VERIFICATION / CERTIFICATION REPORT

SAWDUST 2000 JOINT IMPLEMENTATION PROJECT IN ROMANIA

VERIFICATION PERIOD:
1 JANUARY 2009 TO 31 DECEMBER 2009

REPORT NO. 2010-1041
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DET NORSKE VERITAS

VERIFICATION / CERTIFICATION REPORT

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Client: Danish Energy Agency		Client ref.: Inge Gerhardt-Pedersen

DET NORSKE VERITAS
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Summary:

The Danish Energy Agency (DEA) has commissioned Det Norske Veritas Certification AS (DNV) to perform the verification of the emission reductions reported for the SAWDUST 2000 Joint Implementation Project (ITL number RO 1000020) in five towns of Romania for the period 1 January 2009 to 31 December 2009. This report summarises the findings of this verification.

The verification was carried out in accordance with the Determination and Verification Manual and Romanian JI Track I procedure. During the verification DNV reviewed the project's monitoring reports, baseline study, detrmination report, monitoring plan and the project's previous verification report (fourth voluntary and first JI verification performed by DNV). This report covers the second verification period according to JI Track I procedures of Romania.

In our opinion, the GHG emission reductions reported for the project in the monitoring reports are fairly stated.
Det Norske Veritas Certification AS was able to verify that the emission reductions from the SAWDUST 2000 Joint Implementation Project during the period 01 January 2009 to 31 December 2009 amount to **61 485** tonnes of CO_2 equivalent.

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Report title: SAWDUST 2000 Joint Implementation Project in Romania		
Work carried out by: Mario Vöröš		
Work verified by: Astakala Vidyacharan		
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Abbreviations

BAU	Business As Usual
CAR	Corrective Action Request
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CH_4	Methane
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
EPA	Environmental Protection Agency
ERU	Emission Reduction Units(s)
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N_2O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PCF	Prototype Carbon Fund of the World Bank
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change
GWP	Global Warming Potential

1 INTRODUCTION

The Danish Energy Agency (DEA) has commissioned Det Norske Veritas Certification AS (DNV) to perform a verification of the emission reductions reported for the SAWDUST 2000 Joint Implementation Project for the period 1 January 2009 to 31 December 2009.

The SAWDUST 2000 Joint Implementation Project comprises the conversion of district heating systems by substitution of fossil fuels (natural gas and liquid gas oil) with wood residues (sawdust, woodchips) in five towns of Romania (namely Huedin, Vlahita, Gheorgheni, Vatra Dornei and Intorsura Buzaului).

During the fifth periodical and first JI verification in May of 2009 /4/, two sites of the project (Vatra Dornei, Huedin) were visited to verify that the project was implemented in accordance with the project design document (PDD) and furthermore to assess that the monitoring systems were in place and fully functional.

The site visits were performed at the Gheorgheni, Vlahita and Intorsura Buzaului locations for this verification (it is the sixth periodical and simultaneously the second JI verification) in Romania on 17-18 March 2010. For the other two locations the project's reported emission reduction calculations and supporting data were assessed.

1.1 Objective

Verification is the periodic independent review and *ex post* determinations by an Independent Entity of the monitored reductions in GHG emissions that have occurred as a result of a registered JI project activity during a defined verification period.

1.2 Scope

The scope of the verification is:

- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that the reported GHG emission data is sufficiently supported by evidence.

The verification also followed up the findings of the fifth verification report issued by DNV /4/.

The verification shall ensure that reported emission reductions are complete and accurate.
The verification team has, based on the recommendations in the Determination and Verification Manual /14/, employed a risk-based approach, focusing on the identification of significant reporting risks and verifying the mitigation measures for these.

1.3 Description of the Project Activity

Project Parties:	Romania and Denmark
Title of project activity:	SAWDUST 2000 Joint Implementation Project
Project Entities:	Romanian Ministry of Environment and Water Management
	Danish Energy Agency, Amaliegade 44 DK - 1256 Copenhagen K
	Inge Gerhardt-Pedersen, Tel. +45 33 92 67 29 igp@ens.dk
Location of the project activity:	Huedin
	Gheorgheni
	Intorsura Buzaului
	Vatra Dornei
	Vlahita

The SAWDUST 2000 Joint Implementation Project upgraded and developed the district heating system of five towns (listed above) in Romania. The project substituted previously used fossil fuel (natural gas and liquid oil) with biomass, primarily with sawdust. The project is based on the experiences from a previous pilot project in another Romanian town, Tasca in the Neamt County. The key components of the present project are listed below:

- Use of renewable energy resources
- Reduction of the environmental impacts caused by the illegal dumping of wood waste from the sawmill and the wood processing industry
- Improvement of the social standard in Romania
- Stable heat energy price for consumers that are not being affected by the changes to the fuel prices on the world market

The project generates reductions of green house gas emissions, mainly carbon dioxide through replacement of fossil fuel usage and methane from decomposition of dumped wood waste.

The calculations are based on the fact that 78% of the greenhouse gas emission reductions relate to reductions from anaerobic digestion of wood waste dumped.

The crediting period of the project is from January 2004 to December 2017, established according to an agreement between the Romanian Ministry of Environment and Water Management and the Danish Energy Agency /13/. This information about the crediting period is confirmed in new version of PDD and Monitoring plan /1//2/. This verification is inside of the JI-crediting period 2008-2012. Updating of project information on UNFCCC JI website is

requested as FAR (see chapter 3.2) and it is in progress as was confirmed by DEA responsible person.

