VERIFICATION REPORT
EKORESURSAI,UAB

INITIAL AND FIRST PERIODIC VERIFICATION OF THE LAPES LANDFILL GAS UTILIZATION AND ENERGY GENERATION

MONITORING PERIOD:
1 JULY 2008 TO 31 DECEMBER 2009

REPORT NO. LITHUANIA-VER/0003/2010
REVISION NO. 01

BUREAU VERITAS CERTIFICATION

Report No: LITHUANIA-VER/0003/20

VERIFICATION REPORT

Date of first issue: 04/03/2010	Organizational unit: Bureau Veritas Certification Holding SAS
Client: EKORESURSAI, UAB	Client ref.: Gerardas Zukauskas, Director

Summary:
Bureau Veritas Certification has carried out the initial and 1st periodic verification of the JI Track II project "Lapes Landfill Gas Utilization and Energy Generation" based on UNFCCC criteria for the JI, as well as criteria given to ensure consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 6 of the Kyoto Protocol, the JI rules and modalities and the subsequent decisions by the JI Supervisory Committee, as well as the host country criteria.

The verification scope is defined as a periodic independent review and ex post determination by the Accredited Independent Entities of the monitored reductions in GHG emissions during defined verification period, and consisted of the following three phases: i) desk review of the monitoring report, project design document including its monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

The first output of the verification process is a list of Clarification Requests, Corrective Actions Requests, Forward Actions Requests (CL, CAR and FAR), presented in Appendix A.

In summary, Bureau Veritas Certification confirms that the project is implemented as planned and described in determined and approved project design documents. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately.
The monitoring system is in place and the project is ready to generate GHG emission reductions.
The GHG emission reduction is calculated without material misstatements.

Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and related to the valid and registered project baseline and monitoring, and its associated documents. Based on information seen and evaluated we confirm that the implementation of the project has resulted in 34384 t CO2e reductions during period from 01/07/2008 up to 31/12/2009.

Report No.: LITHUANIA-VER/0003/20	Subject Group: JI	
Project title: Lapes Landfill Gas Utilization and Energy Generation		
Work carried out by: Team Leader : Ashok Mammen Team Member : Tomas Paulaitis Specialist : Wytold Dzugan		
Work verified by: Leonid Yaskin – Internal technical reviewer		
Date of this revision: 08/03/2010	Rev. No.: 03	Number of pages: 44

Indexing terms

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Abbreviations

AIE	Accredited Independent Entities
CAR	Corrective Action Request
CL	Clarification Request
CO2	Carbon Dioxide
ERU	Emission Reduction Units
FAR	Forward Action Request
GHG	Green House Gas(es)
IETA	International Emissions Trading Association
JI	Joint Implementation
MP	Monitoring Plan
MR	Monitoring report
PCF	Prototype Carbon Fund
PDD	Project Design Document
UAB	Joint stock company (in Lithuanian language)
UNFCCC	United Nations Framework Convention for Climate Chang
CHP	Cogeneration plant
LFG	Landfill gas

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1 INTRODUCTION

EKORESURSAI,UAB has commissioned Bureau Veritas Certification to verify the emission reductions of its JI project "Lapes Landfill Gas Utilization and Energy Generation" (hereafter called "the project") at Lapes Subdistrict, Kaunas District Municipality, Lithuania, UNFCCC JI Reference Number 0049. The order comprises the initial and the first periodic verification and is related to emission reductions achieved during 1 July 2008 to 31 December 2009.

This report summarizes the findings of the verification of the project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

This report includes the findings of the initial and first periodic verification. It is based on the Initial Verification Report Template Version 3.0, December 2003 and on the Periodic Verification Report Template Version 3.0, December 2003, both part of the Validation and Verification Manual (VVM) published by International Emission Trading Association (IETA).
Initial and first periodic verification has been performed as one integrated activity. It consisted of a desk review of the project documents including PDD, monitoring plan, determination report, monitoring report and further documentation.
The results of the determination were documented by TÜV SÜD Industrie Service GmbH in the report: "Determination of the JI Project: Lapes Landfill Gas Utilization and Energy Generation" Report No. 806960, Revision 6 dated 10th November 2009.
Project is approved by a host country, Letter of Approval was issued by the Lithuania Ministry of Environmental (see Section 7) and registered under Track 2.

1.1 Objective

Verification is the periodic independent review and ex post determination by the AIE of the monitored reductions in GHG emissions during defined verification period.
The objective of verification can be divided in Initial Verification and Periodic Verification. The objective of the initial verification is to verify that the project is implemented as planned and described in the PDD, to confirm that the monitoring system is in place and fully functional, and to assure that the project will generate verifiable emission reductions.
The objective of the periodic verification is the review and ex post determination by an AIE of the GHG emission reductions. It includes the verification of the data given in the monitoring report by checking the monitoring records and the emissions reduction calculation.

