Goel TMT.

The plant was commissioned in 2005 (also called Unit I) manufactures of TMT Bars, Ferro alloys, steel billets, sponge iron and fly ash bricks. The project activity takes place at a sponge iron plant (Unit I) and involves the generation of electrical power through the installation of waste heat recovery boilers and steam turbine generators (STGs).

The waste heat produced during the manufacture of sponge iron is passed through boilers and the resultant steam is utilised to generate electrical power. The power generated from two condensing turbines (8 MW and 10 MW) is consumed in captive requirements and surplus is exported to the grid via Chhattisgarh State Electricity Board (CSEB).

The energy generated in the project is measured by meters installed at both STGs in the power plant. The project activity was commissioned in phase wise wherein the 8 MW STG started operating on 12/07/2005 and 10 MW STG started operating on 31/08/2005 and has been operating till date on regular basis.

Related Documents	Date
Factory's License	15/07/2005
Electrical Inspector's Report of the Installations	16/06/2005
Permission for running 18 MW TG set captive power plant	2005
Copy of Purchase Order for Boiler placed on M/s Thermax Limited	19/04/2004
Copy of Purchase Order for Turbine placed on M/s Triveni Engineering Industries Ltd	19/04/2004
Boilers Inspection Report	01/06/2022 and 16/08/2022

The project activity entails utilisation of waste heat of flue gases generated in Direct Reduced Iron (DRI) kilns of sponge iron plants of SBPIL (Project Proponent or PP hereafter) in power generation. DRI, is a type of kiln used in the production of sponge iron, where iron ore is reduced to sponge iron using coal & Iron ore through a rotary Kiln at high temperature (1000 ^{0}C).

The reduction process produces carbon dioxide and carbon monoxide. The waste heat from the flue gases is harnessed to generate steam in Waste Heat Recovery Boilers (WHRB), which is then utilized to power two turbines with a combined capacity of 18MW (8MW + 10MW). The 8MW turbine generator was connected to the grid on 12/07/2005, followed by the synchronization of the 10MW turbine generator on 31/08/2005. Subsequent to these synchronizations, the turbines underwent testing and trials on 01/09/2005, marking the earliest date when the project could start supplying electricity to the grid.

Annexure-

OFFICE OF THE SUPTDG. ENGINEER(T&C) CIRCLE
C.S.E.B. GUDHIYARI : RAIPUR – 492 009
PHONE NO./ FAX NO. 0771 - 2592243

NO.10-60/TECH/ 7330 /Raipur, dtd. 13/08/08

To,

The Chief Engineer(Comm.tl.),
C.S. Electricity Board,
Danganiya, Raipur.

Sub :- Synchronization of 8 MW TG set (IIIrd unit) M/s Shree Bajrang Power & Ispat Ltd. with CSEB grid .

Ref :- CE(Comml.) Raipur's letter no.02-02/SE-1/12/Bajrang Power/1242, dtd. 13-08-2008.

In compliance to the above referred letter from CE(Comml.) Raipur, the 8 MW / 10 MVA TG set bearing Sl.No.2K708448-01 of make TDPS of M/s Shree Bajrang Power & Ispat Ltd. Raipur, has been paralleled with Board's Grid through 132KV Bajrang feeder on dtd 13-08-2008

Date of AF&C Start-up

This for your kind information and further needful please.

SUPTDG. ENGINEER(T&C)
CSEB : RAIPUR

Copy to :-
1) The Chief Engineer(T&C), CSEB, Danganiya, Raipur
2) The Chief Engineer(Trans.) CSEB, Danganiya, Raipur
3) The Chief Engineer(RR), CSEB, Gudhiyari, Raipur
4) The Suptdg. Engineer(O& M), CSEB, Raipur
5) The Addl. S.E.(MRT)Dn-I, CSEB, Gudhiyari,Raipur
6) The Executive Engineer(O&M) Dn., CSEB, Nayapara, Raipur
7) The Sr. Accounts Officer, CSEB, Gudhiyari, Raipur.
8) M/s Shree Bajrang Power & Ispat Ltd., Vill-Borjhara, Urla Guma Road, Raipur.

CHHATTISGARH STATE ELECTRICITY BOARD

OFFICE OF THE CHIEF ENGINEER COMMERCIAL
VIDYUT SEWA BHAVAN, ROOM No.411 FOURTH FLOOR
DANGANIA , P.O. SUNDER NAGAR RAIPUR , 492013
PH. 0771 -2574441 , FAX- 0771- 2574442

NO. 02-02 /RAC / HTCC / Comp.- 24 / 2144 RAIPUR DT: 19-11-08

To,
M/S Shri Bajarang Power & Ispat Ltd.
Vill. Borjhara , Urla-Guma Road,
Raipur. (C.G.) 493221

Sub.--: Supplementary HT Bill dated 01 /06/07 towards Parallel operation charges.

Ref.--: Your letter No. 1905 dt. 13/09/2008.

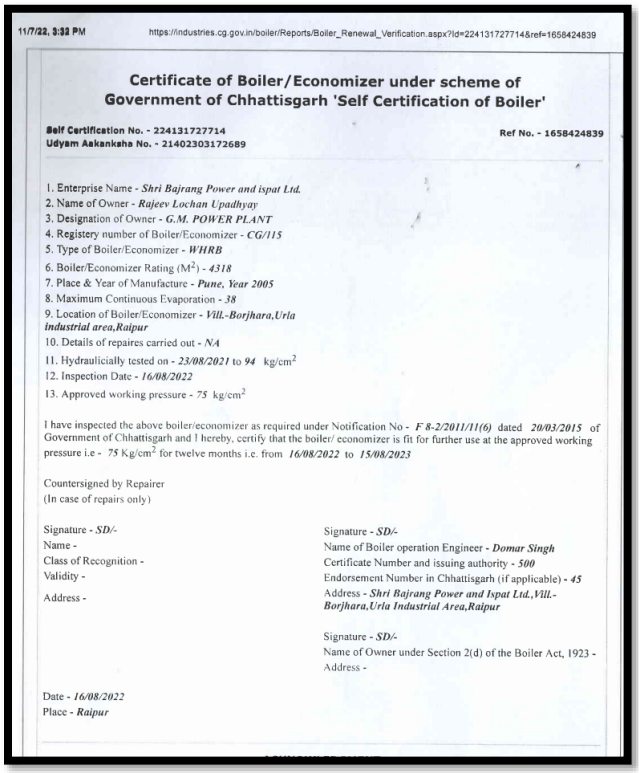
Dear Sir,

Your grievance regarding incorrect supplementary demand of parallel operation charge for second 12.5 MVA Generator from dt. 01/08/05 instead of actual date of synchronization as 31/08/05 has been examined based on available supporting documents. Competent authority has arrived at conclusion and decided that the billing of parallel operation charges for the second 12.5 MVA generator should be commenced from 31/08/05, as per joint meter reading statement of the generators dated 31/08/05.

Thanking You.

CHIEF ENGINEER (COMMERCIAL)

Copy To--:
(1) The Chief Engineer(RR) CSEB Raipur.
(2) The Superintending Engineer(O&M)/ (T&C) CSEB Raipur.
(3) Sr. Regional Accounts Officer CSEB Raipur
--: For needful in above respect..



11/7/22, 3:32 PM https://industries.cg.gov.in/boiler/Reports/Boiler_Renewal_Verification.aspx?Id=224131727714&ref=1658424839

Certificate of Boiler/Economizer under scheme of Government of Chhattisgarh 'Self Certification of Boiler'

Self Certification No. - 224131727714 **Ref No. - 1658424839**
Udyam Aakanksha No. - 21402303172689

1. Enterprise Name - *Shri Bajrang Power and ispat Ltd.*
2. Name of Owner - *Rajeev Lochan Upadhyay*
3. Designation of Owner - *G.M. POWER PLANT*
4. Registery number of Boiler/Economizer - *CG/115*
5. Type of Boiler/Economizer - *WHRB*
6. Boiler/Economizer Rating (M^2) - *4318*
7. Place & Year of Manufacture - *Pune, Year 2005*
8. Maximum Continuous Evaporation - *38*
9. Location of Boiler/Economizer - *Vill.-Borjhara,Urla industrial area,Raipur*
10. Details of repaires carried out - *NA*
11. Hydraulicially tested on - *23/08/2021* to *94* kg/cm^2
12. Inspection Date - *16/08/2022*
13. Approved working pressure - *75* kg/cm^2

I have inspected the above boiler/economizer as required under Notification No - *F 8-2/2011/11(6)* dated *20/03/2015* of Government of Chhattisgarh and I hereby, certify that the boiler/ economizer is fit for further use at the approved working pressure i.e - *75* Kg/cm^2 for twelve months i.e. from *16/08/2022* to *15/08/2023*

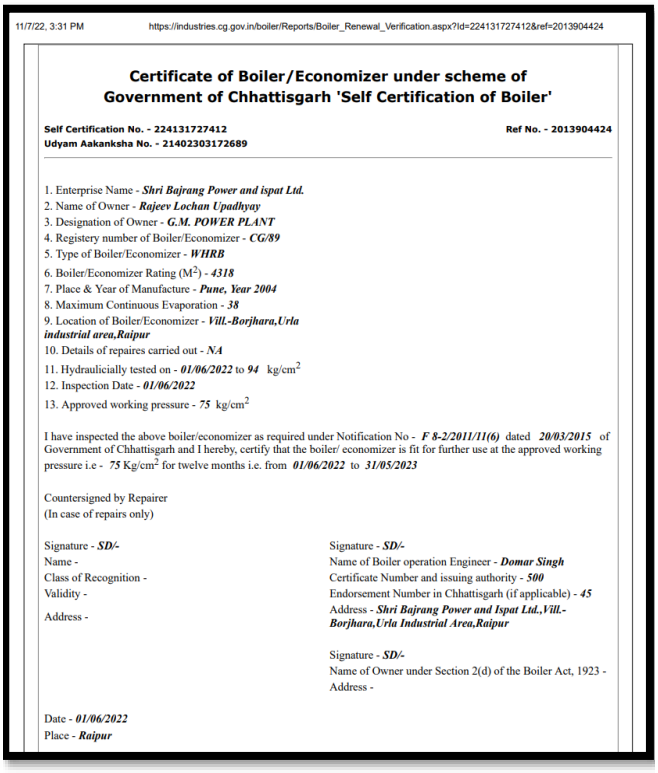
Countersigned by Repairer
(In case of repairs only)

Signature - *SD/-*
Name -
Class of Recognition -
Validity -
Address -

Signature - *SD/-*
Name of Boiler operation Engineer - *Domar Singh*
Certificate Number and issuing authority - *500*
Endorsement Number in Chhattisgarh (if applicable) - *45*
Address - *Shri Bajrang Power and Ispat Ltd.,Vill.-Borjhara,Urla Industrial Area,Raipur*

Signature - *SD/-*
Name of Owner under Section 2(d) of the Boiler Act, 1923 -
Address -

Date - *16/08/2022*
Place - *Raipur*



11/7/22, 3:31 PM https://industries.cg.gov.in/boiler/Reports/Boiler_Renewal_Verification.aspx?Id=224131727412&ref=2013904424

