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Final Verification Report

Danish Energy Agency

Third Periodic Verification of

"Boiler efficiency improvement at Holboca CET Iasi II, Romania" as JI Track 1 Project

4th Monitoring period: 01-01-2010 to 31-12-2010

Report No. 600500555

26 May 2011

TÜV SÜD Industrie Service GmbH
Carbon Management Service
Westendstrasse 199 - 80686 Munich - GERMANY

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Report No.	**Date of first issue**	**Version:**	**Date of this revision**	**No. of pages**
600500555	16-05-2011	2	26-05-2011	15 (without cover page)
Subject:			Third JI Periodic Verification under Track 1 for 2010	
Executing Operational Unit:				
TÜV SÜD Industrie Service GmbH, Carbon Management Service Westendstrasse 199 - 80686 Munich, Federal Republic of Germany				
Project Participants (client and project owner):				
Client (Buyer of credits): Ministry of Climate and Energy Danish Energy Agency, Amaliegade 44 DK-1256; Copenhagen K; Denmark Project Owner: S.C. C.E.T. Iasi S.A., Calea Chişinăului nr.25 700265 - Iaşi, ROMANIA				
Registration number / Project Title			RO1000132 / Project: "Boiler efficiency improvement at Holboca CET Iasi II, Romania"	
Scope/Technical Area (TA)			1/1.2	
Monitoring period:			01-01-2010 to 31-12-2010	
First Monitoring Report (version/date)			Version 01 / 09-02-2011	
Final Monitoring Report (version/date)			Version 03 / 20-05-2011	

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Summary:

TÜV SÜD Industrie Service GmbH has performed the third JI periodic verification of the: "Boiler efficiency improvement at Holboca CET Iasi II, Romania" as a JI Track 1 project. A verification for the pre-JI period of 2006 and 2007 was already conducted by TÜV SÜD Industrie Service GmbH (report no: 1100242 from 04.03.2009) which covered the initial verification as well the years 2006 and 2007. The. verifications of first and second JI Track 1 periods regarding the ERs achieved in 2008 and respectively in 2009 were also conducted by TÜV SÜD Industrie Service GmbH (reports no: 600500085 and no: 600500437).

The project consists of 2 high pressure boilers with a capacity of 420 t/h each and turbo-generators with a capacity of 50 MW each. The combined heat and power plant is fuelled by hard coal and for start-up and transient periods, with fuel oil and produces heat and hot water that supply the Iasi town - Primary Network of District Heating System.

The management of SC C.E.T. IASI SA Centrala de Termoficare is responsible for the data acquisition, collection and for the preparation of the GHG emissions data as well the reported GHG emission reductions.

A document review, followed by a site visit was conducted to verify the information submitted by the project participant regarding the present verification period. Based on the assessment carried out, the verifier confirms:

- that the project has been implemented and operated in accordance with the description given in the registered PDD (version 4, 24-09-2008) in regard to the technical equipment contributing to emission reductions http://ji.unfccc.int/JIITLProject/DB/P0TQKX18ZWNH3BO84RICO3WBQX5HDI/details
- that the project is not completely implemented as described in registered PDDsince the ash removal system is not installed yet. The main components of the system were installed. This can be accepted due to the fact the ash removal system has no influence on efficiency and on emission reductions.
- that the monitoring plan complies with the applied methodology (described in PDD) and the monitoring has been carried out exactly following the monitoring plan.

The equipment which is essential for generating emission reductions are installed exactly following the registered PDD, they run reliably and the meters are calibrated appropriately. The operation of the equipment does not deviate from the description in the registered PDD. The project is generating emission reductions as a JI Track 1 project. The ERs for 2010 were 24 561 tCO_2 while in the registered PDD they were estimated approximately 20 184 tCO_2 per year. This difference is explained by varying weather conditions which influence the heat demand every year. The verifier can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion refers to the project's GHG emissions and resulting GHG emission reductions reported, both determined due to the valid and registered project's baseline, its monitoring plan and its associated documents.

Based on the information we have seen and evaluated we confirm that the implementation of the project resulted in 24 561 t CO_{2e} of emission reductions during the JI Track 1 verification period 01-01-2010 to 31-12-2010.

A possibility of double counting of ERs is also excluded as clearly stated in art 8 of the LoA from the Romanian DFP.

These ERs can be transferred as long as there is an agreement between the Host country and the Buyer country and all parties have issued a LoA for this project.

Verification team:	**Technical Reviewer:**
• ATL Thomas Kleiser (Assessment Team Leader) • Auditor Verifier Madis Maddison • Auditor Verifier Georgios Agrafiotis (Project manager)	Robert Mitterwallner **Responsible Certification Body Members**: Rachel Zhang Deputy Head of Certification Body

TÜV SÜD Industrie Service GmbH Carbon Management Service

Abbreviations

AAU	Assigned Amount Unit
ACM	Approved Consolidated Methodology
AIE	Accredited Independent Entity (also verifier)
CO_{2e}	Carbon dioxide equivalent
CR / CL	Clarification Request
CAR	Corrective Action Request
ER	Emissions reduction
ERU	Emission Reduction Unit
EPA	Environmental Protection Agency
FAR	Forward Action Request
GHG	Greenhouse Gas
IRL	Information Reference List
KP	Kyoto Protocol
MP	Monitoring Plan
MR	Monitoring Report
PDD	Project Design Document
PP	Project Participant
PVC	Periodical Verification Checklist
SD	Sustainable Development
TÜV SÜD	TÜV SÜD Industrie Service GmbH, Carbon Management Service
UNFCCC	UN Framework Convention on Climate Change
VER	Verified Emission Reductions
DVM	Determination and Verification Manual
VP	Verification Protocol

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Main Documents (referred to in this report)

Methodology (name / version)	Project specific	
Final PDD:	Version 4, 24-09-2008	
Revised Monitoring Plan:	N/A	
	Version	Date
Published Monitoring Report	01	09-02-2011
Revised Monitoring Report	03	20-05-2011
Project documentation link:	http://ji.unfccc.int/JIITLProject/DB/P0TQKX18ZWNH3BO84RICO3WBQX5HDI/details	

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1 INTRODUCTION

1.1 Objective

Danish Energy Agency as project participant (PP) has commissioned an independent verification by TÜV SÜD Industrie Service GmbH (TÜV SÜD) of its registered JI Track 1 project: "Boiler efficiency improvement at Holboca CET Iasi II Iasi, Romania".
http://ji.unfccc.int/JIITLProject/DB/P0TQKX18ZWNH3BO84RICO3WBQX5HDI/details.
The objective of the verification work is to comply with the requirements of the JI guidelines. According to this assessment TÜV SÜD shall:

- ensure that the project activity has been implemented and operated as per the registered PDD "Boiler efficiency improvement at Holboca CET Iasi II, Romania" Version 04. 24-09-2008, and that all physical features (technology, project equipment, monitoring and metering equipment) of the project are in place,
- ensure that the published MR and other supporting documents provided are complete and verifiable and in accordance with applicable JI requirements,
- ensure that actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology,
- evaluate the data recorded and stored as per project specific methodology.

1.2 Scope

The verification scope is defined as an independent and objective review and ex-post determination of the monitored reductions in GHG emissions by the Accredited Independent Entity. The verification is based on the submitted monitoring report, the validated project design documents including its monitoring plan and determination report, initial and first periodic verification report, the applied monitoring methodology, relevant decisions, clarifications and guidance from the CMP and the JISC and any other information and references relevant to the project activity's resulting emission reductions. These documents are reviewed against the requirements of the Kyoto Protocol, JI rules and Romanian national requirements as they are set by the Romanian DFP:
http://ji.unfccc.int/JI_Parties/PartiesList.html#Romania.
Based on the requirements in the JI determination and verification manual (DVM) from JISC 19, Annex 4, TÜV SÜD has applied a rule-based approach for the verification of the project. The principles of accuracy, completeness, relevance, reliability and credibility were combined with a conservative approach to establish a traceable and transparent verification opinion.
The verification considers both quantitative and qualitative information on emission reductions.
The verification is not meant to provide any consultancy towards the client. However, stated requests for clarifications, corrective and/or forward actions may provide input for improvement of the monitoring activities.

1.3 GHG Project Description

Project activity:	"Boiler efficiency improvement at Holboca CET II Iasi, Romania"
UNFCCC registration number:	RO1000132
Project Participants:	SC C.E.T. IASI SA Centrala de Termoficare- project owner represented by the General Director Dorin Ivana

	Buyer of credits: Danish Energy Agency (former Danish Environmental Protection Agency) represented by MIHAI BRASOVEANU
Location of the project:	47° 08' 50", 019 North, 27° 43' 03",734 East
Date of registration:	1st April 2010
Starting date of the crediting period:	01-10-2006. Until 31-12-2007 AAUs were verified by TÜV SÜD (Pre-JI Verification Report no: 1100242 from 04.03.2009) and transferred. From 01-01-2008 onwards begins the official JI crediting period of ERUs The. verifications of first and second JI Track 1 periods regarding the ERs achieved in 2008 and respectively in 2009 were also conducted by TÜV SÜD Industrie Service GmbH (reports no: 600500085 and no: 600500437).

Holboca CET II Iasi is a combined heat and power plant owned by SC CET Iasi SA, the municipal owned energy supply company. The power plant is equipped with two high pressure boilers with a capacity of 420 t/h each and turbo-generators with a capacity of 50 MW each. The combined heat and power plant is fuelled by hard coal and for start-up and transient periods, with fuel oil and produces heat and hot water that supply the Iasi town - Primary Network of District Heating System. It is operated on full capacity approximately 6 month per year, during the heating season, which usually lies between the months November – April (no hot water is supplied outside of the heating season).

The JI Track 1 Project activity involves the utilization of fire - side cleaning technology under the trademark Therma Chem. Therma - Chem represents an on-load fire side treatment for large industrial boilers and process heaters in order to eliminate and prevent the deposition of slag and ash deposits on various heat exchange surfaces along the flue gases route, inside boilers radiant section, super-heaters, economisers, air pre-heaters, flue gases ducts, etc.

Consequently the effects of the Therma - Chem technology are the following:

- It increases the boiler efficiency and capacity, thus decreasing fuel consumption and hence the associated greenhouse gas emissions and the quantity of ash and other materials released,
- It maintains the normal boiler operating parameters over prolonged operating periods, eliminating the shutdowns for boiler cleaning and condition restoration,
- Through better efficiency, it will help the power plant to reduce the cost of compliance with emissions regulations, taking into account the reduction of SOx and NOx emissions as well as other particulates due to reduced fuel consumption per ton of steam produced. The implemented measures exceed the national regulations significantly.

2 METHODOLOGY

2.1 Verification Process

The verification process is based on the approach depicted in the Determination and Verification Manual for JI.

Standard auditing techniques have been adopted. The verification team performs first a desk review, followed by an on-site visit which results in a protocol including all the findings. The next step is to close out the findings through direct communication with the PPs and finally prepare the verification report. This verification report and other supporting documents then undergo an internal quality control by the CB "climate and energy" before submission to the project participant Danish Environment Agency (DEA).