The verification follows UNFCCC criteria referring to the Kyoto Protocol criteria, the JI rules and modalities, and the subsequent decisions by the JISC, as well as the host country criteria.

1.2 Scope

Verification scope is defined as an independent and objective review and ex post determination by the Designated Operational Entity of the monitored reductions in GHG emissions. The verification is based on the submitted monitoring report and the determined project design document including the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. Bureau Veritas Certification has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach in the verification, focusing on the identification of significant risks of the project implementation and the generation of ERUs.

The verification is not meant to provide any consulting towards the Client. However, stated requests for forward actions and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

1.3 GHG Project Description

The objective of the project is to use landfill gas extracted from the Lapes landfill site for heat and power generation in a combined heat and power (CHP) plant to be constructed. This significantly reduces methane emissions from the landfill. Substituting landfill gas for fossil fuels in heat and power generation is also reduced CO2 emissions in the Lithuanian energy sector.

The project proponent has built a landfill gas extraction system in the Lapes landfill. A combined heat and power (CHP) plant is also constructed and connected to the gas extraction system. The CHP plant provides electricity for the Lithuanian power grid and heat for the local district heating network. The CHP plant has an electrical capacity of 1.2 MW and a heating capacity of 1.4 MW.

The project started operating on June 2008.

2 METHODOLOGY

The verification is as a desk review and field visit including discussions and interviews with selected experts and stakeholders.

In order to ensure transparency, a verification protocol was customized for the project, according to the Validation and Verification Manual (IETA/PCF) a verification protocol is used as part of the verification. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from verifying the identified criteria. The verification protocol serves the following purposes:

- It organises, details and clarifies the requirements the project is expected to meet; and
- It ensures a transparent verification process where the verifier will documents how a particular requirement has been verified and the result of the verification;

The verification protocol consists of one table under Initial Verification checklist and four tables under Periodic verification checklist. The different columns in these tables are described in Figure 1.

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification procedures.

The completed verification protocol is enclosed in Appendix A to this report.

Initial Verification Protocol Table 1			
Objective	**Reference**	**Comments**	**Conclusion (CARs/FARs)**
The requirements the project must meet	Gives reference to where the requirement is found.	Description of circumstances and further comments on the conclusion	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non-compliance of the stated requirements. Forward Action Request (FAR) indicates essential risks for further periodic verifications.

Periodic Verification Checklist Protocol Table 2: Data Management System/Controls		
Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**
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.	Description of circumstances and further commendation to the conclusion. This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non compliance with stated requirements. The corrective action requests are numbered and presented to the client in the verification report. The Initial Verification has additional Forward Action Requests (FAR). FAR indicates essential risks for further periodic verifications.

Periodic Verification Protocol Table 3: GHG calculation procedures and management control testing		
Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**
Identify and list potential reporting risks based on an assessment of the emission estimation procedures, i.e. ➢ the calculation methods, ➢ raw data collection and sources of supporting documentation, ➢ reports/databases/information systems from which data is obtained. Identify key source data. Examples of source data include metering records, process monitors,	Identify the key controls for each area with potential reporting risks. Assess the adequacy of the key controls and eventually test that the key controls are actually in operation. Internal controls include (not exhaustive): ➢ Understanding of responsibilities and roles ➢ Reporting, reviewing and formal management approval of data; ➢ Procedures for ensuring data completeness,	Identify areas of residual risks, i.e. areas of potential reporting risks where there are no adequate management controls to mitigate potential reporting risks Areas where data accuracy, completeness and consistency could be improved are highlighted.

operational logs, laboratory/analytical data, accounting records, utility data and vendor data. Check appropriate calibration and maintenance of equipment, and assess the likely accuracy of data supplied. Focus on those risks that impact the accuracy, completeness and consistency of the reported data. Risks are weakness in the GHG calculation systems and may include: ➢ manual transfer of data/manual calculations, ➢ unclear origins of data, ➢ accuracy due to technological limitations, ➢ lack of appropriate data protection measures. For example, protected calculation cells in spreadsheets and/or password restrictions.	conformance with reporting guidelines, maintenance of data trails etc. ➢ Controls to ensure the arithmetical accuracy of the GHG data generated and accounting records e.g. internal audits, and checking/ review procedures; ➢ Controls over the computer information systems; ➢ Review processes for identification and understanding of key process parameters and implementation of calibration maintenance regimes ➢ Comparing and analysing the GHG data with previous periods, targets and benchmarks. When testing the specific internal controls, the following questions are considered: 1. Is the control designed properly to ensure that it would either prevent or detect and correct any significant misstatements? 2. To what extent have the internal controls been implemented according to their design; 3. To what extent have the internal controls (if existing) functioned properly (policies and procedures have been followed) throughout the period? 4. How does management assess the internal control as reliable?	