2 METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. These include:

i) Records related to measuring quantity of heat;

ii) Emission factors issued PDD /1/ and Baseline methodology /3/;

iii) Records on validation and/or calibration of the used measuring equipment, etalons and calculation software.

iv) Requirements included in national procedure for using Joint Implementation (JI) under Track I (National JI Track procedure for Romania) /15/

Verification team

				Type of involvement					
Role/Qualification	***Last Name***	***First Name***	***Country***	Desk review	Site visit	Reporting	Supervision of work	Technical review	Expert input
JI verifier / Technical team leader with sectoral knowledge	Vöröš	Mario	Czech Republic	✓	✓	✓	✓		
JI verifier	Andrtová	Zuzana	Czech Republic			✓			
Technical reviewers	Astakala	Vidyacharan	India					✓	

Duration of verification

Preparations: 15-03-2010

On-site verification: From 16-03-2010 to 19-03-2010

Reporting: From 01-04-2010 to 27-10-2010

2.1 Review of Documentation

During the verification DNV has assessed Project design document /1/, Guidelines for Monitoring Plan /2/, Baseline study /3/, Determination report /12/ and Monitoring reports for individual cities /5/ including documents of calibration report and operational records reviewed the during site visit in March 2010.

2.2 Site Visits

The Sawdust 2000 project is a fully implemented project, which includes heating system in the 5 towns, Huedin, Vatra Dornei, Gheorgheni, Intorsura Buzaului and Vlahita in Romania. DNV carried out a site visit at three towns Gheorgheni, Vlahita and Intorsura Buzaului on a sampling basis and according to DNV knowledge of this project based on six years verification experiences in March 2010. Vatra Dornei and Huedin was visited during the first JI verification period in May 2009. These two sites plus site at Gheorgheni are planned to be visited during next verification (seventh periodic and third JI verification). The operations, stocking places and responsible municipalities were visited in these three towns. The operational records of all locations were reviewed and compared with records in individual monitoring reports /5/. Documentation records from calibration of metering devices and trainings were assessed. The operation in these three towns was without any long unplanned malfunctions. The assessment of the two other monitoring reports /5/ for other sites are described below in follows chapters.

Requirements from Monitoring plan /2/ were compared with operational practices in all visited sites. Additionally inspection records /9/ /11/ was assessed from local EPAs (branch offices under the Ministry of Agriculture, Forest, Waters and Environment).

Persons interviewed during site visit are listed in chapter 6 - 'References' of this report. The main topics of interview were: information related operation as capacity of plant, number of consumers, information related to sawdust, its availability and its quality, calculation of emission reduction in monitoring reports /5/, malfunctions of boilers in verified periods, comments from EPAs visits, maintenance records and needs, training requirements and data management.

2.3 Assessment

The data presented in the monitoring reports /5/ were assessed. Project documentation and production records were verified, as well as established monitoring and reporting practices and collection of measurements and the reliability of the installed monitoring equipment. Interviews with personnel of Gheorgheni, Vlahita and Intorsura Buzaului plants and project manager have been performed to assess awareness of personnel. This has enabled the verification team to assess the accuracy and completeness of the reported monitoring results, and to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan and the determination of the reductions in CO_2 emissions.

Further the assessment was carried out by means of:

- Checking and recalculation of quantity of delivered heat and calculation of the baseline emissions;
- Checking the process of the sawdust moisture measuring and reporting;
- Checking the value of emission factor used for baseline calculation;
- Verifying the implementation of the monitoring plan including procedures for quality assurance of the monitoring/measuring equipment and software.

2.4 Reporting of Findings

Findings established during the verification may as follows:

A corrective action request (CAR) is issued, where:

i. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
ii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
iii. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A clarification request (CL) shall be raised if information is insufficient or not clear enough to determine whether the applicable JI requirements have been met.

A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the project for the period 1 January 2009 to 31 December 2009. The findings of the verification are documented in more detail in the verification checklist given in Appendix A.

3.1 Remaining Issues, CARs, FARs from Previous Verification

Five FARs from previous verification /4/ were assessed:

FAR 1: *Tables for NCV of spruces and other type of the sawdust is not a controlled document currently. It shall be included into a controlled documentation as PDD, Monitoring plan etc.*

The FAR is closed. The NCV at certain moisture content is included in the determined and valid Monitoring Report as well as in the annex of the Guidelines for the Monitoring Plan Version 4 /2/ was submitted to verifier.

FAR 2: *The requirements for archiving period are not clear. It shall be reviewed as to what period is required from Romanian government or DEA and establish this period and include an appropriate way of electronic data back-up.*

The FAR is closed. There are no specific requirements for data archiving from the Romanian Government or the Danish Energy Agency (DEA, former DEPA) in this aspect.

Nevertheless it is envisaged that all Monitoring data will be archived at least throughout the crediting period, which is 14 years (2004-2017).

FAR 3: It is important to review the recording primary daily reporting data, which is performed by operational employees. Some records found missing out from official records and it was needed to use back up data or average data (Huedin – 25-27 January 2008 or several days in February). Additional instructions/trainings to increase awareness of relevant employees are needed.