Certificate of Boiler/Economizer under scheme of Government of Chhattisgarh 'Self Certification of Boiler'

Self Certification No. - 224131727412 **Ref No. - 2013904424**
Udyam Aakanksha No. - 21402303172689

1. Enterprise Name - *Shri Bajrang Power and ispat Ltd.*
2. Name of Owner - *Rajeev Lochan Upadhyay*
3. Designation of Owner - *G.M. POWER PLANT*
4. Registery number of Boiler/Economizer - *CG/89*
5. Type of Boiler/Economizer - *WHRB*
6. Boiler/Economizer Rating (M^2) - *4318*
7. Place & Year of Manufacture - *Pune, Year 2004*
8. Maximum Continuous Evaporation - *38*
9. Location of Boiler/Economizer - *Vill.-Borjhara,Urla industrial area,Raipur*
10. Details of repaires carried out - *NA*
11. Hydraulicially tested on - *01/06/2022* to *94* kg/cm^2
12. Inspection Date - *01/06/2022*
13. Approved working pressure - *75* kg/cm^2

I have inspected the above boiler/economizer as required under Notification No - *F 8-2/2011/11(6)* dated *20/03/2015* of Government of Chhattisgarh and I hereby, certify that the boiler/ economizer is fit for further use at the approved working pressure i.e - *75* Kg/cm^2 for twelve months i.e. from *01/06/2022* to *31/05/2023*

Countersigned by Repairer
(In case of repairs only)

Signature - *SD/-*
Name -
Class of Recognition -
Validity -
Address -

Signature - *SD/-*
Name of Boiler operation Engineer - *Domar Singh*
Certificate Number and issuing authority - *500*
Endorsement Number in Chhattisgarh (if applicable) - *45*
Address - *Shri Bajrang Power and Ispat Ltd.,Vill.-Borjhara,Urla Industrial Area,Raipur*

Signature - *SD/-*
Name of Owner under Section 2(d) of the Boiler Act, 1923 -
Address -

Date - *01/06/2022*
Place - *Raipur*

Location of project activity:

Urla Industrial Area

Village : Borjhara
District : Raipur,
State : Chhattisgarh,
Country : India.
Latitude : 21º18’30.8” N (21.3085)
Longitude : 81º35’6.8” E (81.5852)

Scope:

The scope covers verification of emission reductions from the project - SBPIL Waste Heat to Power Project, Borjhara, India, (UCR ID – 400).

Criteria:
Verification criteria is as per the requirements of UCR Standard.

Description of project:

In the project activity two turbo Generators (TG) having a combined capacity of 18 MW were linked with two WHRBs attached to each sponge iron kiln. Due to inadequate steam generation in WHRBs the full capacity of the WHR project as predicted could not be utilised. After the implementation of the AFBC boiler, the excess steam available from the same is being diverted to the WHR project to achieve full generation capacity of 18 MW turbine. Electricity generated from this diverted steam on account of the AFBC boiler is however not claimed as emission reductions (CoUs) in the current project activity.

The majority of sponge iron in India is manufactured through the direct reduction process. This process involves passing coal and iron ore through a rotary kiln at high temperatures (over 1000^{o}C) to reduce the iron ore to sponge iron. The reduction process yields carbon dioxide and carbon monoxide. These gases leave the kiln at high temperature (950^{o}C) and may be utilised to generate power. After leaving the kiln the hot gases are passed through an after-burner chamber where further oxidation of the gases occurs, i.e. carbon monoxide to carbon dioxide. The gases are then fed to waste heat recovery boilers and then drawn through electrostatic precipitators and ultimately released via the stack.

Sr. No	Turbine Details	Make	Date Commissioned
1.	8 MW condensing TG -1	Triveni, India	12/07/2005
2.	10 MW condensing TG-2	Triveni, India	31/08/2005

Sr. No	Boiler Details	Make
1	2 x 38 TPH, 66 Kg/cm2, 490 ± 5^{0} C	Thermax India

The project activity (also known as Unit I within the group of facilities operated and owned by the PP) comprises of two WHRBs, one compatible for 38TPH of steam generation installed at the tail end of second number 350TPD DRI Kiln and another WHRB of 38TPH capacity at the tail end of first number of 350 TPD Kiln along with one AFBC Boiler of 60 TPH steam generation capacity equipped with Water

Cooled Condenser.

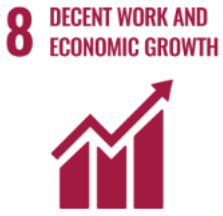
Flue gases temp and pressure	: 950°C, -1 to -5 mmWC (Inlet)
Steam generated pressure and temp	: 66 ATA, 490 ± 5 °C

Heat that is extracted from the hot gas is utilized in the transforming water to high temperature to high pressure steam, to run conventional condensing type Steam Turbo Generator for generation of electricity as a part of forward and backward integration process.

United Nations Sustainable Development Goals:

The project activity displaces CSEB grid power, part of WR grid, which is predominantly fossil fuel based. In the absence of the project activity equivalent amount of power generation would have taken place through fossil fuel dominated power generating stations.

Positive contribution of the project to the following Sustainable Development Goals:

Development Goals	Targeted SDG	Target Indicator (SDG Indicator)
 SDG 13: Climate Action	13.2: Integrate climate change measures into national policies, strategies and planning Target: **502989 tCO_2** for this monitored period	13.2.1: Number of countries that have communicated establishment or operationalization of an integrated policy/ strategy/ plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)
 SDG 7: Affordable and Clean Energy	By 2030, increase substantially the share of non-fossil energy in the global energy mix. Target: **890577 MW_h** supplied for this monitored period	The project activity helps reducing GHG emission in power generation in the grid, which is primarily fossil fuel based.
 SDG 8: Decent Work and Economic Growth	8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value Target: Training, O&M staff	8.5.1: Average hourly earnings of female and male employees, by occupation, age and persons with disabilities. The project activity provides direct employment to over **1250** people. The employment involves tribal people who are more than 40% in population and also are now well qualified as well as competent to take the employment in the steel industry

Level of Assurance:

The verification report is based on the on the information collected through interviews conducted over video calls / phone calls, supporting documents provided during the verification, Project Concept Note (PCN) / Monitoring Report (MR), submitted to SQAC. The verification opinion is assured provided the credibility of all the above.

Review of the following documentation was done by SQAC Lead Verifier, Ms. Sheetal Wader, who is experienced in such projects.

Documentation Verified:

- Project Concept Note (PCN)
- Monitoring Report (MR)
- Commissioning Certificate
- Calibration report
- Deisel Register
- Steam Report
- Data provided upon request of all the documents of the related projects.

Sampling:

Not applicable

Persons interviewed:

1. Mr. Trinath Swain (Vice President - Process): M/s Shri Bajrang Power and Ispat Limited (SBPIL).
2. Mr. Rajeev Lochan Upadhyay (General Manager-Power Plant): M/s Shri Bajrang Power and Ispat Limited (SBPIL).

CALIBRATION CERTIFICATE

Centre for Calibration

NAGMAN CALIBRATION SERVICES LLP

No.168/7, Chennai - Bangalore National Highway,
Chembarambakkam, Chennai - 600 123. Tamilnadu. INDIA
E-Mail : cfcchennai@nagman.com, calibration@nagman.com
Site : www.nagman.com

CFC/FT-01/7.8/R5 | CC-2548

ULR-CC254822000015521F	**Certificate No.: CFC2022-1209-PL/1**
Date of Issue : 09.11.2022	
Customer Name And Address	M/s. Shri Bajrang Power And Ispat Ltd., Vill. Borjhara, Urla - Guma Road, Urla Growth Centre, Raipur - 492 003 (C.G)
Customer Reference	SBPIL/2022-23/825 DT. 09.08.22
Details of the Instrument	
Location	NA
Machine Name / Number	NA
Description	Pressure Calibrator
Make	Nagman®
Model	MPC-E
Serial Number	MPCE 0503 9355
Identification Number	NA
Range	Vide Respective Calibration Table
Operating Range	NA
Resolution	Vide Respective Calibration Table
Accuracy	± 0.1 % F.S.
Equipment received on	22.08.2022
Condition of the equipment on receipt	Serviced & Calibrated
Calibration Procedure Number	CFC/WI-M03, E04
Method of Calibration	Direct-Comparison Method
Date of Calibration	31.10.2022
Date of Next Calibration Suggested	31.10.2023
Calibration Environments	
Temperature	23°C ± 2°C
Relative Humidity	35~65% RH

Master Instrument Details (The Standards used are traceable to National / International Standards)

Nomenclature	Certificate No.	Validity	Traceability
Pneumatic Dead Weight Tester	1634	31-Dec-22	MEASURE TECNIQUES
Piston Cylinder	1500271315-1	22-Oct-24	FLUKE
Dead Weight Tester	HT/CC/211215-10/001	15-Dec-23	HITECH
Multifunction Calibrator	3111221-E01	26-Dec-22	NORTHLAB

Remarks

1. The above UUC was calibrated at Lab.
2. UUC is defined as Unit Under Calibration.
3. The calibration certificate shall not be reproduced except in full without written approval of CFC.
4. The calculated expanded uncertainty includes repeatability,hysteresis, resolution & uncertainty on measurements.
5. The measurement results relate only to the item calibrated.
6. The decision rule will be applied based on the Statement of Conformity requested by the Customer.
7. The results are provided as observed without any adjustments.
8. The Uncertainty stated is the expanded uncertainty of measurement obtained by multiplying the standard uncertainty by the coverage factor correspond to confidence level of 95%.
9. The results are found compliance to manufacturer specifications.

Checked By

P.Raju
Team Member

SCOPE CERTIFICATE

Authorised Signatory

D.Arun
Team Leader

Signature is not required as it is generated through software

CALIBRATION CERTIFICATE

Centre for Calibration

NAGMAN CALIBRATION SERVICES LLP

No.168/7, Chennai - Bangalore National Highway,
Chembarambakkam, Chennai - 600 123. Tamilnadu. INDIA
E-Mail : cfcchennai@nagman.com, calibration@nagman.com
Site : www.nagman.com

CFC/FT-01/7.8/R5 | CC-2548

ULR-CC254822000015560F	**Certificate No. : CFC2022-1209-EL/6**
Date of Issue : 14.11.2022	
Customer Name And Address	M/s.Shri Bajrang Power and Ispat Ltd; Vill. Borjhara, Urla - Guma Road, Urla Growth Centre, Raipur - 492 003 (C.G)
Customer Reference	DC No : SBPIL/2022-23/825 Dated : 09.08.2022
Details of the Instrument	
Location	-
Machine Name / Number	-
Description	Digital Multimeter
Make	Rishabh
Model	RISH Multi 18S
Serial Number	092729
Identification Number	-
Range	Vide Respective Calibration Table
Operating Range	-
Resolution	Vide Respective Calibration Table
Input	-
Output	-
Accuracy	Vide Respective Calibration Table
Equipment received on	22.08.2022
Condition of the equipment on receipt	Good
Calibration Procedure Number	CFC/WI-E03
Method of Calibration	Direct Method
Date of Calibration	29.08.2022
Date of Next Calibration Suggested	29.08.2023
Calibration Environments	
Temperature	25°C ± 4°C
Relative Humidity	30~75% RH

Master Instrument Details (The Standards used are traceable to National / International Standards)

Nomenclature	Certificate No.	Validity	Traceability
Multifunction Calibrator	3111221-E01	26-Dec-22	NORTHLAB
Multifunction Calibrator	4090921-E01	11-Oct-22	NORTHLAB
Multifunction Calibrator	1671221-E02	17-Dec-22	NORTHLAB

Remarks

1. The above UUC was calibrated at Lab.
2. UUC is defined as Unit Under Calibration.
3. The calibration certificate shall not be reproduced except in full without written approval of CFC.
4. The calculated expanded uncertainty includes repeatability, resolution & uncertainty on measurements.
5. The measurement results relate only to the item calibrated.
6. The decision rule will be applied based on the Statement of Conformity requested by the Customer.
7. The results are provided as observed without any adjustments.
8. The Uncertainty stated is the expanded uncertainty of measurement obtained by multiplying the standard uncertainty by the coverage factor correspond to confidence level of 95%.
9. The results are found compliance to manufacturer specifications and the bolded letters does not meet the specified accuracy limits.