2.2 Verification Team

The appointment of the team takes into account the coverage of the technical area(s), sectoral scope(s) and relevant host country experience for verifying the ER achieved by the project activity in the relevant monitoring period for this verification.

The verification team was consisting of the following members:

Name	Qualification	Coverage of scope	Coverage of technical area	Host country experience
Thomas Kleiser	**ATL**	☑	☑	
Madis Maddison	GHG-A	☑	☑	☑
Georgios Agrafiotis	GHG-T	☑		

Thomas Kleiser is Head of the Certification Body of TÜV SÜD Industrie Service GmbH since 2009 and lead auditor. He has participated in more than 100 CDM and JI project assessments, (validations /determinations and verifications) and more than 20 voluntary projects under different schemes.

Madis Maddison is specialized in auditing of greenhouse gas emission reduction projects. This experience he has gained (in co-operation with TÜV SÜD Industrie Service) in determination and verification of Joint Implementation (JI) projects in Estonia, Lithuania, Poland, Romania and Bulgaria. He has received training in the JI determination as well as CDM validation and verification process and applied successfully as GHG Auditor.

Georgios Agrafiotis is determiner and verifier for JI, CDM and voluntary projects. He has work experience in the field of industrial environmental technology and protection and also in technical environmental projects. As GHG auditor he has been appointed scopes 1 and 13 as per UNFCCC definition.

2.3 Review of Documents

The Monitoring Report version 1 submitted by the PP to TÜV SÜD in February 2011 was the base for the desk review.

The published MR was assessed in the desk review with the aim to:

- verify the completeness of the data and the information presented in the MR,

- check the compliance of the MR with respect to the monitoring plan depicted in the registered PDD and verify that the applied methodology was carried out. Particular attention to the frequency of measurements, the quality of the metering equipment including calibration requirements, and the quality assurance and quality control procedures was paid,
- evaluate the data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

A complete list of all documents reviewed is available in Annex 2 of this report.

2.4 On-site Assessment and follow-up Interviews

During 04-03-2011, TÜV SÜD performed a physical site inspection and on-site interviews with project stakeholders to:

- confirm the implementation and operation of the project,
- review the data flow for generating, aggregating and reporting the monitoring parameters,
- confirm the correct implementation of procedures for operations and data collection,
- cross-check the information provided in the MR documentation with other sources (raw data),
- check the monitoring equipments against the requirements of the PDD, including calibrations, maintenance, etc.,
- review the calculations and assumptions used to obtained the GHG data and ER,
- identify if the quality control and quality assurance procedures are in place to prevent or correct errors or omissions in the reported parameters.

A list of the persons interviewed during this verification activity is included in Annex 2.

2.5 Quality of Evidence to Determine Emission Reductions

Among many others the following relevant and reliable evidences have been used by the audit team during the verification process:

1. Calibration and Checking certificates of metering equipment, IRL#24, 25, 26, 27, 28 29
2. Project data sheets, IRL#30
3. Coal and fuel oil stock inventory reports, IRL#31
4. Registration sheets for the main operational parameters of boiler no.1 - 420 t/h and boiler no.2 - 420 t/h running on hard coal, IRL#32
5. Coal purchase invoices, IRL#33
6. Fuel oil purchase invoices, IRL#34
7. Therma-Chem purchase invoices, IRL#21

Sufficient evidence covering the full verification period in the required frequency is available to validate the figures stated in the final MR. The source of the evidences will be discussed in chapter 3.4 of this report. Specific cross-checks have been done in cases that further sources were available. All figures in the monitoring report were cross-checked by the audit team against the raw data. The data collection system meets the requirements of the monitoring plan as per the methodology.

2.6 Resolution of Clarification and Corrective and Forward Action Requests

The objective of this phase of the verification process was to resolve any outstanding issues which needed to be clarified for TÜV SÜD's positive conclusion on the GHG emission reduction calculation. The findings raised as Forward Action Requests (FAR#1) indicated in previous reports (validation/verification) were clarified during communications between the PP and TÜV SÜD.
Concerns raised in the desk review, the on-site audit assessments and the follow up interviews and the responses provided for the raised concerns are documented in Annex 1 (verification protocol) to guarantee the transparency of the verification process.

A Corrective Action Request (CAR) is raised where TÜV SÜD identifies:

- non-conformities in monitoring and/or reporting with the monitoring plan;
- that the evidence provided is not sufficient to prove conformity;
- mistakes in assumptions, data or calculations that impair the ER;
- FARs stated during validation that are not solved until the on-site visit.

A Clarification Request (CR) is raised where TÜV SÜD does not have enough information or the information is not clear in order to confirm a statement or data.

A Forward Action Request (FAR) is raised where TÜV SÜD identifies that monitoring and/or reporting required special attention or adjustments for the next verification period.

Information or clarifications provided as response to a CAR, CL or FAR could also lead to a new CAR.

2.7 Internal Quality Control

As an ultimate step of verification the final documentation including the verification report and the protocol have to undergo an internal quality control by the Certification Body (CB) "climate and energy", i.e. each report has to be finally approved either by the Head of the CB or the Deputy. In case one of these two persons is part of the assessment team the approval can only be given by the other one. If the documents have been satisfactorily approved, the Request for Issuance is submitted with the relevant documents.

3 VERIFICATION RESULTS

In the following sections the results of the verification are stated. The verification results relate to the project performance as documented and described in the final Monitoring Report (20-05-2011, Version 3). The verification findings for each verification subject are presented below:

3.1 FARs from Previous Verification

The verification team confirms that the only FAR#1 presented in the first JI Track 1 verification report no: 600500437 from 24.09.2010 has been solved by the PPs during the verification Audit. However based on this a new FAR#1 was raised concerning the late installation of ash removal system. After the implementation of other components of the Project (Therma Chemtechnology) it was decided to update the ash removal system design. Because of the increase in the cost of such a system additional financial support was applied from EU Structural Funds and Romanian State Budget Funds. The tendering procedure is under implementation now. The modernised ash removal sys-tem is expected to be installed in 2012. This does not have negative influence on the ERU generation nor the additionality of the project activity. Therefore the issue was clarified and closed.

3.2 Project Implementation in accordance with the registered Project Design Document

The JI project as determined is not completely implemented yet. The part that is not fully implemented (ash removal system) has no influence on efficiency and on emission reductions. The installed equipment being essential and operational for generating emission reduction and for metering the data defined in the monitoring plan runs reliably and is calibrated appropriately. The monitoring system is in place and the project does generate GHG emission reductions.

No data and/or variables presented in the MR differ significantly from the stated in the registered PDD, which could cause an increment of the ER in this period or in future periods in relation to the estimates in the registered PDD. The annual ERs are in compliance with the figures as presented in the determined and approved PDD.

3.3 Compliance of the Monitoring Plan with the Monitoring Methodology

The monitoring plan is in accordance with the approved project specific methodology, applied by the proposed JI project activity. Neither a revision nor a deviation to the monitoring plan has been requested to the DFP/AIE.

3.4 Compliance of the Monitoring with the Monitoring Plan

The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD. All parameters were monitored and determined as per the Monitoring Plan.
The verification of the parameters required by the monitoring plan are provided as follows:

Data / Parameter:	Quantity of coal consumed in boiler 1
Data unit:	Tonnes
Description:	Total quantity of coal consumed in boiler 1

Source of data used:	Monitoring is based on meters (coal volume and belt velocity) readings. By mechanical adjustment of coal layer height and direct measurement of belt velocity the volume is established. Further the standard density of hard coal (established by consultant) is used to calculate the result. The data is read and documented hourly in respective log book according to the procedure JI 005. The district heating operator reads the coal meters at every 8 hours (hours 8, 16 and 24) and records the readings of the coal meters in the form "Reading of Damatic coal consumption meters in the boilers" form code F JI 005 – 02. JI Project Manager transfers data to respective project data sheets (IRL#30), from where it is transferred to ER calculation sheet (IRL#7). All meters are fully functional and properly calibrated.
Means of verification/Comments:	Quantity of coal consumed in boiler 1 was verified by checking the data on project data sheets (IRL#30).
Cross-check	Quantity of coal consumed in boiler 1 was cross-checked from monthly coal stock inventory reports (IRL#31).

Data / Parameter:	Quantity of coal consumed in boiler 2
Data unit:	Tonnes
Description:	Total quantity of coal consumed in boiler 2
Source of data used:	Monitoring is based on meters (coal volume and belt velocity) readings. By mechanical adjustment of coal layer height and direct measurement of belt velocity the volume is established. Further the standard density of hard coal (established by consultant) is used to calculate the result. The data is read and documented hourly in respective log book according to the procedure JI 005. The district heating operator reads the coal meters at every 8 hours (hours 8, 16 and 24) and records the readings of the coal meters in the form "Reading of Damatic coal consumption meters in the boilers" form code F JI 005 – 02. JI Project Manager transfers data to respective project data sheets (IRL#30), from where it is transferred to ER calculation sheet (IRL#7). All meters are fully functional and properly calibrated.
Means of verification/Comments:	Quantity of coal consumed in boiler 2 was verified by checking the data on project data sheets (IRL#30).
Cross-check	Quantity of coal consumed in boiler 2 was cross-checked from monthly coal stock inventory reports (IRL#31).

Data / Parameter:	Quantity of fuel oil consumed in boiler 1
Data unit:	Tonnes
Description:	Total quantity of fuel oil consumed in boiler 1
Source of data used:	Monitoring is based on pressure meter readings (serial numbers of sensors: 2896, 4095 and 3999; indicators: 1629-83, 2216-84 and 2256-84). The hourly oil flow is established based on metered pressure losses in the supply pipe (calibrated nomogrammes are used showing the relationship between oil flow and pressure loss in the system). The data is read and documented hourly in respective log book according to the procedure JI 005, JI 008. JI Project Manager transfers data to respective project data sheets (IRL#30), from where it is transferred to ER calculation sheet (IRL#7). All meters are fully functional and properly calibrated.
Means of verification/Comments:	Quantity of oil consumed in boiler 1 was verified by checking the data on project data sheets (IRL#30).
Cross-check	Quantity of oil consumed in boiler 1 was cross-checked from monthly fuel oil stock inventory reports (IRL#31).

Data / Parameter:	Quantity of fuel oil consumed in boiler 2
Data unit:	Tonnes

Description:	Total quantity of fuel oil consumed in boiler 2
Source of data used:	Monitoring is based on pressure meter readings (serial numbers of sensors: 1102, 989 and 993; indicators: 198-90, 220-91 and 268-91). The hourly oil flow is established based on metered pressure losses in the supply pipe (calibrated nomogrammes are used showing the relationship between oil flow and pressure loss in the system). The data is read and documented hourly in respective log book according to the procedure JI 005, JI 008. JI Project Manager transfers data to respective project data sheets (IRL#30), from where it is transferred to ER calculation sheet (IRL#7). All meters are fully functional and properly calibrated.
Means of verification/Comments:	Quantity of oil consumed in boiler 2 was verified by checking the data on project data sheets (IRL#30).
Cross-check	Quantity of oil consumed in boiler 2 was cross-checked from monthly fuel oil stock inventory reports (IRL#31).