Periodic Verification Protocol Table 4: 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)**
List the residual areas of risks. Table 2 where detailed audit testing is necessary. In addition, other material areas may be selected for detailed audit testing.	The additional verification testing performed is described. Testing may include: 1. Sample cross checking of manual transfers of data 2. Recalculation 3. Spreadsheet 'walk throughs' to check links and equations 4. Inspection of calibration and maintenance records for key equipment ➢ Check sampling analysis results ➢ Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.	Having investigated the residual risks, the conclusions should be noted here. Errors and uncertainties should be highlighted. Errors and uncertainty can be due to a number of reasons: ➢ Calculation errors. These may be due to inaccurate manual transposition, use of inappropriate emission factors or assumptions etc. ➢ Lack of clarity in the monitoring plan. This could lead to inconsistent approaches to calculations or scope of reported data. ➢ Technological limitations. There may be inherent uncertainties (error bands) associated with the methods used to measure emissions e.g. use of particular equipment such as meters. ➢ Lack of source data. Data for some sources may not be cost effective or practical to collect. This may result in the use of default data which has been derived based on certain assumptions/conditions and which will therefore have varying applicability in different situations. The second two categories are explored with the site personnel, based on their knowledge and experience of the processes. High risk process parameters or source data (i.e. those with a significant influence on the reported data, such as meters) are reviewed for these uncertainties.

Verification Protocol Table 5: Resolution of Corrective Action and Clarification Requests			
Report clarifications and corrective action requests	**Ref. to checklist question**	**Summary of project owner response**	**Verification conclusion**
If the conclusions from the Verification are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Tables 2, 3 and 4 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the verification team should be summarized in this section.	This section should summarize the verification team's responses and final conclusions. The conclusions should also be included in Tables 2, 3 and 4, under "Final Conclusion".

Figure 1 Verification protocol tables

2.1 Review of Documents

The Monitoring Report submitted by EKORESURSAI and additional background documents related to the project design and baseline, i.e. country Law, Project Design Document (PDD), Approved methodology, Kyoto Protocol, Clarifications on Verification Requirements were reviewed by AIE.

The verification findings presented in this report relate to the project as described in the PDD Version 9 and Project Monitoring Report Version 2 (see UNFCCC website: http://ji.unfccc.int/JI_Projects/DB/2DXNVC6AZ7B04DT9WRP9VME0SL5QA3/Determination/TUEV-SUED1256205016.32/viewDeterminationReport.html).

2.2 Follow-up Interviews

On 27/01/2010 Bureau Veritas Certification performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of EKORESURSAI, UAB and MANFULA, UAB were interviewed (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
EKORESURSAI, UAB	Implementation of the project, responsibilities and legal requirements, monitoring plan, monitoring reporting, training, quality management, metering equipment control.
MANFULA, UAB	Daily monitoring, operational and maintenance activities.

2.3 Resolution of Clarification, Corrective and Forward Action Requests

The objective of this phase of the verification is to raise the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Bureau Veritas Certification positive conclusion on the GHG emission reduction calculation.

Findings established during the initial verification can either be seen as a non-fulfilment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CAR) are issued, where:
i) there is a clear deviation concerning the implementation of the project as defined by the PDD;
ii) requirements set by the MP or qualifications in a verification opinion have not been met; or
iii) there is a risk that the project would not be able to deliver (high quality) ERUs.

Forward Action Requests (FAR) are issued, where:
iv) the actual status requires a special focus on this item for the next consecutive verification, or
v) an adjustment of the MP is recommended.

The verification team may also use the term Clarification Request (CL), which would be where:
vi) additional information is needed for the full clarification of an issue.

To guarantee the transparency of the verification process, the concerns raised are documented in greater detail in the verification protocol in Appendix A.

3 INITIAL VERIFICATION FINDINGS

In the following sections the findings of the verification are stated. The verification findings for each verification subject are presented as follows:

1) The findings from the desk review of the original project activity documents and the findings from interviews during the follow-up visit are summarized. A more detailed record of these findings can be found in the verification protocol in Appendix A.
2) The conclusions on the verification subject are presented.

In the final verification report the discussions and the conclusions that followed the preliminary verification report and possible corrective action requests should also be encapsulated in this section.