Checked By

J.Sampath Kumar
Team Member

SCOPE CERTIFICATE

Authorised Signatory

D.Arun
Team Leader

Signature is not required as it is generated through software

CALIBRATION CERTIFICATE

Centre for Calibration

NAGMAN CALIBRATION SERVICES LLP

No.168/7, Chennai - Bangalore National Highway,
Chembarambakkam, Chennai - 600 123. Tamilnadu. INDIA
E-Mail : cfcchennai@nagman.com, calibration@nagman.com
Site : www.nagman.com

CFC/FT-01/7.8/R5 | CC-2548

ULR-CC254822000015559F	**Certificate No. : CFC2022-1209-EL/5**
Date of Issue : 14.11.2022	
Customer Name And Address	M/s.Shri Bajrang Power and Ispat Ltd; Vill. Borjhara, Urla - Guma Road, Urla Growth Centre, Raipur - 492 003 (C.G)
Customer Reference	DC No : SBPIL/2022-23/825 Dated : 09.08.2022
Details of the Instrument	
Location	-
Machine Name / Number	-
Description	Loop Calibrator
Make	Masibus
Model	LC 11
Serial Number	18080332
Identification Number	-
Range	Vide Respective Calibration Table
Operating Range	-
Resolution	Vide Respective Calibration Table
Input	-
Output	-
Accuracy	Vide Respective Calibration Table
Equipment received on	22.08.2022
Condition of the equipment on receipt	Good
Calibration Procedure Number	CFC/WI-E04
Method of Calibration	Direct Method
Date of Calibration	29.08.2022
Date of Next Calibration Suggested	29.08.2023
Calibration Environments	
Temperature	25°C ± 4°C
Relative Humidity	30~75% RH

Master Instrument Details (The Standards used are traceable to National / International Standards)

Nomenclature	Certificate No.	Validity	Traceability
Multifunction Calibrator	1671221-E02	17-Dec-22	NORTHLAB
Multifunction Calibrator	3111221-E01	26-Dec-22	NORTHLAB

Remarks

1. The above UUC was calibrated at Lab.
2. UUC is defined as Unit Under Calibration.
3. The calibration certificate shall not be reproduced except in full without written approval of CFC.
4. The calculated expanded uncertainty includes repeatability, resolution & uncertainty on measurements.
5. The measurement results relate only to the item calibrated.
6. The decision rule will be applied based on the Statement of Confirmity requested by the Customer.
7. The results are provided as observed without any adjustments.
8. The Uncertainty stated is the expanded uncertainty of measurement obtained by multiplying the standard uncertainty by the coverage factor correspond to confidence level of 95%.
9. The results are found compliance to manufacturer specifications and the bolded letters does not meet the specified accuracy limits.

Checked By

E.Sajitha
Team Member

SCOPE CERTIFICATE

Authorised Signatory

D.Arun
Team Leader

Signature is not required as it is generated through software

SHRI BAJRANG POWER AND ISPAT LTD.
BORJHARA, RAIPUR

CALIBRATING EQUIPMENTS USED :

1. COMPARATOR GAUGE

MAKE : YANTRIKA	CALIBRATED BY : M/S NAGMAN INST. (P) LTD. CHENNAI
SR. NO. : REE 0057	CALIBRATION DUE ON : 24-08-2022
RANGE : 0-160 Kgs/Sq.Cm	CERTIFICATE NO. : 2021-22/CFC/997/4
ACCURACY :± 0.25% of F.S.	

1.DIGITAL MULTIMETER

MAKE : RISHAB	CALIBRATED BY : M/S NAGMAN INST. (P) LTD. CHENNAI
MODEL : RISH 18 S 092729	CALIBRATION DUE ON : 01-09-2022
SR. NO. : 92729	CERTIFICATE NO. : 2021-22/CFC/997/5
ACCURACY : +/- 0.05 % of F.S.	

INSTRUMENT UNDER CALIBRATION :

TAG NO.: 11 PT - 1750	INPUT TYPE : —
DESCRIPTION : Feed Water Pressure Tx.	ACCURACY :± 0.075%
RANGE : 0 ~ 150 Kg/cm2	MAKE : Rosemount
CALIBRATION DATE : 15.07.2022	CALIBRATION DUE : 15.07.2023

CALIBRATION REPORT

INPUT IN %	PRESS IN CALIBRATOR READING IN Kgs/Sq.Cm	READING OF DIGITAL MULTIMETER IN mA			REMARKS
		REQD. VALUE	ACTUAL VALUE	DEVIATION	
0.00	0.0	4.00	4.01	0.01	
25.00	37.5	8.00	8.01	0.01	
50.00	75.0	12.00	12.00		
75.00	112.5	16.00	16.00		
100.00	150.0	20.00	20.00		

INSTRUMENT UNDER CALIBRATION :

TAG NO.: 11 PT - 1726	INPUT TYPE : —
DESCRIPTION : Steam Pressure Tx.	ACCURACY :± 0.075%
RANGE : 0 ~ 150 Kg/cm2	MAKE : Rosemount
CALIBRATION DATE : 15.07.2022	CALIBRATION DUE : 15.07.2023

CALIBRATION REPORT

INPUT IN %	PRESS IN CALIBRATOR READING IN Kgs/Sq.Cm	READING OF DIGITAL MULTIMETER IN mA			REMARKS
		REQD. VALUE	ACTUAL VALUE	DEVIATION	
0.00	0	4.00	4.00		
25.00	37.5	8.00	8.01	0.01	
50.00	75.0	12.00	12.00		
75.00	112.5	16.00	16.00		
100.00	150.0	20.00	20.00		

Calibrated By : Name S.K. Soni
Mitty Singh

Signature

SHRI BAJRANG POWER AND ISPAT LTD.
BORJHARA, RAIPUR

CALIBRATING EQUIPMENTS USED :

1. COMPARATOR GAUGE

MAKE : YANTRIKA	CALIBRATED BY : M/S NAGMAN INST. (P) LTD. CHENNAI
SR. NO. : REE 0057	CALIBRATION DUE ON : 24-08-2022
RANGE : 0-160 Kgs/Sq.Cm	CERTIFICATE NO. : 2021-22/CFC/997/4
ACCURACY :± 0.25% of F.S.	

1.DIGITAL MULTIMETER

MAKE : RISHAB	CALIBRATED BY : M/S NAGMAN INST. (P) LTD. CHENNAI
MODEL : RISH 18 S 092729	CALIBRATION DUE ON : 01-09-2022
SR. NO. : 92729	CERTIFICATE NO. : 2021-22/CFC/997/5
ACCURACY : +/- 0.05 % of F.S.	

INSTRUMENT UNDER CALIBRATION :

TAG NO.: 22 PT - 0100	INPUT TYPE : —
DESCRIPTION : Steam PS. TX. TG 1/L	ACCURACY :± 0.075 %
RANGE : 0 — 100 Kg/cm²	MAKE : ABB
CALIBRATION DATE : 18.07.2022	CALIBRATION DUE : 18.07.2022

CALIBRATION REPORT

INPUT IN %	PRESS IN CALIBRATOR READING IN Kgs/Sq.Cm	READING OF DIGITAL MULTIMETER IN mA			REMARKS
		REQD. VALUE	ACTUAL VALUE	DEVIATION	
0.00	0	4.00	4.00		
25.00	25	8.00	8.00		
50.00	50	12.00	12.00		
75.00	75	16.00	16.01	0.01	
100.00	100	20.00	20.00		

INSTRUMENT UNDER CALIBRATION :

TAG NO.:	INPUT TYPE :
DESCRIPTION :	ACCURACY :±
RANGE :	MAKE :
CALIBRATION DATE :	CALIBRATION DUE :

CALIBRATION REPORT

INPUT IN %	PRESS IN CALIBRATOR READING IN Kgs/Sq.Cm	READING OF DIGITAL MULTIMETER IN mA			REMARKS
		REQD. VALUE	ACTUAL VALUE	DEVIATION	
0.00		4.00			
25.00		8.00			
50.00		12.00			
75.00		16.00			
100.00		20.00			

Calibrated By : Name H.K. Chawla, Nipul Singh

Signature

(A) Details of meters are as below:-

Sr. no.	Meter Sr. no.	Make	Accuracy Class	Specification
1.	120445/20097-1707	Conzerv	0.5	Current Details:-/1 or 5A Voltage Details:80 to 600V
2.	213797/3739-2411	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
3.	213797/3743-2411	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
4.	213797/3744-2411	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
5.	213797/3741-2411	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
6.	120445/20103-1707	Conzerv	0.5	Current Details:-/1 or 5A Voltage Details:80 to 600V
7.	34133841020	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
8.	34133841017	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
9.	126752/231-2907	Conzerv	0.5	Current Details:-/1 or 5A Voltage Details:80 to 600V
10.	213797/3742-2411	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
11.	34133841018	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
12.	213797/3746-2411	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
13.	34133820512	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
14.	213797/3737-2411	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
15.	213797/3740-2411	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
16.	214017/3835-2511	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V
17.	34120540821	Conzerv /Schneider	0.5	Current Details:50mA to 6A, Voltage Details:80 to 600V