The FAR is closed. The new procedures are established and provide regular control for persons (minimum 4 times in year for each boiler house) involved in daily records. The EPAs employees are trained together with plant employees, as required in the Monitoring plan. For detailed view of

action taken please see chapter 3.2 in Periodic verification report for 1 January 2008 to 31 December 2008 - Report number 2009-9127 – version 01 – issued 25-03-2010 /4/.

FAR 4: *The requirements in monitoring plan shall be in accordance with legal requirements. Thus the requirements for local EPAs visits shall be updated accordingly.*

The FAR is closed. Initially a quarterly quality assurance check was envisaged and performed by the local EPAs, however in accordance with the "National Procedure for Track 1" in force in Romania a semi-annual check is sufficient. The respective procedure/form for quality assurance carried out by the local EPAs has been revised in accordance. Semi-annual inspections are required by Romanian Track 1 procedure /15/. This was confirmed by Mrs. Hortensia Dumitriu /22/, NEPA – National Environmental Protection Agency.

FAR 5: Please identify the resource of the table, where NCV of spruces (or other type of sawdust) are identified, and review it, if the data for the humidity over 60% are available. Some cases with higher humidity have been observed.

The FAR is closed. A new table including NCV for moisture contents beyond 60% was issued at all sites in the week 10 / 2010.

3.2 CARs, FARs or CLs from this Verification period

FAR, CAR #	Description of the FAR, CAR	Observed actions taken to resolve	Conclusions
CAR 1	Some records of the calculated NCV for specific sawdust water content were found incorrect. Additional instructions/trainings to increase awareness of relevant employees are needed.	100% check of Calculated NCV related to specific water content in wood fuel was performed during the verification. Incorrect data has been corrected in the new version (v2) of the monitoring reports /5/ by Mr Cristi Dragan Additional trainings and instructions will be carried out in order to increase awareness of relevant employees. This will be done as follows: a) Periodical site inspections including instructions and trainings at all boiler sites incorporated in the project activity will be carried out by Mr Cristi Dragan, Boiler House Manager from Vatra Dornei. Mr Dragan will visit each boiler house at a minimum 4 times a year b) In addition Mr Mihai Brasoveanu, Local Country Coordinator from the Danish Energy Agency (former DEPA) will periodically visit the sites Grue + Hornstrup, who holds a contract with the Danish Energy Agency since 2006 for providing annual monitoring and operational oversight will	The provided explanation is sufficient. The CAR is closed.

		address related issues during the next site visit (planned for the beginning of 2011)	
CAR 2	Some questions (14, 15, 17) in EPA questionnaire, in Vlahita dated for 29.1.2010 and 10.8.2009, was left unfilled.	Objective evidence has been sent to DNV. Mr. Abos on behalf of Environmental Protection Agency for Harghita district sent the corresponding pages from the two mentioned inspection reports with the required modifications. On the top of each page (hand writing) is the date of the report where from the page is. For art 14 & 15 in Vlahita you can find the note "No backup boiler". For art 17 the comment is "Yes" and the note is: "Due to the crises the wood industry is now regressing; the City Hall and Local Authorities are in permanent survey of the market and succeeded to control the sawdust supply up to date".	The provided explanation is sufficient. The CAR is closed.
CAR 3	Monitoring report (MR) for Huedin does not includes wood species at all and MR Intorsura Buzaului does not contain English name of the wood species.	Updated MRs was sent to DNV for a review. English names of the wood species have been updated.	The provided explanation is sufficient. The CAR is closed.
FAR1	The update versions of PDD, Baseline study and Guideline for Monitoring plans should be public available on UNFCCC /JI website.	It is in progress. DEA responsible person discussed with the Romanian DFP this issue. DFP tried to update but something didn't work and the update was not saved on the website. Mrs Florentina Manea try to update the docs on the JISC UNFCCC website in the week 44 (she is the only one allowed to access JISC UNFCCC website but she has now other assignments / missions abroad and we agreed upon a meeting dedicated to the update and upload in the week 44).	The FAR will be reviewed during next verification

3.3 Project Implementation

This is the sixth verification period of the project (second JI-verification period) and the project is fully implemented and established according to description in PDD /1/. Situation was confirmed at visited locations in Gheorgheni, Vlahita and Intorsura Buzaului plants. All locations have adequate provision for sawdust/woodchips stocking and processes correspond with information/directions described in PDD /1/, Baseline study /3/, Monitoring plan /2/ and quantity of local EPAs visits. Bio-fuel in Gheorgheni boiler plant was switched from the sawdust

to the woodchips on 16 Dec. 2008 with respect to market circumstances. Therefore the methane emission reduction was excluded from overall emission reduction calculation for the period 1 January 2009 to 31 December 2009 respectively. Following project Sawdust 2000 from the very first verification period, DNV could observe continuous improvement in the project implementation. Understanding of JI-requirements, operation and data management awareness and understanding of operational personnel, plant managers and EPA personnel are good. This is the result of action taken upon the discussion and findings from annual verifications.

3.4 Completeness of Monitoring

The monitoring plan includes two methodologies for monitoring and estimation of the GHG emission reductions of the project, i.e. reduction of carbon dioxide CO_2 emissions and avoidance of methane CH_4 emission.

Methodology one, comprises the calculation of the annual CO_2 emission reduction originating from the substitution of fossil fuels with wood residues. The CO_2 emission reductions are equal to the annual quantity of CO_2 emission estimated in the BAU scenario. The specific type of the fossil fuel, the calorific value of the oil and natural gas has been determined or monitored by the project operator contacting the relevant supplier of oil and natural gas to obtain precise and reliable data. The CO_2 emission factors for the oil or the natural gas are available. Hence, taking into consideration the heat supply to each town the corresponding CO_2 emissions can be calculated.