Data / Parameter:	Quantity of steam produced in boiler 1
Data unit:	Tonnes
Description:	Total quantity of steam produced in boiler 1
Source of data used:	Monitoring is based on meter readings. The hourly values of produced steam flow are established based on metered pressure difference. The data is read and documented hourly in respective log book according to the procedure JI 005; JI 007. JI Project Manager transfers data to respective project data sheets (IRL#30), from where it is transferred to ER calculation sheet (IRL#7). All meters are fully functional and properly calibrated.
Means of verification/Comments:	Quantity of steam produced by boiler 1 was verified by checking the data on project data sheets (IRL#30).
Cross-check	Quantity of steam produced by boiler 1 was cross-checked from log-book for turbine operation (IRL#32).

Data / Parameter:	Quantity of steam produced in boiler 2
Data unit:	Tonnes
Description:	Total quantity of steam produced in boiler 2
Source of data used:	Monitoring is based on meter readings. The hourly values of produced steam flow is are established based on metered pressure difference. The data is read and documented hourly in respective log book according to the procedure JI 005; JI 007. JI Project Manager transfers data to respective project data sheets (IRL#30), from where it is transferred to ER calculation sheet (IRL#7). All meters are fully functional and properly calibrated.
Means of verification/Comments:	Quantity of steam produced by boiler 2 was verified by checking the data on project data sheets (IRL#30).
Cross-check	Quantity of steam produced by boiler 2 was cross-checked from log-book for turbine operation (IRL#32).

Data / Parameter:	Calorific value of coal
Data unit:	Kcal/kg
Description:	Calorific value of coal used in the boilers
Source of data used:	Monitoring is based on analyzing the coal used in the boilers. The analysis is done daily by utilities own laboratory. The analysed sample is documented daily in a report "Chemical analysis report for hard coal" (IRL#40). JI Project Manager transfers data to respective project data sheets (IRL#30), from where it is transferred to ER

	calculation sheet (IRL#7). The calorimetric system is certified by Romanian National Institue of Metrology. All meters used in analyzing are fully functional and properly calibrated. The personnel are properly trained.
Means of verification/Comments:	Calorific value of coal was verified by checking the data on project data sheets (IRL#30).
Cross-check	Calorific value of coal was cross-checked with the respective information from invoices of purchased coal (IRL#33).

Data / Parameter:	Calorific value of fuel oil
Data unit:	Kcal/kg
Description:	Calorific value of fuel oil used in the boilers
Source of data used:	Monitoring is based on analyzing the fuel oil used in the boilers. . The analysis is done daily by utilities own laboratory. The analysed sample is documented weekly in a report "Analysis certificate for fuel oil" (IRL#41). JI Project Manager transfers data to respective project data sheets (IRL#30), from where it is transferred to ER calculation sheet (IRL#7). The calorimetric system is certified by Romanian National Institue of Metrology. All meters used in analyzing are fully functional and properly calibrated. The personnel are properly trained.
Means of verification/Comments:	Calorific value of fuel oil was verified by checking the data on project data sheets (IRL#30).
Cross-check	No cross-check option is available as calorific value of fuel oil was not indicated on the purchase invoices. However the values are in the same range used for estimation of emission reductions in the PDD of this project and other Romanian project "Energy Efficiency Improvement of the District Heating System in Drobeta Turnu-Severin" (RO1000133) (IRL#39).

3.5 Assessment of Data and Calculation of Greenhouse Gas Emission Reductions

All data has been available and all the parameters have been monitored in accordance with the registered monitoring plan.

The reported data have been cross-checked against other sources available as explained above in chapter 3.4.

The verifier confirms that the methods and formulae used to obtain the baseline, project and leakage emissions are appropriate. The same has been done in accordance with the methods and formulae described in the registered monitoring plan and applicable methodology.

The baseline emissions are calculated on a daily basis by multiplying the fixed EF in the registered PDD with the daily steam production from the two boilers. The final yearly result of 233,273 tCO_2 deviates slightly from the value 233,498 tCO_2 which results by multiplying the yearly steam production by the EF. The reason is a rounding-up function in the excel files. The value of the ERs in the MR is more accurate and conservative.

The verifier confirms that the monitoring report includes all parameters and the monitored data at the intervals required by the methodology and PDD.

The verifier confirms that all the emission factors and default values (ex-ante values from PDD) have been correctly used and could be justified. All the emission factors and default values are explicitly mentioned in the monitoring report.

4 SUMMARY OF FINDINGS

The verifier can confirm that the published MR and related documents are complete and verifiable in accordance with the JI requirements. All the findings raised by the verification team, the responses by the PPs and the conclusion from the team are presented in Annex 1. The means of verification and resulting changes in the MR or related documents are identified in the following tables:

CAR 1: Correct the reference errors in formula to calculate steam specific emissions for January 30 for boiler II (cell I37 on sheet "INPUT DATA BOILER II").
CAR 1, means of verification
Version 2 (06.04.2011) of the Monitoring Report was sent to audit team for verification.
CAR 1, changes in the MR or related documents
Errors in calcualtion sheet formulae were corrected which resulted in slight chenge of the amount of generated ERUs Monitoring Report 06.04.2011, version 2) (IRL#6).

FAR 1: Environmental inspection reports should be issued timely within next month of the reporting period – no later than 31.07 and 31.01.
FAR 1, means of verification
Timely issuance of Environmental inspection reports shall be checked during next verification.
FAR 1, changes in the MR or related documents
No changes in the MR or related documents were made.

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5. VERIFICATION STATEMENT

TÜV SÜD Industrie Service GmbH has performed the third periodic verification for 2010 of the project: "Boiler efficiency improvement at Holboca CET II Iasi, Romania" as JI track 1. The verification is based on the currently valid documentation of the UN Framework Convention on Climate Change (UNFCCC).

The management of SC C.E.T. IASI S.A. is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions on the basis set out within the project's Monitoring Plan indicated in the latest version of determined PDD version 4, dated 24-09-2008.

The verifier can confirm that:

- the development and maintenance of records and reporting procedures are in accordance with the registered monitoring plan;
- the project is operated as planned and described in the validated and registered project design document;
- that the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- that the monitoring system is in place and generates GHG emission reductions data;
- that the GHG emission reductions are calculated without material misstatements;
- that the monitoring plan in Monitoring Report is as per the registered PDD;
- that the monitoring plan in latest determined PDD is in accordance with the approach taken regarding baseline setting and monitoring (please see Appendix B of the JI Guidelines – Decision 9 COP/MOP).

Our opinion refers to the project's GHG emissions and resulting GHG emission reductions reported both determined due to the valid and registered project's baseline, its monitoring plan and its associated documents.

Based on the information we have seen and evaluated, we confirm the following statement:

Reporting period: From 01-01-2010 to 31-12-2010

Verified emissions in the above reporting period:

Baseline emissions:	233 273	t CO_{2e}
Project emissions:	208 712	t CO_{2e}
Leakage emission:	0	t CO_{2e}
Emission reductions:	24 561	t CO_{2e}

Munich, 26-05-2011

Rachel Zhang
Deputy Head of Certification body "climate and energy"

Munich, 26-05-2011

Thomas Kleiser
Assessment Team Leader

Industrie Service

Annex 1: Verification Protocol

Verification Protocol

Project Title: Third periodic verification at Holboca Iasi II, ERs from 2010

Date of Completion: 20.05.2011

Number of Pages: 46

Industrie Service

Input by audit team in green colour

Old text from previous verification (unchanged situation) in black colour

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1. Project Activity Implementation

1.1. Technology

Project Location (s) *include any other sites which are relevant to the project activity*			
	PDD Description	Verification Findings (or Results?)	Conclusion and IRL
Site Description / Address:	*Holboca CET Iasi II is located between the city of Iasi (approx. 13 km away) and the town of Holboca (approx. 8 km away), in the north-eastern part of Romania*	*The address is Holboca, 707250 Iasi, Romania.*	☑
GPS coordinates:		*47° 08' 50",019 North, 27° 43' 03",734 East*	☑
Technical Equipment – Main Components			
	PDD Description	Verification Findings (or Results?)	Conclusion and IRL
Equipment Description	*The Holboca CET Iasi II plant is equipped with two high pressure boil-ers, each with a capacity of 260 Gcal/h, producing 420 t/h of steam.*	*The Holboca CET Iasi II plant is equipped with two high pressure boilers, each with a capacity of 260 Gcal/h, producing 420 t/h of steam.*	☑
Component 1: Technical Features	*Two high pressure boilers, each with a capacity of 260 Gcal/h, producing 420 t/h of steam*	Capacity*: 260 Gcal/h each* Manufacturer*: SC VULCAN SA Bucharest – Romania* Commissioning date*: 1986 and 1988, refur-bished 1997 – 2001* Serial numbers*: 22250 and 22909*	☑
Component 2:	*Therma Chem FS 12 injection system.*	Capacity*: 600 – 1000 liters/hour each*	☑

Technical Features	*Two injection pistols for each boiler and one dosing system for each boiler.*	Manufacturer*: SC HIDROTEH SRL - Romania* Commissioning date*: September 2006* Serial numbers*: Boiler1- CP-IB1-001; Boiler 2 – CP-IB2-002*	
Component 3: Technical Features	*Ash removal system.*	*Ash removal system is installed partially: only electrostatic precipitation of ash was installed in 2007 (for boiler #1) and 2008 (for boiler #2).* Capacity*: Flue Gas Capacity: 1,240,000 m3/h* Manufacturer*:* *for boiler 1: SC IUT Bistrita Nasaud – Romania* *for boiler 2: SC IUT Bistrita Nasaud – Romania* Commissioning date*:* *for boiler 1: 1986, rehabilitated in 2008* *for boiler 2: 1988, rehabilitated in 2009* Serial numbers*: EPS for boiler 22250 and EPS for boiler 22909* *The new project is launched to finance installation of ash removal system. See also FAR#1 in Table 1.4.*	☑
Operation Status during verification			
	Verification Findings		Conclusion and IRL
Approvals / Licenses	*Following licences exist:* 1. *Authorization to operate CET II – Holboca No: 171 issued by ANRE(National Energy Regulation Authority) at 15.04.2003;* 2. *Licence to supply heat energy No: 1511 issued by ANRE (National Energy Regu-*		☑ *IRL#22*

	lation Authority) at 12.07.2002; 3. *Licence to produce heat energy No: 2034 issued by ANRE (National Energy Regulation Authority) at 20.12.2007;* 4. *Licence to supply electric energy No: 1666 issued by ANRE (National Energy Regulation Authority) at 10.11.2004;* 5. *Licence to produce electric energy No: 1726 issued by ANRE (National Energy Regulation Authority) at 25.04.2005;* 6. *Environmental Authorization No: 10 issued by Romanian Ministry of Environment (Bacau Regional Agency) at 10.05.2006.*	
Actual Operation Status	Start date of operation (each site if applicable): *20. December 2006* Under construction ☐ In operation ☒ Boiler 1, Boiler 2 Out of operation ☐ Reason and date (if out of operation):	☑
	The boiler plant was running during the heating season from 01.01.2010 to 07.04.2010 and from 06.12.2010 to 31.12.2009.	☑
Remarks on Special Operational Circumstances During the Verification Period	Phased implementation: *Project is already in operation since December 2006. However ash removal system is not entirely installed, see comments above.* Special cases: *The boilers operate one at a time in order to enable cleaning of another boiler at the mean time. There is not enough heat demand to run both boilers parallel.*	☑