EXECUTIVE ENGINEER (MT) DN. I
C.S.P.D.C.L. RAIPUR

SHREE BAJRANG POWER AND ISPAT LTD

Report Time 05.30AM
Report Date 01/02/2022 Jan-22

CREDA

SR.NO	TAG	DESCRIPTION	UNIT	0 HR	-1 HR	-2 HR	-3 HR	-4 HR	-5 HR	-6 HR	-7 HR	AVERAGE
1	SB33TT0101	Feed Water Temperature	Deg.C	106.94	106.64	106.94	107.07	106.72	106.64	106.50	106.39	106.78
2	SB33PT0101	Feed Water Pressure	Kg/cm2	69.77	70.62	70.20	70.62	70.37	69.95	71.58	69.54	70.33
3	SB33FT102	Feed Water Flow -2	TPH	49.09	46.04	47.36	42.43	52.40	48.44	54.58	49.84	48.52
4	SB33TT204	Main Steam Temperature	Deg.C	497.99	491.44	491.22	486.32	491.87	488.07	500.91	490.76	492.32
5	SB33PT202	Main Steam Pressure-1	Kg/cm2	65.08	66.15	65.77	66.02	65.77	65.65	66.67	65.11	65.78
6	SB33FT202	Main Steam Flow-2	TPH	53.24	50.93	51.39	52.90	51.87	49.57	54.59	50.59	51.89
7	COMP_SB33FT202	Compensated Main Steam Flow-2	TPH	52.58	51.18	51.22	53.21	52.33	50.17	55.00	50.41	52.01
8	SB33MW	MW Generation	MW	7.60	7.63	7.37	7.55	7.30	7.58	7.48	7.52	7.50
9	SB33PT_0100	TURBINE INLET PRESSURE	Kg/cm2	64.03	65.24	64.75	64.97	64.79	64.71	65.58	64.11	64.77
10	SB33TT_0103	TURBINE INLET TEMPRATURE	Deg.C	492.07	489.60	488.23	486.67	491.42	490.69	496.15	485.54	489.69
11	SB33FT_0100	TURBINE INLET FLOW	TPH	32.18	32.30	31.11	32.04	31.15	32.29	31.56	32.27	31.86
12	COMP_SB33FT0100	TURBINE INLET COMPENSATED FLOW	TPH	31.98	32.53	31.65	32.44	31.83	32.51	32.00	32.51	32.18
		TOTALISER										TOT RESET ON 31/01/2022 AT 00:00 Hrs.
1	SB33FT102_TOT	Feed Water Flow 2 Totaliser-ACCM	TONS	279.87	232.04	182.09	130.75	77.65	26.26	36833.44	36782.14	36856.66
2	COMP_SB33FT202_TOT	Comp. Main Steam Flow -2 Totaliser -ACCM	TONS	285.92	236.78	185.94	133.39	79.07	28.47	37811.29	37558.81	37636.37
3	COMP_SB33FT0100_TOT	Compensated Turbine Inlet Flow Totaliser -ACCM	TONS	177.31	144.95	112.81	80.63	48.34	16.09	23892.37	23850.05	23898.62
4	SB33_MW_TOTL	MW TOTALISER-ACCM (Ref. Energy Mtr.)	MW	41.33	33.78	26.28	18.77	11.25	3.75	5575.22	5567.70	5579.00

SHREE BAJRANG POWER AND ISPAT LTD

Report Time 05.30AM
Report Date 01/07/2017 June-17

CREDA

SR.NO	TAG	DESCRIPTION	UNIT	0 HR	-1 HR	-2 HR	-3 HR	-4 HR	-5 HR	-6 HR	-7 HR	AVERAGE
1	SB33TT0101	Feed Water Temperature	Deg.C	109.07	109.15	109.10	108.96	109.10	109.10	109.20	108.98	109.08
2	SB33PT0101	Feed Water Pressure	Kg/cm2	71.51	72.12	72.12	71.89	71.11	71.46	71.51	71.43	71.64
3	SB33FT102	Feed Water Flow -2	TPH	58.47	58.12	60.33	58.33	58.68	58.95	58.65	58.86	58.30
4	SB33TT204	Main Steam Temperature	Deg.C	497.75	503.58	503.19	498.66	501.04	499.78	498.78	500.03	500.48
5	SB33PT202	Main Steam Pressure-1	Kg/cm2	66.07	66.36	66.23	66.20	65.35	65.65	65.78	65.83	65.94
6	SB33FT202	Main Steam Flow-2	TPH	58.26	60.18	60.68	59.16	60.38	60.31	59.99	59.71	59.84
7	COMP_SB33FT202	Compensated Main Steam Flow-2	TPH	58.22	60.14	60.79	59.52	59.99	60.11	60.12	59.59	59.81
8	SB33MW	MW Generation	MW	7.46	7.47	7.50	7.27	7.46	7.33	7.40	7.46	7.42
9	SB33PT_0100	TURBINE INLET PRESSURE	Kg/cm2	64.86	65.09	64.95	64.97	64.03	64.37	64.49	64.49	64.66
10	SB33TT_0103	TURBINE INLET TEMPRATURE	Deg.C	488.26	491.66	490.72	489.26	488.47	490.27	488.26	488.91	489.37
11	SB33FT_0100	TURBINE INLET FLOW	TPH	31.04	31.04	31.18	30.34	31.42	30.63	31.03	31.26	30.99
12	COMP_SB33FT0100	TURBINE INLET COMPENSATED FLOW	TPH	31.22	31.16	31.49	30.75	31.61	30.78	31.42	31.55	31.25
		TOTALISER										TOT RESET ON 30/06/2017 AT 00:00 Hrs.
1	SB33FT102_TOT	Feed Water Flow 2 Totaliser-ACCM	TONS	321.81	264.02	206.53	148.10	88.75	29.50	40149.09	40089.93	40178.57
2	COMP_SB33FT202_TOT	Comp. Main Steam Flow -2 Totaliser -ACCM	TONS	327.95	269.17	210.61	150.98	90.50	30.09	40899.62	40839.25	40929.67
3	COMP_SB33FT0100_TOT	Compensated Turbine Inlet Flow Totaliser -ACCM	TONS	172.86	141.01	109.20	77.51	46.51	15.53	22643.91	22612.15	22659.30
4	SB33_MW_TOTL	MW TOTALISER-ACCM (Ref. Energy Mtr.)	MW	40.89	33.35	25.83	18.34	11.00	3.68	5335.99	5328.47	5339.65

SHRI BAJRANG POWER AND ISPAT LTD.
RAIPUR,CG.

REPORT FOR CREDA -1 & 2 PARAMETERS

SHIFT - A /B / C

Jan-22

SR. NO.	TAG	DESCRIPTION	UNIT	0Hr	-1Hr	-2Hr	-3Hr	-4Hr	-5Hr	-6Hr	-7Hr	avg	TOT RESET ON 31/01/22 AT 00:00 Hrs.
1	11PT1750	FEED WTR PR ECO	KG/CM2	69.9	71.2	69.8	69.4	69.3	69.3	69.2	69.5	69.7	
2	11TT-1710	FEED WTR TEMP	DEG C	105.5	105.4	105.3	105.4	105.3	105.4	105.4	105.4	105.4	
3	11FT_1709	FEED WTR FL	TPH	26	26.1	25.1	24.2	23.9	24	23.6	24.2	24.6	
4	11BFW_TOT_A	FEED WTR FL TOT_A	TON	134.8	109.6	83.7	59	35.6	11.6	18395.5	18371.8		18407.1
5	11PT_1728	MAIN STM PR	KG/CM2	66.6	69.7	68.5	68.2	68.1	68.1	68	67.9	68.4	
6	11TT_1730	MAIN STM TEMP	DEG C	506.8	509.5	507.3	499.1	495	495	493	498.6	500.5	
7	11FT_1729C	MAIN STM FL (C)	TPH	27.7	31.6	26.8	26	25.8	25.7	25.5	25.7	26.9	
8	11STM_TOTC_A	MAIN STM FL TOT (C)_A	TON	144.9	121.6	90	63.6	36.4	12.8	19584.5	19559.0		19597.6
1	22PT1750	FEED WTR PR ECO	KG/CM2	69.4	70.1	69.2	68.9	69.1	69.2	69.3	69.4	69.3	
2	22TT-1710	FEED WTR TEMP	DEG C	106.3	106.3	106.1	106.3	106.2	106.2	106.2	106.2	106.2	
3	22FT_1709	FEED WTR FL	TPH	25.7	24.8	23.7	23.6	25.3	24.8	26.2	27.2	25.1	
4	22BFW_TOT_A	FEED WTR FL TOT_A	TON	133.7	109.5	84.9	61.3	37.7	12.4	18876.2	18849.7		18888.6
5	22PT_1728	MAIN STM PR	KG/CM2	66.1	66.8	66	65.8	65.9	66	65.9	66	66.1	
6	22TT_1730	MAIN STM TEMP	DEG C	495.6	491.9	495.3	493.5	497.8	497.8	495.5	493.2	495.1	
7	22FT_1729C	MAIN STM FL (C)	TPH	26.6	27.1	24.8	24.3	25.7	26.2	25.7	28.1	26.2	
8	22STM_TOTC_A	MAIN STM FL TOT (C)_A	TON	138.4	114.8	87.7	63.3	39	13	19475.4	19448		19488.4
1	TG1_MW	TG1 PWR GEN	MW	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	
2	TG1_MW_TOT_A	TG1 MW TOT_A (Ref Energy Mtr)	MWH	41.8	34.2	26.6	19	11.4	3.8	5601.3	5593.7		5605.1
3	11PT_0100	MAIN STM PR	KG/CM2	64.6	65.3	64.7	64.4	64.4	64.5	64.4	64.3	64.6	
4	11TT_0100	MAIN STM TEMP	DEG C	491.6	497.1	491.4	486.3	487.2	486.7	484.5	486.2	488.9	
5	11FT_0100 C	MAIN STM FL (C)	TPH	30.2	30.2	30.3	30.6	30.5	30.5	30.7	30.6	30.6	
6	11STM_TOT_C_A	MAIN STM TOT (C)_A	TON	165.7	136.1	105.9	75.8	45.5	15.3	22255.4	22225		22270.7
1	TG2_MW	TG2 PWR GEN	MW	9.5	9.6	9.5	9.5	9.5	9.5	9.4	9.5	9.5	
2	TG2_MW_TOT_A	TG2 MW TOT_A (Ref Energy Mtr)	MWH	52.4	42.9	33.3	23.8	14.3	4.8	7036	7026.5		7040.8
3	22PT_0100	MAIN STM PR	KG/CM2	64.5	65.2	64.5	64.3	64.3	64.3	64.3	64.2	64.5	
4	22TT_0100	MAIN STM TEMP	DEG C	490.6	493.5	490.1	487.8	488.9	488.6	487.8	487.5	489.3	
5	22FT_0100 C	MAIN STM FL (C)	TPH	40.7	41.1	40.7	40.6	40.5	40.6	40.4	40.5	40.6	
6	22STM_TOT_C_A	MAIN STM TOT (C)_A	TON	221.3	181.8	140.7	100.5	60.4	20.2	29801.6	29761.4		29821.8

SHRI BAJRANG POWER AND ISPAT LTD.
RAIPUR,CG.