Methodology two comprises the calculation of the CH_4 emission avoidance resulting from reducing the quantities of stockpiles of wood residues that are left for decay. Information/type about the wood residues loaded into the new boiler system and the water content of the wood residues combusted and the heat produced by the biomass boiler system are recorded with daily frequency. The identification of the calorific value of the wood residue entering the boilers according to the wood species and water content is calculated by use of the table with this information. The table is included in the Guidelines for the Monitoring Plan Version 4 /2/ and used tables are controlled documents now. Water content in sawdust is calculated up to 70% humidity from week 10 / 2010.

Bio-fuel in Gheorgheni boiler plant was switched from the sawdust to the woodchips on 16 Dec. 2008 with respect to market circumstances. Therefore the methane emission reduction (methodology II) was excluded from overall emission reduction calculation for the period 1 January 2009 to 31 December 2009 respectively.

The heat production efficiency of the boiler system is considered to be 85% ex-ante /2/ /3/. By using this estimated efficiency value the gross total heat energy amount and biomass quantity loaded into the boiler system may be calculated. The methane emission reductions are calculated on the amount of the sawdust by using the PCF plus model given in the Guidelines for the Monitoring Plan /2/.

The basic data for the calculation of the emission reductions are the weight and water content of the wood residue combusted, and the gross heat energy produced in the boiler system. This information is collected with daily frequency and recorded in monitoring report forms in accordance with the requirements of the Guidelines for the Monitoring Plan /2/ on each site. The respective EPAs, using their own staff to verify once per semester the permanent monitoring performed by the project participants in accordance with the PDD of the project, as well as the

accuracy of the registered data under the permanent monitoring." (Romanian National Procedures fir Track I / CHAPTER IV – Monitoring, determination and issuance of ERUs).

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	Heat production
Measuring frequency: constantly	
Reporting frequency: daily	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Ultrasonic heat meters with internal calculator are used. The accuracy is correct and ensured through calibrations. Calibration certificate for **Gheorgheni** bio-boiler heat meters (0300120/03) dated 26. August 2008 and calculator (SN 4502798/2003) dated 13 August 2008, Natural Gas boiler heat meters (0300119/03) dated 16. September 2008 and calculator (4502799/2003) dated 14 August 2008 Calibration certificate for **Vlahita** heat meter (0300120/03) and calculator (4502797/2003) dated 23 August 2007 Calibration certificate for **Intorsura Buzaului** heat meter (1221570/03)and calculator (4502800/2003) dated 11 May 2007 Calibration certificate for **Vatra Dornei** heat meters (0300117/03, 0300122/03, 0300123/03) and calculator (4502801/2003, 4502802/2003, 4502803/2003) dated 20 September 2006 Calibration certificate for **Huedin** heat meter (1221571/03) and calculator (4502805/2003) dated 13 April 2009. Although previous certificate was not available because obligatory requirements request only present valid certificate storage, DNV is possible to verify that the heat meter work properly and was calibrated. The calibration for previous period was verified during previous periodic verifications unfortunately number of certificate was lost but DNV confirms that these were verified in previous verifications.
Calibration frequency /interval:	
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The frequency of the re-calibration is every **four years** according to Romanian legislation. All calibration protocols were valid.
Company performing the calibration:	

Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
Is(are) calibration(s) valid for the whole reporting period?	Yes
If applicable, has the reported data been cross-checked with other available data?	NA
How were the values in the monitoring report verified?	Verbally, asking operators what is the practice of daily records handling. Cross checking primary data in hand book at the operation with official records in the Monitoring report.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data handling and recording into the Excel spreadsheet calculation template for calculation purposes has been done without any materiality mistakes
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	Water content in biomass
Measuring frequency: daily	
Reporting frequency: daily	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Kitchen scales are used for weighing sawdust. The accuracy is as stated in the PDD. The scales have accuracy 1 g and they are used for differential weighting, which excluded eventual problems with errors of weighting. Types are different (Philips, OBH Nordica, Mom RT)
Calibration frequency /interval:	
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The frequency of the checking procedure is provided every month with 500 ml of water. The procedure is sufficient.
Company performing the calibration:	

Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
Is(are) calibration(s) valid for the whole reporting period?	Yes
If applicable, has the reported data been cross-checked with other available data?	NA
How were the values in the monitoring report verified?	Verbally, asking operators what is the practice of daily records handling. Cross checking primary data in hand book at the operation with official records in the Monitoring report.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data handling and recording into the Excel spreadsheet calculation template for calculation purposes has been done without any materiality mistakes
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

3.5 Accuracy of Emission Reduction Calculations

In accordance with the requirements of the Guidelines for the Monitoring Plan /2/, the produced gross heat energy is measured on each site with calibrated ultrasonic heat meter. The calibration records are part of the project installation documentation. The frequency of the re-calibration is now every four years according to Romanian legislation. The correctness of calibration process was confirmed at all visited sites /6/. The calibration heat flow meter and calculators for Vatra Dornei and Huedin was confirmed with calibration certificate provided /7/.