1.2. Organization

Project Participant (s)

	Verification Findings	Conclusion and IRL
Entity / Responsible person:	*SC C.E.T. IASI SA Centrala de Termoficare- project owner represented by the General Director Dorin Ivana and Danish Energy Agency (former Danish Environmental Protection Agency) represented by MIHAI BRASOVEANU.*	☑
JI Project management:	*Carmen Antonovici – Responsible for Environmental Protection, JI Project. Manager CET Iasi.*	☑

1.3. Quality Management System

General aspects of the Quality Management System		
	Verification Findings	Conclusion and IRL
Quality Management Manual:	*There is a Quality Assurance System implemented and certified in CET Iasi Holboca Power Plant. - ISO 14001 Certificate for Environment Management System for electricity production and supply and for thermal energy production.*	☑ *IRL#22*
Responsibilities:	*General Director Dorin Ivana, Mrs. Carmen Antonovici – Responsible for Environmental Protection CET IASI II*	☑
Qualification and Training:	*Several trainings were conducted. Especially the new JI Project Manager was trained. Danish consultant Grue & Hornstrup has drawn up a constant training programme as a part of post implementation services.*	☑
Implementation of QM-system	*The personnel involved in this project are properly qualified and trained as presented in the attached documents.*	☑ *IRL#9*

		IRL#23

1.4. Outstanding FARs from previous Verifications (or forwarded issues from the determination report)

No Forward Action Requests were issued in determination report.

Outstanding Requests from Previous Verifications	Summary of project owner response	Audit team Conclusion and IRL
FAR#1. The ash removal system shall be installed as it was the part of the Project described in PDD. In case PP will reconsider to install it, the deviation from the Project Design Document will be mentioned.	Please find a respective description attached (IRL#37).	*After the implementation of other components of the Project (Therma Chemtechnology) it was decided to update the ash removal system design. Because of the increase in the cost of such a system additional financial support was applied from EU Structural Funds and Romanian State Budget Funds. The tendering procedure is under implementation now. The modernised ash removal system is expected to be installed in 2012.* *This does not have negative influence on the ERU generation nor the additionality of the project activity. Therefore the issue is clarified and closed.* ☑

2. Monitoring Plan Implementation

2.1. Parameters

Parameters					
Meth/tool	PDD	MR	Included in table	Compliance	Conclusion and IRL
Project specific methodology is applied	*$fP_{a,B1}$ Quantity of coal consumed in boiler 1*	*$fP_{a,B1}$ Quantity of coal consumed in boiler 1*	*§ 2.2 Table 1*	*Compliant with project specific methodology, PDD and Monitoring Report*	☑ *IRL#3 IRL#6*
Project specific methodology is applied	*$fP_{a,B2}$ Quantity of coal consumed in boiler 2*	*$fP_{a,B2}$ Quantity of coal consumed in boiler 2*	*§ 2.2 Table 2*	*Compliant with project specific methodology, PDD and Monitoring Report*	☑ *IRL#3 IRL#6*
Project specific methodology is applied	*$fP_{b,B1}$ Quantity of fuel oil consumed in boiler 1*	*$fP_{b,B1}$ Quantity of fuel oil consumed in boiler 1*	*§ 2.2 Table 3*	*Compliant with project specific methodology, PDD and Monitoring Report*	☑ *IRL#3 IRL#6*
Project specific methodology is applied	*$fP_{b,B2}$ Quantity of fuel oil consumed in boiler 2*	*$fP_{b,B2}$ Quantity of fuel oil consumed in boiler 2*	*§ 2.2 Table 4*	*Compliant with project specific methodology, PDD and Monitoring Report*	☑ *IRL#3 IRL#6*
Project specific methodology is applied	*qP_{B1} Quantity of steam produced in boiler 1*	*qP_{B1} Quantity of steam produced in boiler 1*	*§ 2.2 Table 5*	*Compliant with project specific methodology, PDD and Monitoring Report*	☑ *IRL#3 IRL#6*
Project specific methodology is	*qP_{B2} Quantity of steam*	*qP_{B2} Quantity of steam*	*§ 2.2 Table 6*	*Compliant with project specific methodology, PDD and Monitoring Report*	☑ *IRL#3*

Parameters					
Meth/tool	PDD	MR	Included in table	Compliance	Conclusion and IRL
applied	*produced in boiler 2*	*produced in boiler 2*			*IRL#6*
Project specific methodology is applied	*CV_a Calorific value of coal*	*CV_a Calorific value of coal*	*§ 2.3 Table 7*	*Compliant with project specific methodology, PDD and Monitoring Report*	☑ *IRL#3 IRL#6*
Project specific methodology is applied	*CV_b Calorific value of fuel oil*	*CV_b Calorific value of fuel oil*	*§ 2.3 Table 8*	*Compliant with project specific methodology, PDD and Monitoring Report*	☑ *IRL#3 IRL#6*

2.2. Parameters measured directly with instruments in the field

Table 1

Parameter and instrumentation Information					
	PDD	Meth/Tool	MR	Verification Findings	Conclusion and IRL
Parameter title	*Quantity of coal consumed in boiler 1*	*-*	*Quantity of coal consumed in boiler 1*	*Parameter title is consistent with PDD and Monitoring Report.*	☑ *IRL#3 IRL#6*
Parameter ID (if available)	*$fP_{a,B1}$*	*-*	*$fP_{a,B1}$*	*Parameter ID is consistent with PDD and Monitoring Report.*	☑ *IRL#3 IRL#6*

Data Unit	*tonnes*	*-*	*tonnes*	*Data Unit is consistent with PDD and Monitoring Report.*	☑ *IRL#3 IRL#6*
Monitoring frequency (reading)	*-*	*-*	*Hourly*	*Measurement frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3 IRL#6*
Monitoring frequency (recording)	*Daily*	*-*	*Daily*	*Recording frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3 IRL#6*
Calibration requirements	*No requirements*	*-*	*The calibration of the monitoring equipment is performed by observing the specific legal regulations and issuing the related metrological control certificate*	*Calibration requirements are consistent with Monitoring Report.* *Calibration is performed once a year according to the JI 006 version 2 procedure by AMC Laboratory of SC CET Iasi S.A..*	☑ *IRL#3 IRL#6 IRL#24*
Uncertainty level	*Low*	*-*	*Low*	*Uncertainty level is low, because metering is simple and reliable metering equipment is used.* *Within the range of 0.06 – 600 000 imp/min for belt speed metering.* *It is consistent with PDD and Monitoring Report.*	☑ *IRL#3 IRL#6 IRL#24*
Measurement Principle (if applicable)	*Data calculated in accordance with specific procedures*	*-*	*An indirect method that take in consideration:* *- the coal conveyor*	*According to the procedure JI 006 version 2. Mechanical adjustment of coal layer height and direct measurement of belt velocity.* *The calculation unit calculates the hourly con-*	☑ *IRL#3 IRL#6*

			speed, *- the volume of the coal disposed along a linear meter deposited on the band,* *- the reference coal density.*	*sumption in tonnes. The standard density of hard coal established during the refurbishment of boilers by the consultant (Finnish FORTUM). The figure 803.57 kg/m^3 is used.* *Measurement principle is consistent with PDD and Monitoring Report.*	
	Technical aspects				Conclusion and IRL
Instrument Type:	*Frequency/Current Adapter*				☑ *IRL#38*
Serial Number:	*3XM5H -001;* *3XM5H –002;* *3XM5H –003;* *3XM5H –004*				☑ *IRL#38*
Manufacturer Model Nr.:	*3XM5H TRUCK: Redller Revolution-Mill no.1, Redller Revolution-Mill no.2, Redller Revolution-Mill no.3, Redller Revolution-Mill no.4*				☑ *IRL#38*
Specific Location:	*On the coal conveyor belts feeding the boiler 1.*				☑
Measurement Range:	*Measurement range for tons of coal is not defined, however for belt velocity 0.06-1000 rpm.*				☑ *IRL#38*
Gaps in operating time of instrument :	Period: *Verified on-site that there were no gaps.*				☑
	Default value used: *N/A*				☑
	Justification: *N/A*				☑

	QA/QC aspects	Conclusion and IRL
Source of data	Type: *Manually taken readings from Data Control System (Damatic or DCS) by operator.* *Manually transferred from operational log book to daily forms by technical staff from energy dpt.*	☑
	Procedures: *The district heating operator reads the coal meters at every 8 hours (hours 8, 16 and 24) and records the readings of the coal meters in the form "Reading of Damatic coal consumption meters in the boilers" form code F JI 005 – 02.*	☑ *IRL#13*
	Implementation of procedure: *Procedures are implemented, it was verified on site.*	☑
	Responsibility: *JI Project Manager Ms. Carmen Antonovici is responsible for data acquisition.*	☑
Archiving of raw data and protection measures	*Data archiving is described in the MP.* *The original log book (hard copy) is stored in Companies Central Archive for 5 years.* *All relevant reports are archived as hard copy and electronic files. Electronic files are saved on Project Managers computer and on the computer of Energy Department as well until 2018.* *Annual data is also archived separately on CDROM.*	☑ *IRL#8*
Data transfer and protection of input data for calculations	*Data from manual daily forms are transferred manually to calculation tool (excel sheet) according to the attached procedure. This fuel consumption and heat production data is documented daily and entered into readymade input data excel sheets for each boiler which are the main part of the Monitoring Report.*	☑
	Quality of evidence	Conclusion and IRL
Completeness of data	*Completeness has been verified on-site, since all days are included in the presented data.*	☑
Data verification	Consistency of raw data with calculation tool: *Quantity of coal consumed in boiler 1 was verified by checking the data on project data sheets.* *No discrepancies were identified.*	☑ *IRL#30*

	Consistency of calculation tool with monitoring report: *The data in the monitoring report is consistent with the calculation tool.*	☑
Crosscheck (if available)	*Quantity of coal consumed in boiler 1 was cross-checked by monthly coal stock inventory reports.* *Coal consumed for heat production was 20% lower than indicated by stock inventory. The difference is explained by the fact that some of the coal is used for the plant's own needs. This difference is conservative and therefore acceptable for auditing team.*	☑ *IRL#31*