REPORT FOR CREDA -1 & 2 PARAMETERS

SHIFT - A /B / C

June 17

SR. NO.	TAG	DESCRIPTION	UNIT	0Hr	-1Hr	-2Hr	-3Hr	-4Hr	-5Hr	-6Hr	-7Hr	avg	TOT RESET ON 30/06/17 AT 00:00 Hrs.
1	11PT1750	FEED WTR PR ECO	KG/CM2	69.4	69.1	68.7	68.7	68.8	68.6	68.8	68.5	68.9	
2	11TT-1710	FEED WTR TEMP	DEG C	107.9	108	108	108.1	108	108.1	108	108.3	108.1	
3	11FT_1709	FEED WTR FL	TPH	22.9	22.5	20	21.5	21.8	22.3	22.1	23.3	22.1	
4	11BFW_TOT_A	FEED WTR FL TOT_A	TON	118.7	96.5	73.5	53.7	32.1	10.9	15990.5	15968.2		16001.68
5	11PT_1728	MAIN STM PR	KG/CM2	65.2	65.9	65.6	65.6	65.6	65.6	65.6	65.5	65.7	
6	11TT_1730	MAIN STM TEMP	DEG C	498	494.9	490.4	494.2	494.5	496.9	494	495.8	494.9	
7	11FT_1729C	MAIN STM FL (C)	TPH	23.1	23.8	21.7	22.8	22.9	23.5	23.5	24.1	23.2	
8	11STM_TOTC_A	MAIN STM FL TOT (C)_A	TON	125.7	102.3	78.3	55.7	33.8	11.4	16834	16810.6		16845.75
1	22PT1750	FEED WTR PR ECO	KG/CM2	68.3	67.7	67.6	67.2	67.3	67.2	67.2	67.1	67.5	
2	22TT-1710	FEED WTR TEMP	DEG C	108.6	108.6	108.5	108.5	108.6	108.5	108.5	108.6	108.6	
3	22FT_1709	FEED WTR FL	TPH	16	16.3	16.1	13.1	15.2	14.7	14.1	14.3	15.0	
4	22BFW_TOT_A	FEED WTR FL TOT_A	TON	86.9	68.1	51.8	35.4	21.2	7.6	12325.9	12311.8		12333.28
5	22PT_1728	MAIN STM PR	KG/CM2	65.7	66.2	65.2	64.9	64.9	64.9	64.9	64.8	64.7	65.0
6	22TT_1730	MAIN STM TEMP	DEG C	504.9	492.2	494.3	490.5	492.4	489.2	488.1	478.8	491.3	
7	22FT_1729C	MAIN STM FL (C)	TPH	19.5	16.9	17.2	14.9	15.7	15.6	15.3	15.8	16.3	
8	22STM_TOTC_A	MAIN STM FL TOT (C)_A	TON	82.2	72.6	58.3	38.1	22.7	7.9	13131.2	13116.1		13139
1	TG1_MW	TG1 PWR GEN	MW	7.4	6.9	6.7	6.6	6.8	6.6	6.6	6.6	6.8	
2	TG1_MW_TOT_A	TG1 MW TOT_A (Ref Energy Mtr)	MWH	37.9	30.5	23.7	16.7	10.1	3.5	4761	4754.4		4764.3
3	11PT_0100	MAIN STM PR	KG/CM2	64.6	64.3	64.2	64.1	64.1	64.1	64	63.9	64.2	
4	11TT_0100	MAIN STM TEMP	DEG C	485.6	482	481.4	480.3	482.6	482.1	478.7	478.3	481.4	
5	11FT_0100 C	MAIN STM FL (C)	TPH	30	28.2	27.4	27	27.5	26.9	26.8	27.1	27.6	
6	11STM_TOT_C_A	MAIN STM TOT (C)_A	TON	151.9	122.5	94.9	66.9	40.6	13.8	19167.4	19140.8		19180.85
1	TG2_MW	TG2 PWR GEN	MW	9.6	9.4	9.3	9.3	9.2	9.5	9.2	9.3	9.4	
2	TG2_MW_TOT_A	TG2 MW TOT_A (Ref Energy Mtr)	MWH	51.4	41.9	32.4	23.1	13.8	4.5	6713.8	6704.5		6718.55
3	22PT_0100	MAIN STM PR	KG/CM2	64.5	64.1	64	63.9	63.9	63.8	63.8	63.7	64.0	
4	22TT_0100	MAIN STM TEMP	DEG C	493.8	490.7	490.4	490.2	491	490.7	488.4	489.2	490.5	
5	22FT_0100 C	MAIN STM FL (C)	TPH	40.6	39.8	39.4	39.2	38.9	40	38.7	39.3	39.5	
6	22STM_TOT_C_A	MAIN STM TOT (C)_A	TON	215.3	175.6	135.6	96.4	57.8	18.8	28227.2	28188.2		28247.2

CULATION FOR PROPORTION OF % OF USEFUL QUANTUM OF STEAM PRODUCED FROM BIOMASS FIRED AFBC BOILER INSTALLED BY SHRI BAJRANG POWER AND ISPAT LTD.
REPORT FOR January - 2018

Day	Steam Generation (in Tons)				Useful Steam Consumption (in Tons)				Steam (in Tons)	
	WHR1	WHR2	Rice Husk Fired AFBC Boiler	Total Steam Generation	T.G. 1	T.G. 2	T.G. 3	Total Steam Consumption	Dumped Steam	Net Useful Steam from AFBC
	A	B	C	D=A+B+C	E	F	G	H=E+F+G	I=D-H	J=C-I
01 January 2018 (00:00 Hrs to 05:30 Hrs)	0.10	143.30	328.86	472.26	120.80	192.40	150.02	463.22	9.04	319.82
01-Jan-18	0.30	647.50	1,431.94	2,079.74	526.20	852.10	661.28	2,039.58	40.16	1,391.78
02-Jan-18	0.20	644.80	1,440.76	2,085.76	513.30	856.20	673.97	2,043.47	42.29	1,398.47
03-Jan-18	140.70	656.90	1,419.35	2,216.95	572.10	880.60	700.74	2,153.44	63.51	1,355.84
04-Jan-18	403.80	662.60	1,275.33	2,341.73	704.60	893.80	701.91	2,300.31	41.42	1,233.91
05-Jan-18	349.20	541.50	680.61	1,571.31	591.50	480.20	417.66	1,489.36	81.95	598.66
06-Jan-18	374.20	564.10	686.16	1,624.46	559.00	509.10	469.69	1,537.79	86.67	599.7
7-Jan-18	441.10	654.50	1,325.77	2,421.37	691.20	892.80	788.37	2,372.37	49.00	1,276.7
08-Jan-18	480.80	656.50	1,332.00	2,469.30	727.80	928.60	791.52	2,447.92	21.38	1,310.62
09-Jan-18	480.10	632.40	1,341.24	2,453.74	728.10	921.70	786.86	2,436.66	17.08	1,324.16
10-Jan-18	502.10	622.40	1,333.27	2,457.77	725.00	927.40	790.02	2,442.42	15.35	1,317.92
11-Jan-18	519.60	622.90	1,301.65	2,444.15	727.20	909.50	792.38	2,429.08	15.07	1,286.58
12-Jan-18	564.30	605.80	1,290.65	2,460.75	722.70	918.10	793.46	2,434.26	16.49	1,274.16
13-Jan-18	544.40	600.00	1,305.87	2,450.27	721.00	920.50	790.28	2,431.78	18.49	1,287.38
14-Jan-18	531.40	606.00	1,306.97	2,444.37	720.10	916.60	792.05	2,428.75	15.62	1,291.35
15-Jan-18	491.00	693.90	1,251.15	2,436.05	696.10	927.80	791.43	2,415.33	20.72	1,230.43
16-Jan-18	474.10	641.00	1,304.13	2,419.23	693.80	931.40	772.65	2,397.85	21.38	1,282.75
17-Jan-18	455.90	669.40	1,343.80	2,469.10	705.20	955.90	788.34	2,449.44	19.66	1,324.14
18-Jan-18	477.10	667.20	1,322.76	2,467.06	704.10	949.80	792.09	2,445.99	21.07	1,301.69
19-Jan-18	539.80	679.20	1,247.49	2,466.49	707.20	951.10	790.55	2,448.85	17.64	1,229.85
20-Jan-18	578.20	663.90	1,243.92	2,486.02	715.80	963.20	784.09	2,463.09	22.93	1,220.99
21-Jan-18	584.20	649.30	1,263.69	2,497.19	718.80	966.50	793.26	2,478.56	18.63	1,245.06
22-Jan-18	535.80	641.20	1,287.59	2,464.59	708.20	953.70	778.79	2,440.69	23.90	1,263.69
23-Jan-18	603.30	670.30	1,217.08	2,490.68	717.20	967.40	784.96	2,469.56	21.12	1,196.96
24-Jan-18	628.60	626.90	1,215.11	2,470.61	701.70	961.50	779.85	2,443.05	27.56	1,187.55
25-Jan-18	593.40	578.60	1,175.87	2,347.87	715.20	824.50	777.55	2,317.25	30.62	1,145.25
26-Jan-18	645.90	645.90	1,183.19	2,474.99	719.20	954.30	775.59	2,449.09	25.90	1,157.29
27-Jan-18	635.40	626.90	1,229.62	2,491.92	717.20	965.10	784.35	2,466.65	25.27	1,204.35
28-Jan-18	632.00	669.70	1,206.48	2,508.18	725.00	968.30	784.29	2,477.59	30.59	1,175.89
29-Jan-18	638.60	659.00	1,205.96	2,503.56	723.90	958.90	780.43	2,473.23	30.33	1,175.6
-Jan-18	609.10	625.30	1,135.12	2,369.52	661.50	927.90	751.55	2,340.95	28.57	1,100.55
31- January-2018 (upto 24:00 Hrs)	439.45	454.10	916.24	1,809.79	497.90	693.15	592.67	1,783.72	26.07	890.17
TOTAL	14,884.15	19,723.00	38,549.63	73,156.78	21,178.60	27,830.05	23,202.65	72,211.30	945.48	37,604.15

% of Net Useful steam generated from AFBC boiler = Net useful Steam from AFBC / Total Steam Generation

= 37604.15 / 73156.78 = 51.40%

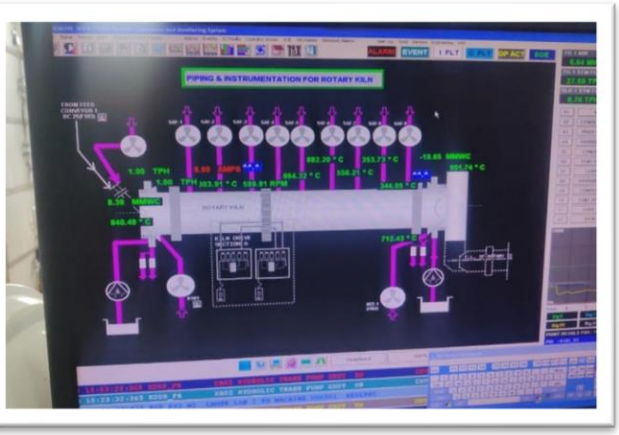
SHRI BAJRANG POWER & ISPAT LTD.