Data handling and recording into the Excel spreadsheet calculation template for calculation purposes has been done without any materiality mistakes. Minor differences in overwriting were corrected. It was not influencing the end result. Some records of the calculated NCV for specific sawdust water content were found incorrect. Additional instructions/trainings to increase awareness of relevant employees are needed (CAR 1). 100% check of Calculated NCV related to specific water content in wood fuel was performed during the verificationted. Incorrect data has been corrected in the new version (v2) of the monitoring reports /5/ during the site visit and at reporting stage by verifier Mr. Mario Vöröš. Overall emission reductions amount was adjusted accordingly.

3.6 Quality of Evidence to Determine Emission Reductions

The basic data for the calculation of the emission reductions are the weight and water content of the wood residue combusted, and the gross heat energy produced in the boiler system. This

information is collected with daily frequency and recorded in the monitoring report forms in accordance with the requirements of the monitoring plan of each site.

The input data are verifed by plant manager and performed by staff of the individual plants. These data are verified monthly by technical consultant of the project, who is plant manager of Vatra Dornei. Some records of the calculated NCV for specific sawdust water content were found incorrect (CAR1) and corrected as described in chapter 3.2. Additional instructions/trainings to increase awareness of relevant employees were needed (FAR 3 from previous verification), it was checked out that sufficient measures were taken and this is described in chapter 3.1. .

Operations are checked twice in year by local EPAs. This is in accordance with newly issued legal requirements.

3.7 Management System and Quality Assurance

The SAWDUST 2000 Joint Implementation Project reflects legal requirements for national JI track 1 procedure /15/, and plant managers are appointed in all 5 plants. The operators of the boiler plants are responsible for the necessary daily raw data collection. The approval of the measured data and the evaluation of these are the task of the plant managers in co-operation with the local EPA. The calculated emission reductions are approved by the local EPAs.

The monitoring tasks are included into the Monitoring Plan /2/ as a special instruction.

The personnel were trained on the operation of the new biomass boiler system as well as in relation of the importance of the calculation of emission reductions and the way to achieve these. Records from mentioned trainings are available at the audited sites /8/, /10/.

The quality assurance system comprises inspection of the monitoring procedure by an independent third party, the local EPAs were recommended for this activity. The tasks of the quality assurance to be performed by the utility/project operator and the relevant local EPA are listed in detail in the Monitoring Plan. Small inconvenience regarding EPA's inspection was identified during onsite visit in Vlahita. Some question (14, 15, 17) in EPA questionnaire dated for 29.1.2010 and 10.8.2009, was left unfilled (CAR 2), the verification sorted this out and closed the issue.

Management system and data collecting approach is periodically checked and reviewed first by Mr. Cristian Dragan, plant manager in Vatra Dornei and Supervisor of Sawdust 2000 in one person, and also by periodical inspections of EPA's staff. The improvement of recording discipline is required. Monitoring report for Huedin and Intorsura Buzaului did not contain English name of the wood species (CAR 3), the verification sorted this out and closed the issue. There are three different tree (sawdust) species used as a fuel. Every tree species has for the same water content percentage different value of calculated NCV.

4 VERIFICATION STATEMENT

Det Norske Veritas Certification AS (DNV) has performed a verification of the emission reductions reported for the *SAWDUST 2000 Joint Implementation Project* in Romania for the period 1 January 2009 to 31 December 2009.

The Danish Energy Agency (DEA) is responsible for the collection of data in accordance with the validated monitoring plan and the reporting of GHG emissions reductions from the project.

It is DNV's responsibility to express an independent verification statement on the reported GHG emission reductions from the project and the compliance with the monitoring plan.

The verification was carried out in accordance with the JI Determination and Verification Manual /14/ and Romanian JI Track I procedure /15/. DNV conducted the verification on the basis of the monitoring plan included in the PDD /1/ of the project and the project's monitoring plans for individual sites (Guidelines for Monitoring Plan – Version 4 – issued 2005-01-05) for the year 2009 /2/. The verification included i) checking whether the provisions of the monitoring plan in the PDD were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

DNV's verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. DNV planned and performed the verification by obtaining evidence and other information and explanations that DNV considers necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In DNV's opinion, the GHG emissions reduction for the project as reported in the project's monitoring reports for individual sites for 2009 /5/ is fairly stated.

The GHG emission reductions were correctly calculated on the basis of the validated monitoring plan and formulae given in the Project Design Document of 5 January 2005 /1/.

Det Norske Veritas Certification AS is able to certify that the emission reductions from the SAWDUST 2000 Joint Implementation Project in Romania during the period 1 January 2009 to 31 December 2009 amount to **61 485** tonnes of CO_2 equivalent.

For the individual sites, this translates to:

Huedin	6 341 tonnes of CO_2 equivalent
Gheorgheni	3 434 tonnes of CO_2 equivalent
Intorsura Buzaului	9 088 tonnes of CO_2 equivalent
Vatra Dornei	35 999 tonnes of CO_2 equivalent
Vlahita	6 623 tonnes of CO_2 equivalent

DNV does not assume any responsibility towards the issuance and utilization of the emission reductions hereby verified and certified. The verification of reported emission reductions is based on the information made available to DNV and the engagement conditions detailed in

this report. DNV cannot be held liable by any party for decisions made or not made based on this report.

Prague and Oslo, 27-10-2010

Mario Vöröš
JI Verifier
DNV Prague, Czech Republic

Ole Andreas Flagstad
JI Approver,
Det Norske Veritas Certification AS

5 REFERENCES

Documents provided by the Project Participants that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the periodic verification conclusions, and are usually further checked through interviews with key personnel.