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Table 2

Parameter and instrumentation Information					
	PDD	Meth/Tool	MR	Verification Findings	Conclusion and IRL
Parameter title	*Quantity of coal consumed in boiler 2*	-	*Quantity of coal consumed in boiler 2*	*Parameter title is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Parameter ID (if available)	$fP_{a,B2}$	-	$fP_{a,B2}$	*Parameter ID is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Data Unit	*tonnes*	-	*tonnes*	*Data Unit is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Monitoring frequency (reading)	-	-	*Hourly*	*Measurement frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3*

					IRL#6
Monitoring frequency (recording)	*Daily*	-	*Daily*	*Recording frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Calibration requirements	*No requirements*	-	*The calibration of the monitoring equipment is performed by observing the specific legal regulations and issuing the related metrological control certificate*	*Calibration requirements are consistent with PDD and Monitoring Report.* *Calibration is performed once a year according to the JI 006 procedure by AMC Laboratory of SC CET Iasi S.A.*	☑ *IRL#3* *IRL#6* *IRL#24*
Uncertainty level	*Low*	-	*Low*	*Uncertainty level is low, because metering is simple and reliable metering equipment is used.* *Within the range of 0.06 – 600 000 imp/min for belt speed metering.* *It is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6* *IRL#24*
Measurement Principle (if applicable)	*Data calculated in accordance with specific procedures*	-	*An indirect method that take in consideration:* *- the coal conveyor speed,* *- the volume of the coal disposed along a linear meter deposited on the band,* *- the reference coal*	*According to the procedure JI 006 version 2. Mechanical adjustment of coal layer height and direct measurement of belt velocity.* *The calculation unit calculates the hourly consumption in tonnes. The standard density of hard coal established during the refurbishment of boilers by the consultant (Finnish FORTUM). The figure 803.57 kg/m^3 is used.* *Measurement principle is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*

			density.		
	Technical aspects				Conclusion and IRL
Instrument Type:	*Frequency/Current Adapter*				☑ *IRL#38*
Serial Number:	*3XM5H -001;* *3XM5H –002;* *3XM5H –003;* *3XM5H –004*				☑ *IRL#38*
Manufacturer Model Nr.:	*3XM5H TRUCK: Redller Revolution-Mill no.1, Redller Revolution-Mill no.2, Redller Revolution-Mill no.3, Redller Revolution-Mill no.4.*				☑ *IRL#38*
Specific Location:	*On the coal conveyor belts feeding the boiler 2.*				☑
Measurement Range:	*Measurement range for tonnes of coal is not defined, however for belt velocity 0-1000rpm.*				☑ *IRL#38*
Gaps in operating time of instrument :	Period: *Verified on-site that there were no gaps.*				☑
	Default value used: *N/A*				☑
	Justification: *N/A*				☑
	QA/QC aspects				Conclusion and IRL
Source of data	Type*: Manually taken readings from Data Control System (Damatic or DCS) by operator.* *Manually transferred from operational log book to daily forms by technical staff from energy dpt.*				☑
	Procedures: *The district heating operator reads the coal meters at every 8 hours (hours 8, 16 and 24)*				☑

	and records the readings of the coal meters in the form "Reading of Damatic coal consumption meters in the boilers" form code F JI 005 – 02.	*IRL#13*
	Implementation of procedure: *Procedures are implemented, it was verified on site.*	☑
	Responsibility: *JI Project Manager Ms. Carmen Antonovici is responsible for data acquisition.*	☑
Archiving of raw data and protection measures	*Data archiving is described in the MP.* *The original log book (hard copy) is stored in Companies Central Archive for 5 years.* *All relevant reports are archived as hard copy and electronic files. Electronic files are saved on Project Managers computer and on the computer of Energy Department as well until 2018.* *Annual data is also archived separately on CDROM.*	☑ *IRL#8*
Data transfer and protection of input data for calculations	*Data from manual daily forms are transferred manually to calculation tool (excel sheet) according to the attached procedure. This fuel consumption and heat production data is documented daily and entered into readymade input data excel sheets for each boiler which are the main part of the Monitoring Report.*	☑
	Quality of evidence	Conclusion and IRL
Completeness of data	*Completeness has been verified on-site, since all days are included in the presented data.*	☑
Data verification	Consistency of raw data with calculation tool: *Quantity of coal consumed in boiler 2 was verified by checking the data on project data sheets.* *No discrepancies were identified.*	☑ *IRL#30*
	Consistency of calculation tool with monitoring report: *The data in the monitoring report is consistent with the calculation tool.*	☑
Crosscheck (if available)	*Quantity of coal consumed in boiler 2 was cross-checked by monthly coal stock inventory reports.* *Coal consumed for heat production was 20% lower than indicated by stock inventory. The difference is explained by the fact that some of the coal is used for the plant's own needs. This difference is conser-*	☑ *IRL#31*

	vative and therefore acceptable for auditing team.	

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Table 3

Parameter and instrumentation Information					
	PDD	Meth/Tool	MR	Verification Findings	Conclusion and IRL
Parameter title	*Quantity of fuel oil consumed in boiler 1*	-	*Quantity of fuel oil consumed in boiler 1*	*Parameter title is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Parameter ID (if available)	*$fP_{b,B1}$*	-	*$fP_{b,B1}$*	*Parameter ID is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Data Unit	*tonnes*	-	*tonnes*	*Data Unit is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Monitoring frequency (reading)	-	-	*Hourly*	*Measurement frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Monitoring frequency (recording)	*Daily*	-	*Daily*	*Recording frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Calibration requirements	*No requirements*	-	*The calibration of the monitoring*	*Calibration requirements are consistent with PDD and Monitoring Report.*	☑ *IRL#3*

			equipment is performed by observing the specific legal regulations and issuing the related metrological control certificate	*Calibration is performed once a year according to the JI 008 procedure by AMC Laboratory of SC CET Iasi S.A.*	*IRL#6* *IRL#16* *IRL#26*
Uncertainty level	*Low*	*-*	*Low*	*0.5% for sensor and 1.5% for the indicator.* *It is consistent with PDD and Monitoring Report*	☑ *IRL#3* *IRL#6* *IRL#38*
Measurement Principle (if applicable)	*Data calculated in accordance with specific procedures*	*-*	*Direct measurement of pressure on oil return pipes. Establishment of flow using the nomogrammes.*	*According to the procedure JI 008. Direct measurement of pressure on oil return pipes of each fuel burners group (I main burner, II main burner and III flame support). Establishment of flow using the nomogrammes.* *Measurement principle is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6* *IRL#16*
	Technical aspects				Conclusion and IRL
Instrument Type:	*Pressure Sensor / Indicator*				☑ *IRL#38*
Serial Number:	*Sensors: 2896, 4095 and 3999* *Indicators: 1629-83, 2216-84 and 2256-84* *Three sensors for two main lines for boilers and one for flame support.*				☑ *IRL#38*

Manufacturer Model Nr.:	*Boiler 1 FE1GM Forward Fuel Oil Pressure / AI 96 Forward Fuel Oil Pressure*	☑ *IRL#38*
Specific Location:	*On the return oil pipes feeding the boiler 1 of each fuel burners group (I main burner, II main burner and III flame support).*	☑
Measurement Range:	*For pressure gauges 0-50 bar / 4-20mA.*	☑ *IRL#38*
Gaps in operating time of instrument :	Period: *Verified on-site that there were no gaps.*	☑
	Default value used: *N/A*	☑
	Justification: *N/A*	☑
	QA/QC aspects	Conclusion and IRL
Source of data	Type*: Manually taken readings from boiler panel are used to calculate total flow of oil (for three burner groups) and the result is entered into operational log book.*	☑
	Procedures: *The district heating operator reads the oil meters at every hour and records the readings of the fuel oil pressure gauges in the boiler log book.*	☑ *IRL#16*
	Implementation of procedure: *Procedures are implemented, it was verified on site.*	☑
	Responsibility: *JI Project Manager Mrs. Carmen Antonovici is responsible for data acquisition.*	☑
Archiving of raw data and protection meas-ures	*Data archiving is described in the MP.* *The original log book (hard copy) is stored in Companies Central Archive for 5 years.* *All relevant reports are archived as hard copy and electronic files. Electronic files are saved on Project Managers computer and on the computer of Energy Department as well until 2018.* *Annual data is also archived separately on CDROM.*	☑ *IRL#8*

Data transfer and protection of input data for calculations	*Data from manual daily forms are transferred manually to calculation tool (excel sheet) according to the attached procedure. This fuel consumption and heat production data is documented daily and entered into readymade input data excel sheets for each boiler which are the main part of the Monitoring Report.*	☑
	Quality of evidence	Conclusion and IRL
Completeness of data	*Completeness has been verified on-site, since all days are included in the presented data.*	☑
Data verification	Consistency of raw data with calculation tool: *Quantity of oil consumed in boiler 1 was verified by checking the data on project data sheets* *No discrepancies were found.*	☑ *IRL#30*
	Consistency of calculation tool with monitoring report: *The data in the monitoring report is consistent with the calculation tool.*	☑
Crosscheck (if available)	*Quantity of oil consumed in boiler 1 was cross-checked from monthly fuel oil stock inventory reports.* *Fuel oil consumed for heat production was 20% lower than indicated by stock inventory. The difference is explained by the fact that some of the oil is used for the plant's own needs. This difference is conservative and therefore acceptable for auditing team.*	☑ *IRL#31*

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Table 4

Parameter and instrumentation Information					
	PDD	Meth/Tool	MR	Verification Findings	Conclusion and IRL
Parameter title	*Quantity of fuel oil consumed in boiler 2*	*-*	*Quantity of fuel oil consumed in boiler 2*	*Parameter title is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*

Parameter ID (if available)	*$fP_{b,B2}$*	-	*$fP_{b,B2}$*	*Parameter ID is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Data Unit	*tonnes*	-	*tonnes*	*Data Unit is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Monitoring frequency (reading)	-	-	*Hourly*	*Measurement frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Monitoring frequency (recording)	*Daily*	-	*Daily*	*Recording frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Calibration requirements	*No requirements*	-	*The calibration of the monitoring equipment is performed by observing the specific legal regulations and issuing the related metrological control certificate*	*Calibration requirements are consistent with PDD and Monitoring Report.* *Calibration is performed once a year according to the JI 008 procedure by AMC Laboratory of SC CET Iasi S.A.*	☑ *IRL#3* *IRL#6* *IRL#16* *IRL#26*
Uncertainty level	*Low*	-	*Low*	*0.5% for sensor and 1.5% for the indicator.* *It is consistent with PDD and Monitoring Report*	☑ *IRL#3* *IRL#6* *IRL#38*