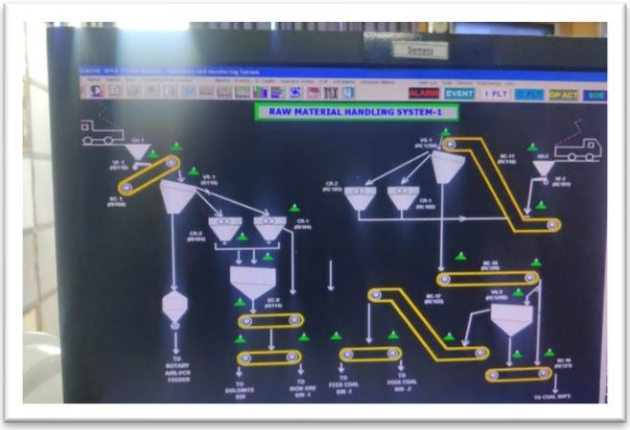
N FOR PROPORTION OF % OF USEFUL QUANTUM OF STEAM PRODUCED FROM BIOMASS FIRED AFBC BOILER INSTALLED BY SHRI BAJRANG POWER AND ISPAT LTD.
REPORT FOR JANUARY - 2022

Day	Steam Generation (in Tons)				Useful Steam Consumption (in Tons)				Steam (in Tons)	
	WHR1	WHR2	Rice Husk Fired AFBC Boiler	Total Steam Generation	T.G. 1	T.G. 2	T.G. 3	Total Steam Consumption	Dumped Steam	Net Useful Steam from AFBC
	A	B	C	D=A+B+C	E	F	G	H=E+F+G	I=D-H	J=C-I
01 Jan' 2022 (00:00 Hrs to 05:30 Hrs)	152.60	119.90	293.13	565.63	184.00	220.00	176.16	560.16	5.47	287.66
01-Jan-22	665.80	537.70	1,263.18	2,466.68	714.30	959.70	768.83	2,442.83	23.85	1,239.33
02-Jan-22	680.90	541.70	1,246.38	2,468.98	711.70	960.30	770.71	2,442.71	26.27	1,220.11
03-Jan-22	670.00	549.00	1,247.00	2,466.00	717.00	959.90	765.56	2,442.46	23.54	1,223.46
04-Jan-22	656.00	566.50	1,252.96	2,475.46	719.10	967.10	765.58	2,451.78	23.68	1,229.28
05-Jan-22	635.60	540.70	1,289.27	2,465.57	714.90	959.90	768.03	2,442.83	22.74	1,266.53
06-Jan-22	643.50	619.70	1,209.87	2,473.07	717.60	962.50	770.18	2,450.28	22.79	1,187.08
07-Jan-22	664.10	672.40	1,150.38	2,486.88	718.60	967.80	779.23	2,465.63	21.25	1,129.13
08-Jan-22	667.90	650.50	1,167.52	2,485.92	718.60	965.50	778.20	2,462.30	23.62	1,143.90
09-Jan-22	613.20	639.70	1,193.56	2,446.46	711.20	951.30	762.16	2,424.66	21.80	1,171.76
10-Jan-22	621.50	643.50	1,202.45	2,467.45	715.00	961.70	772.02	2,448.72	18.73	1,183.72
11-Jan-22	631.80	647.30	1,191.83	2,470.93	714.30	964.30	772.92	2,451.22	19.71	1,172.12
12-Jan-22	630.20	652.70	1,191.53	2,474.43	714.10	965.00	774.82	2,453.92	20.51	1,171.02
13-Jan-22	640.00	677.00	1,159.05	2,476.05	717.30	966.80	773.82	2,457.92	18.13	1,140.92
14-Jan-22	655.30	679.30	1,145.71	2,480.31	721.20	968.50	772.77	2,462.47	17.84	1,127.87
15-Jan-22	648.00	664.20	1,160.60	2,472.80	719.30	964.80	772.87	2,456.97	15.83	1,144.77
16-Jan-22	671.90	638.80	1,161.50	2,472.20	716.50	968.10	776.72	2,459.32	12.88	1,148.62
17-Jan-22	652.70	641.40	1,171.94	2,466.04	714.20	962.70	774.63	2,451.53	14.51	1,157.43
18-Jan-22	634.00	631.00	1,194.16	2,459.16	713.10	961.60	770.75	2,445.45	13.71	1,180.45
19-Jan-22	651.40	620.10	1,198.63	2,470.13	717.10	964.20	769.78	2,451.08	19.05	1,179.58
20-Jan-22	662.50	616.90	1,212.46	2,491.86	721.80	965.30	775.92	2,463.02	28.84	1,183.62
21-Jan-22	674.70	590.90	1,227.35	2,492.95	721.80	963.10	777.52	2,462.42	30.53	1,196.82
22-Jan-22	643.30	637.10	1,207.37	2,487.77	720.50	963.50	775.18	2,459.18	28.59	1,178.78
23-Jan-22	622.00	613.30	1,266.29	2,501.59	727.20	964.70	778.79	2,470.69	30.90	1,235.39
24-Jan-22	612.90	644.20	1,232.88	2,489.98	723.40	962.10	775.58	2,461.08	28.90	1,203.98
25-Jan-22	599.30	625.40	1,256.82	2,481.52	724.20	959.40	767.59	2,451.19	30.33	1,226.49
26-Jan-22	567.50	629.50	1,279.90	2,476.90	719.70	959.80	769.48	2,448.98	27.92	1,251.98
27-Jan-22	564.50	631.40	1,266.57	2,462.47	721.70	951.30	759.78	2,432.78	29.69	1,236.88
28-Jan-22	549.10	614.10	1,279.10	2,442.30	716.50	947.20	745.14	2,408.84	33.46	1,245.64
29-Jan-22	579.80	728.20	1,168.01	2,476.01	720.70	960.40	769.37	2,450.47	25.54	1,142.47
30-Jan-22	565.60	695.90	1,219.99	2,481.49	724.20	960.60	768.26	2,453.06	28.43	1,191.56
31-Jan-22 (upto 24:00 Hrs)	470.00	528.40	928.98	1,927.38	559.90	744.70	600.57	1,905.17	22.21	906.77
TOTAL	19,597.60	19,488.40	37,636.37	76,722.37	22,270.70	29,821.80	23,898.62	75,991.12	731.25	36,905.12

% of Net Useful steam generated from AFBC boiler = Net useful Steam from AFBC / Total Steam Generation

= 36905.12 / 76722.37 = 48.10%





Applied methodologies and standardized baselines:

UCR Protocol Standard Baseline

SECTORAL SCOPE - 01 Energy industries (Renewable/Non-renewable Sources)

04 Manufacturing industries

TYPE III - Energy Efficiency

CATEGORY - **ACM0012** Large-scale Consolidated Methodology - Waste energy recovery Version 06.0

The consolidated methodology is applicable to project activities implemented in an existing or Greenfield waste energy generation (WEG) facility converting waste energy carried in identified waste

energy carrying medium (WECM) stream(s) into useful energy (i.e. power, mechanical or thermal) consumed in an existing or Greenfield recipient facility(ies) and/or supplied to the grid in the case of electricity generation. The WEG facility may be one of the recipient facilities.

Applicability of methodologies and standardized baselines

- This project is included under this methodology since it applies to project activities that generate electricity from waste heat or the combustion of waste gases in industrial facilities. It's also included within the UCR Standard Positive List of technologies (updated) and is within the large -scale CDM thresholds under the applied methodology.

- Project activity involves power generation with installed capacity of 18 MW (8 MW+10 MW). Regulations do not require the project activity to recover and/or utilize the waste energy prior to the implementation of the project activity; The methodology is applicable where waste pressure is used to generate electricity only and the electricity generated from waste pressure is measurable.

- The proposed project activity is a power generation project from waste heat from DRI kilns in a sponge iron plant. The project activity displaces Chhattisgarh State Electricity Board (CSEB) grid power, part of WR grid, which is predominantly fossil fuel based.

- The methodology allows for the recipient facility to be same as the waste energy generation facility. The project site is the waste energy generation facility and the facility itself receives useful energy generated using waste energy under the project activity.

Applicability of double counting emission reductions

There is no double accounting of emission reductions in the project activity due to the following reasons:

- Project is uniquely identifiable based on its location coordinates,
- Project has dedicated commissioning certificate and connection point and plant operation data on power generation in project activity is taken from energy meters installed at project site.
- Project is associated with distinct and unique energy meters which are dedicated to the consumption point for PP.

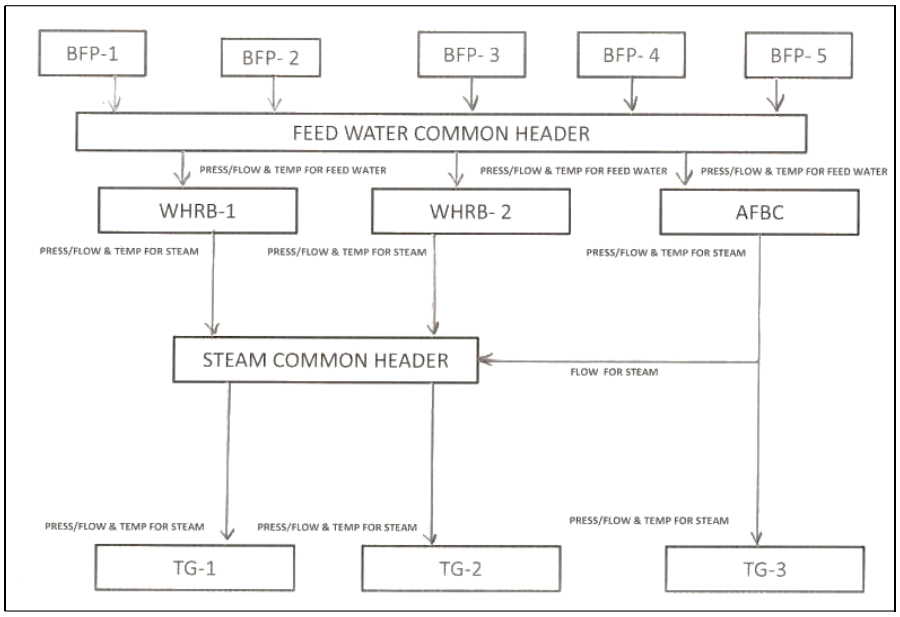
Agreement for Double Counting Avoidance from Proponent has been provided duly signed on 07/03/2024

Project boundary, sources and greenhouse gases (GHGs)

The spatial extent of the project boundary comprises the waste heat or gas sources, captive power generating equipment, any equipment used to provide auxiliary heat to the waste heat recovery process, and the power plants connected physically to the electricity grid that the proposed project activity will affect. In line with the methodology the project boundary encompasses emissions of the project activity associated with the CO_2 emissions from the combustion of auxiliary fossil fuels and baseline emissions associated with the CO_2 emissions from fossil fuel fired power plants connected to the electricity system.

At the project site there is captive power generating equipment but there is no injection of fuel into the after burning chamber to provide auxiliary heat. The project boundary is hence the spatial extent to the captive power generating equipments and the power plants connected to the grid.

	Source	GHG	Included?	Justification/Explanation
Baseline	Grid-connected electricity	**CO_2**	**Included**	**Major source of emission**
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
Project Activity	On-site fossil fuel consumption due to project activity Combustion of waste gas for electricity generation	CO_2	Excluded	Project activity entails use of waste heat of the flue gases from DRI kilns for power generation. Project activity does not entail use of fossil fuels in the project activity. ***However, the minor emissions from on-site diesel consumption are negligible and are included.*** This is conservative and will be monitored at verification
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.