/1/ SAWDUST 2000 Project Design Document - Version 3 – issued 2005-01-05

http://ji.unfccc.int/JIITLProject/DB/YVNY1K95HNNREFBNUYC8MGJD04HCCT/details (version 2)

/2/ SAWDUST 2000 Guidelines for Monitoring Plan – Version 4 – issued 2005-01-05 and previous SAWDUST 2000 Project Implementation Monitoring Plan – Version 1- issued 2002-09-16

Version 4 received by DNV from project participant.

Version 1 available with UNFCCC:

http://ji.unfccc.int/JIITLProject/DB/YVNY1K95HNNREFBNUYC8MGJD04HCCT/details (link to version 1)

/3/ SAWDUST 2000 Baseline Study – Version 3 – issued 2005-01-05

Version 3 received by DNV from project participant

Version 2 available with UNFCCC:

http://ji.unfccc.int/JIITLProject/DB/YVNY1K95HNNREFBNUYC8MGJD04HCCT/details (version 2)

/4/ DNV: Periodic verification report for 1 January 2008 to 31 December 2008 - Report number 2009-9127 – version 01 – issued 25-03-2010

/5/ Monitoring reports for individual sites as excel files:

Monitoring Plan Gheorgheni - 2009 v2 excel spreadsheet dated 17 March 2010
Monitoring Plan Huedin - 2009 v2 excel spreadsheet dated 4 April 2010
Monitoring Plan Intorsura Buzaului 2009 v2 excel spreadsheet dated 18 March 2010
Monitoring Plan Vatra Dornei 2009 v2 excel spreadsheet dated 5 April 2010
Monitoring Plan Vlahita v2 excel spreadsheet dated 17 March 2010

/6/ Plant visited during the verificaiton:

Calibration certificate for Gheorgheni bio-boiler heat meters dated 26. August 2008 and calculator dated 13 August 2008, Natural Gas boiler flow meters dated 16. September 2008 and calculator dated 14 August 2008

Calibration certificate for Vlahita heat meter and calculator dated 23 August 2007

Calibration certificate for Intorsura Buzaului heat meter and calculator dated 11 May 2007

/7/ Other plants:

Calibration certificate for Vatra Dornei heat meters and calculator dated 20 September

2006

Calibration certificate for Huedin heat meter and calculator dated 13 April 2009

/8/ Training records from 22 Feb. 2010 and 9 Feb. 2009 (operators, EPA employee in Intorsura Buzaului)

/9/ EPA's inspection records (checklist) for Intorsura Buzaului from 29. Jan. 2010 and 28 July 2009

/10/ Training records from 6. Feb. 2009 and 10. March 2010 (operators, EPA employee in Vlahita)

Training records from 10. Feb. 2010 (operators, EPA employee in Gheorgheni)

/11/ EPA's inspection records (checklist) for Gheorgheni (6.1.2010 and 17.8. 2009), Vlahita (29.1.2010 and 10.8.2009)

/12// SGS Determination report: DETERMINATION OF THE SAWDUST 2000 PROJECT dated 16 February 2005

/13/ Project agreement between Ministry of Environment of the Kingdom of Denmark and the Ministry of Waters and Environmental Protection of Romania regarding the "Sawdust 2000" Join Implementation Project, signed 7 March 2003

Background documents related to the design and/or methodologies employed in the design or other reference documents.

/14/ JI Supervisory Committee, Determination and verification manual, version 01 adopted at JISC 19

/15/ Ministry of Environment: National procedure for using Joint Implementation (JI) mechanism under Track I (National JI Track I Procedure) issued 21 March 2008

http://ji.unfccc.int/UserManagement/FileStorage/AWBVICCKC5KW215L28BETVJZ1YHUN6 (English version)

http://www.mmediu.ro/protectia_mediului/schimbari_climatice/5_Proiecte_JI/ORDIN_JI_PE_BAZA_MODULUI_I.doc (Romanian version)

Persons interviewed during the initial verification, or persons who contributed with other information that are not included in the documents listed above.

/16/ Mr. Mihai Brasoveanu, LPC – contact person DEA

/17/ Mr. Cristian Dragan, plant manager in Vatra Dornei, Supervisor of Sawdust 2000

/18/ Mrs. Kimpián Ágnes, plant manager in Gheorgheni

/19/ Mr. Abos Alexandru, local EPA representant in Gheorgheni and in Vlahita

/20/ Mr. Manecuta Vasile, local EPA representant in Intorsura Buzaului

/21/ Mr. Jarcau Ion, operator in Intorsura Buzaului thermal plant

/22/ Mrs. Hortensia Dumitriu, Head of National Environmental Protection Agency, Bucharest

/23/ Mrs. Florentina Mana, JI Romania Focal point, Bucharest

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APPENDIX A

VERIFICATION CHECKLIST

Table 1: Data Management System/Controls

The project operator's data management system/controls are assessed to identify reporting risks and to assess the data management system's/control's ability to mitigate reporting risks. The GHG data management system/controls are assessed against the expectations detailed in the table. A score is assigned as follows:

- Full - all best-practice expectations are implemented.
- Partial - a proportion of the best practice expectations is implemented
- Limited - this should be given if little or none of the system component is in place.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
A. Defined organisational structure, responsibilities and competencies		
A.1. Position and roles *Position and role of each person in the GHG data management process is clearly defined and implemented, from raw data generation to submission of the final data. Accountability of senior management must also be demonstrated.*	F	The boiler plants in the five towns involved in the project SAWDUST 2000 are the property of the local government, and plant managers are appointed by them. The operators of the boiler plants are responsible for the necessary daily raw data collection; the evaluation is a task for the plant managers with the cooperation of local EPA responsible to audits of the plants according to check list. Local EPA has attended on enhancement training and made active inspections according to project methodology requirements. Refresh training (monitoring procedures) for responsible personnel and EPA personnel is made annually and properly documented.
A.2. Responsibilities *Specific monitoring and reporting tasks and responsibilities are included in job descriptions or special instructions for employees.*	F	The monitoring tasks are included into the monitoring plan as special instruction. Awareness of relevant personnel is at good level. Continual improvement is quite rapid. Refresh training (monitoring procedures) for responsible personnel and EPA personnel is made annually and properly documented.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
A.3. *Competencies needed* *Competencies needed for each aspect of the GHG determination process are analysed. Personnel competencies are assessed and training programme implemented as required.*	F	The personnel were trained in relation of the importance of the emission reductions and the way to achieve this. Records from the trainings are stored on site.
B. Conformance with monitoring plan		
B.1. Reporting procedures *Reporting procedures should reflect the monitoring plan content. Where deviations from the monitoring plan occur, the impact of this on the data is estimated and the reasons justified.*	F	The collection of raw data for the calculation of the emission reduction is continuous in each of the five places of the project in accordance of the monitoring plan. Monitoring report (MR) for Huedin does not includes the name of the wood species and MR for Intorsura Buzaului does not contain English name of the wood specie. **(FAR 2).**
B.2. Necessary Changes *Necessary changes to the monitoring plan are identified and changes are integrated in local procedures as necessary.*	F	Bio-fuel in Gheorgheni boiler plant was switched from the sawdust to the woodchips on 16 Dec. 2008 with respect to market circumstances. Therefore the methane emission reduction was excluded from overall emission reduction calculation for the period 1 January 2009 to 31 December 2009 respectively.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
C. *Application of GHG determination methods*		
C.1. Methods used *There are documented description of the methods used to determine GHG emissions and justification for the chosen methods. If applicable, procedures for capturing emissions from non-routine or exceptional events are in place and implemented.*	F	The emission reduction caused by the project consists of two areas: • Carbon dioxide emission reduction from substituting fossil fuels (oil and natural gas) with wood residues • Methane emission reduction (anaerobic digestion of wood residues) from reducing the quantity of wood residues dumped in stockpiles in the nature Carbon dioxide emission reductions are calculated on the base of the heat supply of each cities considering the emission factors and calorific value of the necessary existing fossil fuels substituted by wood residues (first of all by sawdust). The methane emission reduction is calculated using the model of PCF plus Research Study. (Methane and Nitrous Oxide Emission from Biomass Waste Stockpiles) The study is a first-order multiphase model and includes three key aspects when estimating methane emission. 1. to predict the methane emission as a function of time for wood stockpiles 2. requires easily obtainable input parameters 3. is able to incorporate wood waste of various ages and types The quantity of the avoided methane emission in carbon dioxide equivalent is calculated by a computer program. The calculations may be followed on the monitoring record forms. The monitoring plan contains instruction for the operation of the standby boiler system during the break down of the biomass boilers. In this case the amount of the used fossil fuel and its net calorific value should be determined and considered at the calculation of the emission reduction.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
C.2. Information/process flow *An information/process flow diagram, describing the entire process from raw data to reported totals is developed.*	P	The raw data are collected in individual boiler houses by operators in daily recorded logbooks. Plant managers fulfilled monitoring reports excel sheets, which are Monitoring report. The control of this individual excel files is performed by Plant manager from Vatra Dornei, who is responsible for general review of Monitoring report. The whole process is cross checked by local EPAs. Very small indiscipline in recording the calculated Net Calorific Value (NCV) linked to water content of sawdust in monitoring plans was observed during the verification review. All mistakes were corrected. **(CAR 1)**
C.3. Data transfer *Where data is transferred between or within systems/spreadsheets, the method of transfer (automatic/manual) is highlighted - automatic links/updates are implemented where possible. All assumptions and the references to original data sources are documented.*	F	Each input, and the assumptions used during the calculation of emission reduction are documented clearly on the monitoring record forms.
C.4. Data trails *Requirements for documented data trails are defined and implemented and all documentation are physically available.*	F	The forms included in the monitoring plan are used as a protocol of data handling. Data and information obtained by third party concerning are documented and confirmed by signature.
D. Identification and maintenance of key process parameters		
D.1. Identification of key parameters *The key physical process parameters that are critical for the determination of GHG emissions (e.g. meters, sampling methods) are identified.*	F	The moisture of the wood residue used for the boilers is measured daily. Methodology of sawdust drying process is properly kept. Scales are controlled properly. The produced heat energy also is reported once every day and it is measured by ultrasonic heat meter continuously.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
D.2. Calibration/maintenance *Appropriate calibration/maintenance requirements are determined.*	F	The ultrasonic heat meter in each site was calibrated during the installation of the new boiler system. Recalibration is performed every four years according the national legislation. All measurements devices are correctly maintained and calibrated. The moisture of the wood residue supplied into the boiler is calculated by the weight loss on drying using the balance and drying oven. The boiler system has instructions for maintenance. The performance of the maintenance and every change in the operation of the biomass boilers are documented also on the monitoring record forms.
E. GHG Calculations		
E.1. Guidance on checks and reviews *Guidance is provided on when, where and how checks and reviews are to be carried out, and what evidence needs to be documented. This includes spot checks by a second person not performing the calculations over manual data transfers, changes in assumptions and the overall reliability of the calculation processes.*	P	The calculated emission reduction are reviewed and approved by the local EPAs. Semi annual inspections are performed by local EPAs. Some question (14, 15, 17) in EPA questionnaire, in Vlahita dated for 29.1.2010 and 10.8.2009, was left unfilled **(CAR 2)**.
E.2. Internal validation *Data reported from internal departments should be validated visibly (by signature or electronically) by an employee who is able to assess the accuracy and completeness of the data. Supporting information on the data limitations, problems should also be included in the data trail.*	F	Each monitoring record form is reviewed and approved by the plant manager and finally is reviewed by Plant manager from Vatra Dornei. Independent inspection of project is performed by local EPA.
E.3. Data protection measures *Data protection measures for databases/spreadsheets should be in place (access restrictions and editor rights).*	F	The input data necessary for the calculation and the calculation of the emission reduction of the project are stored in computer, but all information is also available in printed form and copied on CDs. The archiving period is at least, throughout the crediting period, 14 years (2004-2017).