Measurement Principle (if applicable)	*Data calculated in accordance with specific procedures*	-	*Direct measurement of pressure on oil return pipes. Establishment of flow using the nomogrammes.*	*According to the procedure JI 008. Direct measurement of pressure on oil return pipes. Establishment of flow using the nomogrammes.* *Measurement principle is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6* *IRL#16*
	Technical aspects				Conclusion and IRL
Instrument Type:	*Pressure Sensor / Indicator*				☑ *IRL#38*
Serial Number:	*Sensors: 1102, 989 and 993* *Indicators: 198-90, 220-91 and 268-91*				☑ *IRL#38*
Manufacturer Model Nr.:	*Boiler 2 FE1GM Forward Fuel Oil Pressure / AI 96 Forward Fuel Oil Pressure*				☑ *IRL#38*
Specific Location:	*On the incoming and return oil pipes feeding the boiler 2.*				☑
Measurement Range:	*For pressure gauges 0-50 bar / 4-20mA.*				☑ *IRL#38*
Gaps in operating time of instrument :	Period: *Verified on-site that there were no gaps.*				☑
	Default value used: *N/A*				☑
	Justification: *N/A*				☑
	QA/QC aspects				Conclusion and IRL

Source of data	Type*: Manually taken readings from boiler panel are used to calculate total flow of oil (for three burner groups) and the result is entered into operational log book.*	☑
	Procedures: *The district heating operator reads the oil meters at every hour and records the readings of the fuel oil pressure gauges in the boiler log book.*	☑ *IRL#16*
	Implementation of procedure: *Procedures are implemented, it was verified on site.*	☑
	Responsibility: *JI Project Manager Mrs. Carmen Antonovici is responsible for data acquisition.*	☑
Archiving of raw data and protection measures	*Data archiving is described in the MP.* *The original log book (hard copy) is stored in Companies Central Archive for 5 years.* *All relevant reports are archived as hard copy and electronic files. Electronic files are saved on Project Managers computer and on the computer of Energy Department as well until 2018.* *Annual data is also archived separately on CDROM.*	☑ *IRL#8*
Data transfer and protection of input data for calculations	*Data from manual daily forms are transferred manually to calculation tool (excel sheet) according to the attached procedure. This fuel consumption and heat production data is documented daily and entered into readymade input data excel sheets for each boiler which are the main part of the Monitoring Report.*	☑
	Quality of evidence	Conclusion and IRL
Completeness of data	*Completeness has been verified on-site, since all days are included in the presented data.*	☑
Data verification	Consistency of raw data with calculation tool: *Quantity of oil consumed in boiler 2 was verified by checking the data on project data sheets* *No discrepancies were found.*	☑ *IRL#30*
	Consistency of calculation tool with monitoring report: *The data in the monitoring report is consistent with the calculation tool.*	☑
Crosscheck (if avail-	*Quantity of oil consumed in boiler 2 was cross-checked from monthly fuel oil stock inventory reports.*	☑

able)	*Fuel oil consumed for heat production was 20% lower than indicated by stock inventory. The difference is explained by the fact that some of the oil is used for the plant's own needs. This difference is conservative and therefore acceptable for auditing team.*	*IRL#31*

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Table 5

Parameter and instrumentation Information					
	PDD	Meth/Tool	MR	Verification Findings	Conclusion and IRL
Parameter title	*Quantity of steam produced in boiler 1*	*-*	*Quantity of steam produced in boiler 1*	*Parameter title is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Parameter ID (if available)	*qP_{B1}*	*-*	*qP_{B1}*	*Parameter ID is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Data Unit	*tonnes*	*-*	*tonnes*	*Data Unit is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Monitoring frequency (reading)	*-*	*-*	*Hourly*	*Measurement frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Monitoring frequency (recording)	*Daily*	*-*	*Daily*	*Recording frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3*

					IRL#6
Calibration requirements	*No requirements*	*-*	*The calibration of the monitoring equipment is performed by observing the specific legal regulations and issuing the related metrological control certificate*	*Calibration requirements are consistent with PDD and Monitoring Report.* *Calibration is performed once a year according to the NTM-3-163-94 document and procedure JI-007 by AMC Laboratory of SC CET Iasi S.A.*	☑ *IRL#3* *IRL#6* *IRL#15* *IRL#25*
Uncertainty level	*Low*	*-*	*Low*	*0.5%* *It is consistent with PDD and Monitoring Report*	☑ *IRL#3* *IRL#6* *IRL#38*
Measurement Principle (if applicable)	*Data calculated in accordance with specific procedures*	*-*	*The pressure variable drop method:* *restrictor device as primary element for obtaining the pressure drop,* *- differential pressure electronic transducer used for ΔP measurement,* *- connection pipelines between the primary element and ΔP measurement*	*According to the procedure JI 007. Direct measurement of pressure drop on steam flow.* *Measurement principle is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6* *IRL#15*

			transducer, *- operational blocks for processing the transducer output signal, installed on DCS Control Panel for displaying*		
	Technical aspects				Conclusion and IRL
Instrument Type:	*Differential Pressure Transducer / Pressure Transducer/ Voltage-Current Adapter.*				☑ *IRL#38*
Serial Number:	*Flow left 12W606158 020 and flow right 12W606159 020;* *Pressure left 642/95 and pressure right 648/95;* *Temperature left 32180 and temperature right 3F001852.*				☑ *IRL#38*
Manufacturer Model Nr.:	*EJA110A, Yokogava: Differential Pressure Transducer;* *TPRM: Pressure Transducer;* *AT2F-19: Voltage/Current Adapter for temperature left;* *TMD 833AB2AK: Voltage/Current Adapter for temperature right.*				☑ *IRL#38*
Specific Location:	*On the produced steam pipes of the boiler 1.*				☑
Measurement Range:	*For pressure gauges 0-100Kpa 4-20mA/ 0-200 bar*				☑ *IRL#38*
Gaps in operating time of instrument :	Period: *Verified on-site that there were no gaps.*				☑
	Default value used: *N/A*				☑
	Justification: *N/A*				☑

	QA/QC aspects	Conclusion and IRL
Source of data	Type*: Manually taken readings from Data Control System (Damatic or DCS).*	☑
	Procedures: *The district heating operator reads the oil meters at every hour and records the readings of the fuel oil pressure gauges in the boiler log book.*	☑
	Implementation of procedure: *Procedures are implemented, it was verified on site.*	☑
	Responsibility: *JI Project Manager Mrs. Carmen Antonovici is responsible for data acquisition.*	☑
Archiving of raw data and protection meas-ures	*Data archiving is described in the MP.* *The original log book (hard copy) is stored in Companies Central Archive for 5 years.* *All relevant reports are archived as hard copy and electronic files. Electronic files are saved on Project Managers computer and on the computer of Energy Department as well until 2018.* *Annual data is also archived separately on CDROM.*	☑ *IRL#8*
Data transfer and protection of input data for calculations	*Data from manual daily forms are transferred manually to calculation tool (excel sheet) according to the attached procedure. This fuel consumption and heat production data is documented daily and entered into readymade input data excel sheets for each boiler which are the main part of the Monitoring Re-port.*	☑
	Quality of evidence	Conclusion and IRL
Completeness of data	*Completeness has been verified on-site, since all days are included in the presented data.*	☑
Data verification	Consistency of raw data with calculation tool: *Quantity of steam produced by boiler 1 was verified by checking the data on project data sheets.*	☑ *IRL#30*

	Consistency of calculation tool with monitoring report: *The data in the monitoring report is consistent with the calculation tool.*	☑
Crosscheck (if available)	*Quantity of steam produced by boiler 1 was cross-checked from log-book for turbine operation. No significant discrepancies were found.*	☑ *IRL#32*

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Table 6

Parameter and instrumentation Information					
	PDD	Meth/Tool	MR	Verification Findings	Conclusion and IRL
Parameter title	*Quantity of steam produced in boiler 2*	-	*Quantity of steam produced in boiler 2*	*Parameter title is consistent with PDD and Monitoring Report.*	☑ *IRL#3 IRL#6*
Parameter ID (if available)	qP_{B2}	-	qP_{B2}	*Parameter ID is consistent with PDD and Monitoring Report.*	☑ *IRL#3 IRL#6*
Data Unit	*tonnes*	-	*tonnes*	*Data Unit is consistent with PDD and Monitoring Report.*	☑ *IRL#3 IRL#6*
Monitoring frequency (reading)	-	-	*Hourly*	*Measurement frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3 IRL#6*

Monitoring frequency (recording)	*Daily*	-	*Daily*	*Recording frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Calibration requirements	*No requirements*	-	*The calibration of the monitoring equipment is performed by observing the specific legal regulations and issuing the related metrological control certificate*	*Calibration requirements are consistent with PDD and Monitoring Report.* *Calibration is performed once a year according to the NTM-3-163-94 document and procedure JI-007 by AMC Laboratory of SC CET Iasi S.A.*	☑ *IRL#3* *IRL#6* *IRL#15* *IRL#25*
Uncertainty level	*Low*	-	*Low*	*0.5%* *It is consistent with PDD and Monitoring Report*	☑ *IRL#3* *IRL#6* *IRL#38*
Measurement Principle (if applicable)	*Data calculated in accordance with specific procedures*	-	*The pressure variable drop method:* *restrictor device as primary element for obtaining the pressure drop,* *- differential pressure electronic transducer used for ΔP measurement,* *- connection pipelines between the*	*According to the procedure JI 007. Direct measurement of pressure drop on steam flow.* *Measurement principle is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6* *IRL#15*

			primary element and ΔP measurement transducer, *- operational blocks for processing the transducer output signal, installed on DCS Control Panel for* *displaying*		
	Technical aspects				Conclusion and IRL
Instrument Type:	*Differential Pressure Transducer / Pressure Transducer/ Voltage-Current Adapter.*				☑ *IRL#38*
Serial Number:	*Flow left 12A725390 129 and flow right 12A725391 129;* *Pressure left 646/95 and pressure right 635/95;* *Temperature left 3F001900 and temperature right 3F001895.*				☑ *IRL#38*
Manufacturer Model Nr.:	*EJA110A, Yokogava: Differential Pressure Transducer;* *TPRM: Pressure Transducer;* *TMD 833AB2AK: Voltage/Current Adapter for temperature.*				☑ *IRL#38*
Specific Location:	*On the produced steam pipes of the boiler 2.*				☑
Measurement Range:	*For pressure gauges 0-100Kpa 4-20mA/ 0-200 bar*				☑ *IRL#38*
Gaps in operating time of instrument :	Period: *Verified on-site that there were no gaps.*				☑
	Default value used: *N/A*				☑

	Justification: *N/A*	☑
	QA/QC aspects	Conclusion and IRL
Source of data	Type*: Manually taken readings from Data Control System (Damatic or DCS).*	☑
	Procedures: *The district heating operator reads the oil meters at every hour and records the readings of the fuel oil pressure gauges in the boiler log book.*	☑
	Implementation of procedure: *Procedures are implemented, it was verified on site.*	☑
	Responsibility: *JI Project Manager Mrs. Carmen Antonovici is responsible for data acquisition.*	☑
Archiving of raw data and protection meas-ures	*Data archiving is described in the MP.* *The original log book (hard copy) is stored in Companies Central Archive for 5 years.* *All relevant reports are archived as hard copy and electronic files. Electronic files are saved on Project Managers computer and on the computer of Energy Department as well until 2018.* *Annual data is also archived separately on CDROM.*	☑ *IRL#8*
Data transfer and protection of input data for calculations	*Data from manual daily forms are transferred manually to calculation tool (excel sheet) according to the attached procedure. This fuel consumption and heat production data is documented daily and entered into readymade input data excel sheets for each boiler which are the main part of the Monitoring Re-port.*	☑
	Quality of evidence	Conclusion and IRL
Completeness of data	*Completeness has been verified on-site, since all days are included in the presented data.*	☑
Data verification	Consistency of raw data with calculation tool: *Quantity of steam produced by boiler 2 was verified by checking the data on project data sheets.*	☑