From the above boundary diagram, the steam source from the AFBC boiler has not been considered within the boundary as the steam from this source will be apportioned in line with the methodology so that the CoUs are claimed only for the electricity produced from the steam generated by the waste heat recovery boilers. The monitoring of the project activity will ensure that this is implemented in line with the monitoring methodology. The back-up diesel generators only have the capacity to rotate the kiln. The system is not designed to operate the sponge iron plant.

PEy = Project emissions in year y (tCO_2/y)

The project emissions, if any, due to the usage of fossil fuel (diesel) are calculated as follows:

$PE_y = Q_i \cdot CO_{EFi} \cdot NCV_i \cdot OXID$

Where:

PE_y = project emissions in year y, tCO_2e

Q_i = mass of fossil fuel combusted, t

CO_{EFi} = emissions factor of fossil fuel combusted, tCO_2/TJ

NCV_i = net calorific value of fossil fuel combusted, TJ/t

OXID = oxidation factor, %

PE_y = 91.62 tCO_2 over the monitored period

Year	2015	2016	2017	2018	2019	2020	2021	2022	**Total**
PE_y tCO_2	5.43	2.17	1.67	7.13	44.22	20.33	8.65	2.02	**91.62**

Net GHG Emission Reductions and Removals

Thus, $ERy = BE_y – PE_y – LE_y$

Where:

ER_y = Emission reductions in year y (tCO_2/y)

BE_y = Baseline Emissions in year y ($t\ CO_2/y$)

LE_y = Leakage emissions in year y (tCO_2/y)

Establishment and description of baseline scenario (Adapted CDM Methodology using UCR Protocol)

Baseline emissions include only CO_2 emissions from electricity generation in power plants that are displaced due to the project activity. The case established for the power required by the project activity, since it requires 1.8 MWh for its auxiliary use, is less than the installed capacity of the equipment as per the methodology and its associated emissions quantification formula to be selected.

The baseline emissions corresponding to electricity supplied by the project activity to recipient facilities is estimated for each recipient facility in accordance with the case established as above and in the case of the project activity is as follows:

(a) Case 1a: recipients whose project level electricity consumption is less than or up to the maximum capacity of the existing pre-project equipment at the recipient facility to use the following modified equation:

$$BE_{EL,j,y} = \sum_{i} (EG_{i,j,y} \times EF_{Elec,i,j,y})$$ Equation (4)

Where:

$EG_{i,j,y}$	=	The power supplied by the project activity to the recipient facility *j*, which in the absence of the project activity would have been sourced from baseline source *i* (e.g. '*gr*' for the grid or '*is*' for an identified source) during the year *y* as per the identified baseline scenario for recipient facility *j* (MWh)
$EF_{Elec,i,j,y}$		The CO_2 emission factor for the baseline electricity source *i* (e.g. '*gr*' for the grid, and '*is*' for an identified source), corresponding to baseline scenario for the recipient facility *j*, during the year *y* (t CO_2/MWh)

f_{WCM} = Fraction of total electricity generated by the project activity using waste gas.

$$f_{WCM} = \frac{ST_{whr,y}}{ST_{whr,y} + ST_{other,y}}$$

Where:

$ST_{whr,y}$ = Energy content of the steam generated in waste heat recovery boiler fed to turbine via common steam header

$ST_{other,y}$ = Energy content of steam generated in other boiler (AFBC) fed to turbine via common steam header

(b) If the electricity displaced by the project activity in the recipient facility is supplied by a connected grid system, the CO_2 emission factor of the electricity is modified from the UNFCCC CDM methodology and instead shall be determined following the guidance provided by the UCR CoU protocol for conservativeness.

Power Gen Cap Capacity	MW	18
Auxiliary Power Consumption	%	10%

Annual Baseline Emission Reductions: $BE_{EL,j,y} = f_{WCM} (EG_{BL,y} \times EF_{CO2,GRID,y})$

$BE_{EL,j,y}$ = Baseline emission reductions in a year y at project site/recipient plant (j).

where:

$EG_{BL,y}$ is calculated based on daily gross power generation and auxiliary power consumption in

the power generation plant (recipient plant)

$EG_{BL,y} = EG_{GEN,y} – EG_{AUX,y}$.

where:
$EG_{BL,y}$ = Net power generation from turbine in year y (MWh/yr)
$EG_{GEN,y}$= Gross power generation from turbine in year y (MWh/yr)
$EG_{AUX,y}$= Auxiliary power consumption in power generation plant in year y (MWh/yr)

$EF_{Grid,CO2,y} = CO_2$ emission factor of the grid in year y (t CO_2/MWh) as determined by the UCR Standard for the 2015-2022 period.
A "grid emission factor" refers to a CO_2 emission factor (tCO_2/MWh) which will be associated with each unit of electricity provided by an electricity system.

The UCR recommends an emission factor of 0.9 tCO_2/MWh for the 2015-2021 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program.

Also, for the vintage 2021-22, the combined margin emission factor calculated from CEA database in India results into same emission factors as that of the default value. Hence, the same emission factor has been considered to calculate the emission reduction.

No leakage is applicable under this methodology, hence, LE_y= 0

Year	Net electricity supplied	Total electricity generated	Auxiliary electricity	Net electricity supplied
	KWh	MWh	MWh	MWh
	EG_y	EG_{Gen}	EG_{Aux}	EG_y
2015	3,89,88,471	42,802	3,813	38,988.471
2016	12,22,44,093	1,33,534	11,290	1,22,244.093
2017	12,02,59,901	1,31,597	11,337	1,20,259.901
2018	12,34,78,170	1,33,931	10,453	1,23,478.170
2019	11,69,46,409	1,26,955	10,008	1,16,946.409
2020	11,25,71,870	1,20,934	8,379	1,12,571.870
2021	12,69,42,731	1,36,374	9,431	1,26,942.731
2022	12,91,46,264	1,38,242	9,096	1,29,146.264
Grand Total	**89,05,77,909**	**9,64,368**	**73,807**	**8,90,577.91**

		ST_{whr}			ST_{whr}			ST_{other}						
	Steam from WHR boiler #1			Steam from WHR boiler #2			Steam from Afbc boiler			oing to new 8 MW turbine from AFB			Quantity of steam entering the
	emperatur	Pressure	Quantity	emperatur	Pressure	Quantity	emperatur	Pressure	Quantity	Temperatu		Pressure	
Month	°C	kg/cm^2	tonnes	°C	kg/cm^2	tonnes	°C	kg/cm^2	tonnes	tonnes	°C	kg/cm^2	tonnes
	$Temp_{whr}$	$Press_{whr}$	$Quantity_{whr}$	$Temp_{whr}$	$Press_{whr}$	$Quantity_{whr}$	$Temp_{other}$	$Press_{other}$	$Quantity_{other}$	$Quantity_{8MW}$	$Temp_{8MW}$	$Press_{8MW}$	$Quantity_{csh}$
Sep-15	492.84	65.38	15530.25	493.95	65.54	15432.90	498.16	65.26	10500.58	0.00	0.00	0.00	10500.58
Oct-15	493.83	66.05	17448.60	493.39	65.91	19093.55	500.53	65.28	24518.27	13905.27	492.23	64.20	10613.00
Nov-15	494.08	66.53	13451.10	491.74	66.21	19111.85	502.14	65.42	35604.28	21457.94	493.34	64.05	14146.34
Dec-15	493.64	66.39	5039.00	495.19	66.01	18821.95	494.23	65.86	39682.92	20648.08	485.28	64.73	19034.84
Jan-16	495.16	65.34	17768.65	487.64	65.63	17875.20	503.14	65.43	39657.22	23667.13	495.15	64.17	15990.09
Feb-16	494.25	65.95	17715.80	493.33	65.79	3032.35	504.83	65.51	37678.24	20745.53	496.18	64.47	16932.71
Mar-16	483.65	65.70	15232.40	492.50	66.39	21970.85	510.36	65.73	35843.74	23475.24	501.18	64.30	12368.50
Apr-16	495.23	66.01	18050.35	493.41	65.49	17338.30	506.41	64.91	36159.50	23574.22	497.32	63.87	12585.28
May-16	494.89	66.26	21345.60	492.13	65.96	19590.75	499.02	65.38	29125.82	19915.37	489.69	64.38	9210.45
Jun-16	492.81	65.66	19015.75	493.09	65.85	19145.85	500.59	65.71	35664.94	23220.12	491.35	64.40	12444.82
Jul-16	493.55	65.88	16727.45	494.29	65.71	16884.75	496.17	65.93	35170.76	20172.73	486.96	64.68	14998.03
Aug-16	491.23	65.36	16027.55	487.88	65.33	4553.80	499.96	65.64	39646.77	23785.19	489.37	64.58	15861.58
Sep-16	493.80	64.80	8629.70	487.40	65.10	11819.35	501.63	65.26	34404.83	18988.83	491.15	63.88	15416.00
Oct-16	492.00	66.10	11626.65	493.40	65.80	18464.05	498.00	65.63	41313.69	23928.55	487.34	64.42	17385.14
Nov-16	497.00	65.60	17345.90	494.50	65.90	18634.90	508.57	65.62	38992.88	23455.73	497.95	64.41	15537.15
Dec-16	495.60	66.10	12448.20	493.20	66.40	20293.05	511.83	65.14	39834.83	22686.95	499.04	64.21	17147.88
Jan-17	494.50	64.90	14195.70	490.20	65.60	21985.15	512.41	65.13	39884.78	23956.97	502.26	63.82	15927.81
Feb-17	488.40	64.90	9748.75	488.90	65.20	9384.20	509.93	65.54	39000.75	20414.14	499.06	64.19	18586.61
Mar-17	494.70	66.10	13038.15	491.30	65.90	17197.65	511.23	65.89	40009.78	23266.61	501.02	64.73	16743.17
Apr-17	490.10	65.90	15729.90	491.10	65.00	14716.05	495.83	65.50	21406.03	12131.01	485.71	64.23	9275.02
May-17	496.50	66.10	15978.25	493.40	65.90	15778.40	499.62	65.87	40898.80	23209.51	490.13	64.74	17689.29
Jun-17	494.80	65.70	16845.75	491.30	65.00	13139.00	500.48	65.94	40929.67	22659.30	489.37	64.66	18270.37
Jul-17	493.60	65.00	6805.10	490.10	65.10	15492.40	495.45	65.32	43527.89	20973.30	484.85	64.05	22554.59
Aug-17	496.00	64.90	14181.85	490.00	65.00	5968.50	501.49	65.59	43572.67	21082.59	490.56	64.19	22490.08
Sep-17	497.80	65.70	10829.20	489.10	65.40	15933.10	497.14	65.68	41117.24	22179.31	486.84	64.38	18937.93
Oct-17	496.20	65.60	15310.80	493.80	65.40	16212.70	496.06	65.68	40550.87	22215.07	483.97	64.46	18335.80
Nov-17	498.90	65.80	13470.10	493.70	65.60	16126.80	497.69	65.67	42088.88	22747.10	486.02	64.54	19341.78
Dec-17	492.00	66.40	11058.40	495.90	66.00	18087.15	496.94	65.61	39137.16	21862.68	484.05	64.47	17274.48
Jan-18	497.60	66.10	14884.15	467.00	65.60	19723.00	501.08	65.48	38549.63	23202.65	489.65	64.47	15346.98
Feb-18	496.80	66.30	17735.65	494.40	65.40	9946.40	502.84	65.37	34238.28	21260.33	489.00	64.37	12977.95
Mar-18	496.70	66.20	15166.85	494.40	66.40	18576.05	502.04	65.57	40392.56	23896.13	488.95	64.55	16496.43
Apr-18	498.80	65.70	14663.30	494.50	66.30	19724.20	495.89	65.63	38438.94	22368.88	483.90	64.48	16070.06
May-18	499.30	66.20	18974.80	487.90	65.50	20955.35	495.25	65.13	35179.49	23624.73	484.23	64.12	11554.76
Jun-18	482.10	65.60	15215.75	493.90	65.90	18931.95	499.34	65.81	38716.50	23009.68	487.64	64.56	15706.82
Jul-18	486.80	65.40	6492.10	492.90	65.80	18729.20	495.55	65.79	34581.52	23062.16	482.59	64.43	11519.36
Aug-18	497.10	65.30	10901.75	498.50	65.60	18739.35	499.09	65.86	43041.24	23314.07	486.56	64.49	19727.17
Sep-18	493.60	65.20	13328.95	490.50	65.80	9606.15	499.61	65.49	40896.91	21013.97	485.43	64.22	19882.94
Oct-18	499.90	65.10	10891.80	491.80	65.20	13707.35	499.37	65.38	44359.48	21088.70	486.94	64.07	23270.78
Nov-18	494.90	66.10	12797.05	498.30	65.40	15941.25	498.65	65.58	40013.33	21651.57	486.51	64.39	18361.76
Dec-18	499.10	65.20	11094.70	496.40	65.20	17593.30	499.53	65.73	41850.08	22321.23	487.22	64.53	19528.85
Jan-19	495.10	65.70	10935.20	493.00	66.10	19224.45	499.03	65.44	30886.48	16181.25	486.62	64.38	14705.23
Feb-19	498.60	65.20	10295.55	498.70	65.00	10316.70	499.61	65.64	34464.73	18548.17	487.33	64.41	15916.56
Mar-19	494.90	65.20	15366.15	490.20	65.30	17236.75	498.99	65.56	39804.44	22595.38	486.25	64.17	17209.06
Apr-19	500.30	66.20	12986.15	495.10	66.00	16059.05	495.71	65.78	37513.20	20210.73	484.34	64.71	17302.47
May-19	494.70	65.20	11958.20	490.10	65.60	17653.05	497.03	65.49	42374.77	22678.36	484.91	64.36	19696.41
Jun-19	490.10	65.80	10448.15	494.90	65.70	16725.90	496.14	65.74	36929.88	19385.97	484.29	64.52	17543.91
Jul-19	503.30	66.60	10752.65	469.20	65.60	15733.20	502.52	65.78	41868.83	21058.56	490.01	64.76	20810.27
Aug-19	506.10	65.30	11498.60	486.20	65.30	10754.90	499.02	65.42	28826.17	13248.76	485.61	64.39	15577.41
Sep-19	504.30	66.00	2668.75	498.00	65.30	13349.50	498.26	65.91	37324.73	15579.05	493.92	64.54	21745.68
Oct-19	493.70	66.20	16565.15	497.90	65.30	12460.05	497.99	65.67	43545.47	22333.92	493.85	64.31	21211.55
Nov-19	494.00	65.30	10762.45	485.90	65.10	16668.40	499.34	65.51	41693.69	22053.77	494.67	64.33	19639.92
Dec-19	502.30	65.80	10878.20	496.80	65.10	11622.65	499.51	65.63	44538.84	19728.98	494.32	64.40	24809.86