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
E.4. IT systems *IT systems used for GHG monitoring and reporting should be tested and documented.*	F	Individual boiler houses have independent computers for reporting daily logbooks to excel file of Monitoring report for their boiler house. These files are finally collected in Vatra Dornei for final review. The calculators of every heat meter are under regular (every 4 years) calibration. The monitoring reports are archived on CDs annually. The archiving period is at least, throughout the crediting period, 14 years (2004-2017).

Table 2: GHG calculation procedures and management control testing

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
Shut down of heat meters.	The heat meters are regularly calibrated and maintained. The eventual malfunction would be reported in operational records. Recalculation from invoicing of heat delivery would be possible.	1.) Wrong data usage. 2.) Wrong formulas application
Wrong data transfer	The data is controlled by individual plant manager and by supervisor of the project (he checks the data randomly).	
Incorrect calculation	The formulas used in excel files was checked in several steps and review by supervisor of the project annually.	

Table 3: Detailed audit testing of residual risk areas and random testing

Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)
Wrong data usage	The Monitoring plans were compared with sample of primary data and small incorrectness was corrected during the verification.	
Wrong formulas application	All formulas was verified with Monitoring Plan /2/	

Corrective action requests

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 1	Some records of the calculated NCV for specific sawdust water content were found incorrect. Additional instructions/trainings to increase awareness of relevant employees are needed.	100% check of Calculated NCV related to specific water content in wood fuel was performed during the verification. Incorrect data has been corrected in the new version (v2) of the monitoring reports /5/ by Mr Cristi Dragan Additional trainings and instructions will be carried out in order to increase awareness of relevant employees. This will be done as follows: a) Periodical site inspections including instructions and trainings at all boiler sites incorporated in the project activity will be carried out by Mr Cristi Dragan, Boiler House Manager from Vatra Dornei. Mr Dragan will visit each boiler house at a minimum 4 times a year b) In addition Mr Mihai Brasoveanu, Local Country Coordinator from the Danish Energy Agency (former DEPA) will periodically visit the sites Grue + Hornstrup, who holds a contract with the Danish Energy Agency since 2006 for providing annual monitoring and operational oversight will address related issues during the next site visit (planned for the beginning of 2011)	The provided explanation is sufficient. The CAR is closed.

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR2	Some questions (14, 15, 17) in EPA questionnaire, in Vlahita dated for 29.1.2010 and 10.8.2009, was left unfilled.	Objective evidence has been sent to DNV. Mr. Abos on behalf of Environmental Protection Agency for Harghita district sent the corresponding pages from the two mentioned inspection reports with the required modifications. On the top of each page (hand writing) is the date of the report where from the page is. For art 14 & 15 in Vlahita you can find the note "No backup boiler". For art 17 the comment is "Yes" and the note is: "Due to the crises the wood industry is now regressing; the City Hall and Local Authorities are in permanent survey of the market and succeeded to control the sawdust supply up to date".	The provided explanation is sufficient. The CAR is closed.
CAR3	Monitoring report (MR) for Huedin does not includes wood species at all and MR Intorsura Buzaului does not contain English name of the wood species.	Updated MRs was sent to DNV for a review. English names of the wood species have been updated.	The provided explanation is sufficient. The CAR is closed.

Clarification requests

CL ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CL 1			

Forward action requests from this verification

FAR ID	Forward action request	Response by Project Participants	DNV's assessment of response by Project Participants
FAR 1	The update versions of PDD, Baseline study and Guideline for Monitoring plans should be public available on UNFCCC /JI website.	It is in progress. DEA responsible person discussed with the Romanian DFP this issue. DFP tried to update but something didn't work and the update was not saved on the website. Mrs Florentina Manea try to update the docs on the JISC UNFCCC website in the week 44 (she is the only one allowed to access JISC UNFCCC website but she has now other assignments / missions abroad and we agreed upon a meeting dedicated to the update and upload in the week 44).	The FAR will be reviewed during next verification