		IRL#30
	Consistency of calculation tool with monitoring report: *The data in the monitoring report is consistent with the calculation tool.*	☑
Crosscheck (if available)	*Quantity of steam produced by boiler 2 was cross-checked from log-book for turbine operation. No significant discrepancies were found.*	☑ *IRL#32*

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2.3. Parameters measured through sampling

Table 7

Sampling information					
	PDD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	*Calorific value of coal*	-	*Calorific value of coal*	*Parameter title is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Parameter ID (if available)	*CV_a*	-	*CV_a*	*Parameter ID is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Data Unit	*Kcal/kg*	-	*Kcal/kg*	*Parameter unit is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Sampling frequency	*Daily*	-	*Daily*	*Sampling frequency is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Sampling point	*Not specified*	-	*Not specified*	*The distribution tower by the service receptionist*	☑ *IRL#3* *IRL#6*
Uncertainty level	*Not specified*	-	*Not specified*	*The relative experimental standard deviation is of 0.04%, and the measure-*	☑ *IRL#3*

				ment uncertainty is of 0.32%.	*IRL#6* *IRL#38*
	Technical aspects				Conclusion and IRL
Sampling Principle:	*According to the procedure JI 009. Mixed daily sample.*				☑ *IRL#17*
Methodology of Sampling:	*According to the procedure JI 009* *Samples are taken from the coal feeding belt before the distribution tower.* *Periodicity of collecting the elementary samples is shown by a shovel at every five minutes, during the feeding with coal, in total about 20 kg of fuel. The samples taken off within an interval of 24 hours are collected, grinded and mixed up to the homogenization, the resulted coal weight representing the representative sample; it is deposited in plastic bags.*				☑ *IRL#17*
Sample Analysed by:	*Laboratory of Iasi CET II at Holboca.*				☑
Certification of Analyser/ Laboratory:	*Laboratory itself is certified (by Romanian National Institute of Metrology) to serve only the needs of Holboca CET II. The certificate is issued for calorimetric system. The analysing equipment is certified.*				☑ *IRL#27* *IRL#28* *IRL#29*
Methodology of Sample Analysis (if applicable)	*Description is given in the procedure JI 009: the heating power test consists in the complete combustion in the calorimetric bomb of a known quantity of fuel, the heat released by combustion being delivered to the calorimetric system that includes a known quantity of water, whose temperature increase is registered.*				☑ *IRL#17*
Measurement Range:	*N/A*				☑

Gaps in sampling frequency	Period: *No gaps.*	☑
	Default value used: *N/A*	☑
	Justification: *N/A*	☑
	QA/QC aspects	Conclusion and IRL
Source of data	Type*: Daily analysis certificates.*	☑
	Procedures: *The operation of coal sampling is done according to the procedure JI-009.*	☑ *IRL#17*
	Implementation of procedure: *Procedures are implemented, it was verified on site.*	☑
	Responsibility: *JI Project Manager Mrs. Carmen Antonovici is responsible for data acquisition for the sampling and analysis.*	☑
	Representativeness: *The samples have been collected and analysed daily, therefore the data is representative for a full verification period.*	☑
	Reproducibility: *One sealed (witness) sample of the supplied coal is stored for 3 month period. Daily samples are not stored.*	☑
Archiving of raw data and protection measures	*Archiving of raw data is made in the analysis report - document code F-167-01, which is stored in the Laboratory, At Energy dpt. and JI Project archive.*	☑
Data transfer and protection of input data for calculations	*Data from the analysis report are transferred manually to calculation tool (excel sheet) according to the attached procedure. The LHV data is documented daily and entered into readymade input data excel sheets for each boiler, which are the main part of the Monitoring Report.*	☑
	Quality of evidence	Conclusion and IRL

Completeness of data	*Completeness has been verified on-site, since all days are included in the presented data.*	☑
Data verification	Consistency of raw data with calculation tool: *Calorific value of coal was verified by checking the data on project data sheets.*	☑ *IRL#30*
	Consistency of calculation tool with monitoring report: *The data in the monitoring report is consistent with the calculation tool.*	☑
Crosscheck (if available)	*Calorific value of coal was cross-checked with the respective information from invoices of supplied coal.* *No significant discrepancies were found. The calorific value stated by the supplier was similar or slightly higher than established by CET laboratory.*	☑ *IRL#34*

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Table 8

Sampling information					
	PDD	Meth/Tool	MR	Verified	Conclusion and IRL
Parameter title	*Calorific value of fuel oil*	-	*Calorific value of fuel oil*	*Parameter title is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Parameter ID (if available)	*CV_b*	-	*CV_b*	*Parameter ID is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*

Data Unit	*Kcal/kg*	*-*	*Kcal/kg*	*Parameter unit is consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Sampling frequency	*Daily*	*-*	*Weekly*	*Weekly, this is also described in the standard procedure JI-009.* *The use of fuel oil is quite low, the storing capacity on CET is sufficient. Fuel oil is purchased seldom and therefore daily sampling is not required. Neither it has significant impact on ER calculation. It is auditor's opinion, that sampling frequency can be considered consistent with PDD and Monitoring Report.*	☑ *IRL#3* *IRL#6*
Sampling point	*Not specified*	*-*	*Not specified*	*It was verified on site that the sampling for fuel oil is on the transportation pipelines towards the boilers located in fuel oil pumping station building.*	☑ *IRL#3* *IRL#6*
Uncertainty level	*Not specified*	*-*	*Not specified*	*The relative experimental standard deviation is of 0.04%, and the measurement uncertainty is of 0.32%.*	☑ *IRL#3* *IRL#6* *IRL#38*
	Technical aspects				Conclusion and IRL
Sampling Principle:	*According to the procedure JI 009. One sample (200 g) is taken.*				☑ *IRL#17*
Methodology of Sampling:	*According to the procedure JI 009. One sample (200 g) is taken.*				☑

		IRL#17
Sample Analysed by:	*Laboratory of Iasi CET II at Holboca.*	☑
Certification of Analyser/ Laboratory:	*Laboratory itself is certified (by Romanian National Institute of Metrology) to serve only the needs of Holboca CET II. The certificate is issued for calorimetric system. The analysing equipment is certified.*	☑ *IRL#27* *IRL#28* *IRL#29*
Methodology of Sample Analysis (if applicable)	*Description is given in the procedure JI 009: the heating power test consists in the complete combustion in the calorimetric bomb of a known quantity of fuel, the heat released by combustion being delivered to the calorimetric system that includes a known quantity of water, whose temperature increase is registered.*	☑ *IRL#17*
Measurement Range:	*N/A*	☑
Gaps in sampling frequency	Period: *No gaps*	☑
	Default value used: *N/A*	☑
	Justification: *N/A*	☑
	QA/QC aspects	Conclusion and IRL
Source of data	Type*: Calorific value certificates issued by Holboca CET II laboratory.*	☑
	Procedures: *The operation of fuel oil sampling is done according to the procedure JI-009.*	☑ *IRL#17*
	Implementation of procedure: *Procedures are implemented, it was verified on site.*	☑
	Responsibility: *JI Project Manager Mrs. Carmen Antonovici is responsible for data acquisition for the sampling and analysis.*	☑

	Representativeness: *The samples have been collected and analysed weekly, therefore the data is representative for a full verification period.*	☑
	Reproducibility: *The control sample on reception of fuel oil is taken (from every third railway tank) for storage of 3 months. The weekly samples are not stored.*	☑
Archiving of raw data and protection measures	*Archiving of raw data is made in the analysis report - document code F-167-01, which is stored in the Laboratory, At Energy dpt. and JI Project archive.*	☑
Data transfer and protection of input data for calculations	*Data from the analysis report are transferred manually to calculation tool (excel sheet) according to the attached procedure. The LHV data is documented daily and entered into readymade input data excel sheets for each boiler, which are the main part of the Monitoring Report.*	☑
	Quality of evidence	Conclusion and IRL
Completeness of data	*Completeness has been verified on-site, since all days are included in the presented data.*	☑
Data verification	Consistency of raw data with calculation tool: *Calorific value of fuel oil was verified by checking the data on project data sheets.*	☑ *IRL#30*
	Consistency of calculation tool with monitoring report: *The data in the monitoring report is consistent with the calculation tool.*	☑
Crosscheck (if available)	*No cross-check is available as calorific value of fuel oil was not indicated on the purchase invoices. However the values are in the same range used for estimation of emission reductions in the PDD of this project and other Romanian project "Energy Efficiency Improvement of the District Heating System in Drobeta Turnu-Severin" (RO1000133).*	☑ *IRL#39*

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2.4. Parameters obtained through external sources and accounting data

Not applicable

2.5. Other parameters not included in the methodology/tool but included in the PDD

Not applicable

3. Data Processing and ER calculation

Description of data processing from transferred data to final results in the calculation tool		
Step	Description	Conclusion and IRL
Consistency	*All abbreviations and units are consistent with the PDD and Methodology and traceable to the raw data.*	☑ *IRL#7*
Calculation Tool description	*The calculation tool in general is clearly described and transparent;* *The issuing date and revision number are indicated.* *All formulae, intermediate steps and constants are described transparently including correct units and are in compliance with the methodology and the PDD.* *The data collected are further used for calculation. The calculation is done by means of excel data sheets.* *The calculation tool steps are presented in the document "Boiler efficiency improvement at Holboca CET Iasi II - Monitoring Plan Guidelines and Procedures"*	☑ *IRL#7*
Elimination of not plausible data (if applicable)	*N/A.*	☑
Transformation from useable data to input data for further calculation (if applicalbe)	*All the data transferred to the sheet is directly useable*	☑
Ex-ante data	*No ex-ante data is used*	☑

Default parameter	*Steam specific emissions for the boilers were predefined and fixed in the PDD as following:* *For boiler 1: qB_{B1} = 247.99071 kg CO_2/t and* *For boiler 2: qB_{B1} = 244.55855 kg CO_2/t.* *Standard density of hard coal 803.57 kg/m^3 is used.*	☑ *IRL#7*
Formulae check	*All formulae included in the calculation tool are in compliance with the PDD.* **Corrective Action Request #1.** *Correct the reference errors in formula to calculate steam specific emissions for January 30 for boiler II (cell I37 on sheet "INPUT DATA BOILER II").*	☑ *IRL#7*
Rounding functions	*N/A, no rounding functions are used*	☑ *IRL#7*
Calculation tool changes and protection measures	*The calculation tool is issued in protected version.*	☑ *IRL#7*
Reported data	*The results of the calculation tool are consistent with these mentioned in the MR. ERs for 2010 are in both documents stated to be 24 561 tCO_2e.*	☑ *IRL#6* *IRL#7*