Jan-20	500.00	65.70	13330.95	493.80	65.00	13879.50	498.79	65.68	43621.63	21467.77	494.16	64.50	22153.86
Feb-20	500.50	65.40	11759.95	499.00	64.80	14102.75	499.33	65.81	40514.84	19945.69	494.71	64.56	20569.15
Mar-20	496.30	65.40	9747.00	499.90	65.20	10751.10	499.39	65.76	32555.25	15270.71	494.90	64.46	17284.54
Apr-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-20	500.00	65.40	11842.60	496.80	64.90	11282.65	499.51	65.71	43333.09	18845.83	494.41	64.42	24487.26
Jun-20	497.70	65.60	12739.75	494.80	64.60	11787.70	497.92	65.48	38789.68	17598.80	493.58	64.17	21190.88
Jul-20	496.30	65.70	12584.60	495.90	64.60	11091.70	498.07	65.61	40419.24	18405.51	493.34	64.29	22013.73
Aug-20	501.30	66.50	14781.20	487.20	64.90	10829.00	497.13	65.55	44119.34	19834.48	492.78	64.30	24284.86
Sep-20	498.50	66.80	18739.60	495.30	65.50	11876.10	495.25	65.67	38136.68	19227.21	490.27	64.72	18909.47
Oct-20	498.70	66.70	16454.40	497.70	65.00	12298.80	497.87	65.52	41085.65	19535.23	493.27	64.43	21550.42
Nov-20	491.20	66.50	15154.30	500.60	65.70	8201.90	495.88	65.53	39899.28	17577.60	492.32	64.53	22321.68
Dec-20	492.30	66.90	9504.60	498.70	65.40	13625.80	496.48	65.84	42540.77	19512.14	493.02	64.74	23028.63
Jan-21	502.20	66.50	15928.20	501.00	65.50	15135.20	497.90	65.68	40788.56	20376.78	493.75	64.52	20411.78
Feb-21	499.20	66.00	13648.30	497.90	65.50	14930.20	495.21	65.54	36462.13	19863.82	490.80	64.45	16598.31
Mar-21	496.00	66.70	15732.50	496.50	65.90	17348.60	496.81	65.62	39975.76	22374.93	491.74	64.65	17600.83
Apr-21	493.20	66.30	14405.40	494.00	65.40	14739.10	495.72	65.75	38828.18	19713.53	491.59	64.47	19114.65
May-21	499.30	66.40	8886.55	498.40	65.20	8455.80	495.88	65.64	25050.77	12235.75	491.60	64.47	12815.02
Jun-21	490.10	67.40	17056.80	495.50	65.80	16060.70	494.70	65.45	38485.37	22001.39	491.22	64.49	16483.98
Jul-21	498.50	67.80	19352.60	497.20	65.80	16928.40	494.89	65.80	39688.90	23992.05	490.88	64.54	15696.85
Aug-21	500.70	68.20	15091.00	497.50	66.00	17239.10	494.65	65.45	36663.42	20330.92	491.06	64.51	16332.50
Sep-21	498.80	67.20	18950.50	499.40	65.00	12248.60	494.88	65.74	39429.71	21682.58	491.38	64.36	17747.13
Oct-21	502.10	67.20	15943.00	498.10	65.20	14237.80	498.56	65.73	43823.11	22197.11	494.12	64.47	21626.00
Nov-21	498.10	67.20	14858.70	496.30	64.90	13444.30	497.95	65.60	42182.32	21077.05	493.72	64.38	21105.27
Dec-21	497.50	68.50	16551.60	497.60	65.80	14955.60	498.12	65.91	41854.86	22203.09	493.43	64.87	19651.77
Jan-22	500.50	68.40	19597.60	495.10	66.10	19488.40	492.32	65.78	37636.37	23898.62	489.80	64.77	13737.75
Feb-22	499.00	67.40	7351.20	491.10	65.30	17266.20	497.53	65.83	32625.70	15768.20	493.87	64.52	16857.50
Mar-22	501.30	66.70	16761.10	484.00	64.70	10980.90	497.07	65.54	42478.23	21826.67	492.97	64.24	20651.56
Apr-22	499.20	68.40	16122.50	496.00	66.80	17758.90	498.38	66.26	35990.91	21690.52	493.96	65.20	14300.39
May-22	497.50	67.50	18824.80	497.10	65.70	19850.20	496.52	65.79	38621.25	23605.51	493.41	64.52	15015.74
Jun-22	494.90	68.80	19053.50	494.80	66.60	19019.00	496.21	65.91	36909.81	22810.87	489.99	64.98	14098.94
Jul-22	497.30	68.78	20199.00	493.10	66.00	18906.20	496.24	65.73	21864.58	18060.36	492.55	64.68	3804.22
Aug-22	498.50	69.40	21247.70	495.80	66.00	17273.60	491.59	65.55	37609.53	23798.29	487.48	64.74	13811.24
Sep-22	486.20	68.10	8122.00	488.30	65.70	10058.40	496.65	65.71	41500.69	18099.20	492.44	64.44	23401.49
Oct-22	497.10	68.50	14168.60	497.20	65.50	16098.50	493.87	65.49	42863.46	22519.10	498.48	64.23	20344.36
Nov-22	499.30	68.60	15092.40	496.20	65.50	17961.20	494.62	65.91	40811.52	23136.11	491.30	64.68	17675.41
Dec-22	504.10	69.20	19121.90	464.00	65.90	18381.10	496.30	65.38	39796.62	23185.22	491.43	64.31	16611.40
Total	**490.57**	**65.55**	**1226563.35**	**487.43**	**64.81**	**1330555.70**	**493.18**	**64.87**	**3312910.19**	**20425.11**	**479.79**	**5541.78**	**1515500.08**

Issuance Period: 01/09/2015 to 31/12/2022

Year	BEy (tCO_2)	PEy (tCO_2)	ERy (tCO_2)
2015	24389.70	5.4315347	24382
2016	75200.60	2.1726139	75194
2017	65949.71	1.67	65941
2018	71604.94	7.1306301	71590
2019	61043.31	44.215478	60993
2020	54506.84	20.33	54482
2021	71716.85	8.6514599	71703
2022	78711.42	2.0166313	78704
Total	**5,03,123.37**	**91.62**	**5,02,989**

Total Emission Reductions for the current crediting period **= 5,02,989** tCO_2eq (**5,02,989** CoUs)

Conclusions:

Based on the audit conducted on the basis of UCR Protocol, which draws reference from UCR Protocol Standard Baseline, ACM0012 Waste energy recovery Version 6.0, the documents submitted during the verification including the Data, Project Concept Note (PCN) / Monitoring Report (MR), SQAC is able to certify that the emission reductions from the project - SBPIL Waste Heat to Power Project, Borjhara, India (UCR ID – 400) for the period **01/09/2015 to 31/12/2022** amounts to **5,02,989 CoUs (5,02,989 tCO_2eq)**

Sheetal Wader
Lead Verifier (Signature)

SQAC Certification Pvt. Ltd. Mapusa-Goa

Santosh Nair
Senior Internal Reviewer
(Signature)

Date: 12/03/2024