4. Additional assessment

4.1. Internal Review

Description and performance of internal review		
	Description	Conclusion and IRL
Procedure	*According to the JI 003 procedure.* *The raw data is processed by energy department, JP Project Manager verifies the data monthly.* *JI Project Manager coordinates the activity of the team constituted for the implementation of the Project "Boiler Efficiency Improvement at Holboca CET IASI II"; is responsible for the Monitoring Plan management; initiates the adjustment of this procedure any time, as necessary, after the Verifier prior Notification; Notifies the Verifier about any queries appeared regarding the data management and regarding the procedures adjustment necessity; supervises the activities related to the project.*	☑ *IRL#11*
Documentation	*The Monitoring Report is issued by CET IASI II.* *Documented instructions exist as "Monitoring Plan – Guidelines and Procedures" and several "JI Procedures" 001 – 009.*	☑ *IRL#6* *IRL#8*
Responsibilities	*The general manager Mr. Dorin Ivana makes the final internal approval of the Monitoring Report.*	☑

4.2. Peculiarities

Description of Peculiarities and unexpected Daily Events during the verification period		
	Description	Conclusion and IRL
Performance	*No major peculiarities neither major breakdowns took place.*	☑

	It was confirmed on-site from the log-book.	
Documentation	*Manual log-book*	☑ *IRL#35*
Measures	*No major measures are needed initialized to stabilize the performance of the facility.*	☑

4.3. Further additional requirements

Description of additional requirements to be checked		
	Description	Conclusion and IRL
Environmental issues	*According to the Romanian legislation the local EPA should prepare a semi-annual Inspection Reports for JI Track 1 projects. This project became Track 1 in April 2010. The Inspection Reports for 2010 did not contain any significant deficiencies from the environmental point of view.* *However the Reports were issued in February 2011.* **Forward Action Request #1.** *Environmental inspection reports should be issued timely within next month of the reporting period – no later than 31.07 and 31.01.*	☑ *IRL#36*

4.4. Data Reporting

Description of the Monitoring Report		
	Comments and Results	Conclusion and IRL
Compliance with UNFCCC regulations	*The project is applying a project specific methodology approach. All requirements from the project specific methodology approach are fulfilled. The Methodology, Monitoring Plan in the PDD and the Monitoring Report are consistent.* *Monitoring report (Version 2 dated 06.04.2011) including excel sheet "110406 JI Project Iasi 2010_Monitoring Report_Protected_V2.xls" (Version 2 dated 06.04.2011) is consistent with the PDD.* *The verified period is from the 01.01.2010 until 31.12.2010.*	☑ *IRL#3* *IRL#6* *IRL#7*
Completeness and Transparency	*The project description and implementation is complete and transparently explained in the Monitoring Report.*	☑
Correctness	*All the reported data is correctly represented in the Monitoring report and Calculation Tool.*	☑ *IRL#6* *IRL#7*

5. Compilation and Resolutions of CARs, CRs and FARs

Corrective Action Requests by audit team			
	Comments and Results	Ref	Conclusion and IRL
Issue	***Corrective Action Request #1*** *Correct the reference errors in formula to calculate steam specific emissions for January 30 for boiler II (cell I37 on sheet "INPUT DATA BOILER II").*	*3*	☑ *IRL#7*
Response	*Respective Excel Spreadsheet has been revised and is attached. The Monitoring Report will be updated in accordance once TÜV has approved the requested changes.*		
Assessment	*The error in ERU calculation workbook has been corrected. The issue is closed.*		
Clarification Requests by audit team			
	Comments and Results	Ref	Conclusion and IRL
Issue			
Response			
Assessment			

Forward Action Requests by audit team			
	Comments and Results	Ref	Conclusion and IRL
Issue	*Forward Action Request #1* *Environmental inspection reports should be issued timely within next month of the reporting period – no later than 31.07 and 31.01.*	*4.3*	☑
Response	*Emphasis will be made that Environmental Inspection Reports will be issued timely within next month of the reporting period – no later than 31.07 and 31.01.*		
Assessment	*It will be checked during the next verification. The issue is closed for now.*		

Annex 2: Information Reference List

Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in JI Context)
1.	04/03/2011	On-site interviews conducted by TÜV SÜD. **Validation Team:** Madis Maddison – JI Auditor Verifier **Interviewed Persons:** Ivana Dorin – General Director CET Iasi Ion Asavoae – Plant Director CET Iasi Carmen Antovici – JI Project Manager CET Iasi Marina Balaita – Assistant to JI Project Manager CET Iasi Nicolae Istrate – Head of Laboratory AMC CET Iasi Bobu Boris – Eng. S.C. ENERGIC-SERV Hunea Traian – Head of boilers department Musteata Jean – Head of chemical department Cristina Dascalu- Iasi Regional Environmental Protection Agency Mihai Brasoveanu – Danish Environmental Agency /Local Project Coordinator Romania	TÜV SÜD	
2.	24/09/2010	First JI Track 1 Verification Report no: 600500437	TUV SUD	Previous Verification Report
3.	24/09/2008	PDD Version 4, RO1000132, http://ji.unfccc.int/JIITLProject/DB/P0TQKX18ZWNH3BO84RICO3WBQX5HDI/details	CET Iasi	PDD
4.	09/02/2011	Monitoring Report for JI Project – "Boiler Efficiency Improvement at Holboca C.E.T. Iasi II", Version 1	CET Iasi	First published Monitoring Report
5.	09/02/2011	Excel file "110210 JI Project Iasi 2010_Monitoring Report_Protected.xls", Version 1	CET Iasi	ER calculation workbook for First published Monitoring Report
6.	20/04/2011	Monitoring Report for JI Project – "Boiler Efficiency Improvement at Holboca C.E.T. Iasi II", Version 3	CET Iasi	Final Monitoring Report

Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in JI Context)
7.	06/04/2011	Excel file “110406 JI Project Iasi 2010_Monitoring Report_Protected_V2.xls”, Version 2	CET Iasi	ER calculation workbook for Final Monitoring Report
8.	24/09/2008	MP Guidelines and Procedures Version 3 No.080729	GRUE&HORNSTRUP	Monitoring Plan
9.	12/09/2006	JI 001 Procedure - Training of the Staff with Responsibilities under the Project “Boiler Efficiency Improvement at Holboca CET Iasi II“ – Version 1	CET Iasi	
10.	15/09/2006	JI 002 Procedure - The Features of the Used Fuels at CET Iasi II Boilers – Version 1	CET Iasi	
11.	10/10/2007	JI 003 Procedure - Monitoring of the Greenhouses Gases Emission Reductions at CET Iasi II – Version 2	CET Iasi	
12.	12/09/2006	JI 004 Procedure - Monitoring Report of the Greenhouses Gases Emission Reductions at CET Iasi II – Version 1	CET Iasi	
13.	10/10/2007	JI 005 Procedure - Registration of the Main Parameters at the Boilers of 420 t/h on Mineral Coal – Version 2	CET Iasi	
14.	10/05/2009	JI 006 Procedure - Coal Flow Checking And Calibration In The DCS Damatic System at CET II – Version 2	CET Iasi	
15.	15/09/2006	JI 007 Procedure - Checking and Calibration of the Differential Pressure Transducers; Measurement of the Boilers Live Steam at CET II – Version 1	CET Iasi	
16.	12/09/2006	JI 008 Procedure - The Calculation of the Fuel Oil Flow Spent at the Boilers of 420 t/h on Mineral Coal – Version 1	CET Iasi	
17.	10/10/2007	JI 009 Procedure - The Coal Sampling on the Boilers' Feeding Bands, the Fuel Oil Sampling and the Settlement Of The Fuels Heating Power – Version 1	CET Iasi	
18.	01/11/2008	JI 010 Procedure - Settlement of the Main Parameters in Case the Boilers Measurement Devices Afferent to the JI Project from CET Iasi II are out of Order – Version 1	CET Iasi	
19.	13/05/2009	JI 011 Procedure - Electronic Data Integrity and Security for JI Project “Boiler Efficiency Improvement at Holboca CET IASI II” – Version 2	CET Iasi	
20.	30/11/2006	PO-168 Operation of the Therma-chem FS-12 solution injection installation in the boilers of 420 t/h	CET Iasi	

Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in JI Context)
21.	09/03/2010 06/12/2010	Therma-Chem invoices	CET Iasi	
22.	01/03/2011	List of Operational Licences	CET Iasi	
23.	09/12/2010	Minutes of periodic training	CET Iasi	
24.	12/10/2010 13/10/2010 25/10/2010	Testing protocols for coal quantity meters	CET Iasi	
25.	08/06/2010 14/06/2010 16/06/2010 17/06/2010 10/08/2010 20/09/2010 21/09/2010	Testing protocols for steam quantity meters	CET Iasi	
26.	21/06/2010 23/06/2010 23/08/2010 24/08/2010 25/08/2010	Testing protocols for fuel oil quantity meters	CET Iasi	
27.	11/11/2008	Metrological testing protocols for laboratory balances meters, No: 0030181	Romanian Bureau of Legal Metrology	
28.	22/12/2010	Metrological testing protocols for calorimetric bomb, No: 04.02-83/2010	Romanian Bureau of Legal Metrology	
29.	23/12/2010	Metrological testing protocols for calorimetric system, No: 04.02-85/2010	Romanian Bureau of Legal Metrology	
30.	01/03/2011	Project data sheets for 2010	CET Iasi	Verification of raw data
31.	23/06/2010	Coal and fuel oil stock inventory reports	CET Iasi	Cross-check of quantity of

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				used coal
32.	02/03/2011	Registration sheets for the main operational parameters of boiler no.1 - 420 t/h and boiler no.2 - 420 t/h running on hard coal	CET Iasi	Cross-check of quantity of produced steam
33.	08/01/2010 … 18/07/2010	Invoices on purchased coal		Cross-check of calorimetric value for coal
34.	05/10/2007 24/11/2007	Invoices on purchased fuel oil	SC Rafinaria Steaua Romana SA	Cross-check of calorimetric value of fuel oil
35.	2010	Manually filled operation log book	CET Iasi	Cross-check of peculiarities in operation of boilers
36.	02/2011	Semi-annual Inspection Reports for 2010	Iasi Environment Protection Agency	FAR#1
37.	02/03/2011	Explanatory Memorandum, Ash Removable System	CET Iasi	FAR#1 from previous VR
38.	01/03/2011	JI PROJECT BOILER RELATED MEASURING EQUIPMENT SPECIFICATION	CET Iasi	
39.	07/11/2009	PDD version 8. Energy efficiency improvement of the district heating system in Drobeta Turnu-Severin (reg no: RO1000133) http://ji.unfccc.int/UserManagement/FileStorage/UG9DWM3KJC7L0RT5IE4N6VX2ZBP81O		
40.	2010	Chemical analysis reports for hard coal	CET Iasi	
41.	2010	Chemical analysis reports for fuel oil	CET Iasi	