3.1 Remaining issues, FAR's from determination

There are no unresolved issues prescribed in the final determination report (report No. 806960, revision 6, issued by TUV SUD Industries Service GmbH on 10/11/2009).

3.2 Project Implementation

3.2.1 Discussion

The project implementation has been checked according to the information provided in the PDD. The plant started to extract and flare landfill gas on June 2008 and was ready to generate emission reductions before the start of the 1st monitoring period (1 July 2008). Production and monitoring of the electric and heat power using landfill gas was started on 22 August 2008. It can be stated that the project has been implemented in accordance with the PDD:

- The equipment has been installed as specified in the PDD;
- The required calibrated monitoring equipment is in place;
- Responsibilities to perform monitoring are defined;
- The qualification of responsible personnel is sufficient;

- The plant was ready to generate emission reductions before the start of the 1st monitoring period (1 July 2008).

3.2.2 Findings

None.

3.3.3 Conclusions

Bureau Veritas confirms that the project complies with the requirements of the PDD.

3.3 Internal and External Data

3.3.1 Discussion

Monitoring routines to calculate emission reductions have been checked. Internal data sources can be divided into these types:

1) Continuous direct measurements:
a) Methane fraction in LFG, vol. %;
b) Amount of LFG to CHP plant, nm3.
c) Amount of LFG flared, nm3.
d) Flare temperature, ^{0}C.

2) Periodic direct measurements:
a) Electricity generated, MWh;
b) Electricity consumed, MWh;
c) Heat generated, MWh;
d) Natural gas consumed, nm3;
e) Natural gas calorific value, kcal/nm3.

3) Use of default emission factors:
a) Emission factor for heat generation;
b) Emission factor for natural gas.

It can be stated that internal data are collected in accordance with the monitoring plan.

3.2.2 Findings

None.

3.3.3 Conclusions

Bureau Veritas confirms that:

- Internal data collecting routines are in place;
- Internal data are available for emission reduction calculations.

3.4 Environmental and Social Indicators

3.4.1 Discussion

Reduced landfill gas emissions will have positive health and local environmental benefits. The hazard risk of fire and explosions will also be reduced. In addition, replacing fossil fuels in power and heat generation with biogas will reduce harmful emissions. The monitoring plan does not comprise to monitor any environmental and/or social indicators, there're no any legal requirements forcing to implement such kind of measurements. Environmental impacts are not significant and are managed according to applicable legal requirements.

Representatives of *EKORESURSAI, UAB* confirmed that no environmental or social incidents happened during the project implementation and first monitoring period.

3.4.2 Findings

None.

3.4.3 Conclusions

Bureau Veritas confirms that the project complies with the JI requirements as well as with the local requirements.

3.5 Management and Operational System

In order to ensure the successful operation of the Client project and the credibility and verifiability of the emission reductions achieved, the project must have a well defined management and operational system.

3.5.1 Discussion

The existing management and operational system were checked and discussed with the company representatives.

A monitoring management and quality assurance system has been developed and implemented effectively, including necessary forms and procedures:

Form A1a_Process Data Sheet (week)

Form A1b_Process Data Sheet (month)

Form A2_Daily Check Form (LFG Plant)

Form A3_Daily Check Form (CHP)

Form A4_ Monthly QA Check Form

Form A5_Calibration Log Sheet

Procedure B1_Record Keeping

Procedure B2_Data Transfer

Procedure B3a_Daily Check for LFG Plant

Procedure B3b_Daily Check for CHP

Procedure B4_Calibration Records

Procedure B5_Monthly QA Check.

3.5.2 Findings

None.

3.5.3 Conclusions

Bureau Veritas confirms that the Monitoring Report and the Management and Operational Systems are eligible for reliable project monitoring.

4 FIRST PERIODIC VERIFICATION FINDINGS

4.1 Remaining issues, CAR's, FAR's from previous verification

They are no remaining issues from the initial verification.

4.2 Completeness of Monitoring

4.2.1 Discussion

Monitoring procedures have been checked. It can be stated that monitoring routines generally are implemented in accordance with the monitoring plan and PDD, however CAR1, CL1, CL5, CL6, FAR4 were issued. The estimated amount of emission reductions over 2008-2009 is 44394 t CO2 e while in the Monitoring report Version 2 the amount is 36782 t CO2 e.

4.2.2 Findings

CAR 1: Emission reductions from methane avoidance (LFG utilization) are calculated using annual averages of the methane fraction and LFG flow. Please, use paired values of the methane fraction of the landfill gas and LFG flow which are averaged for the same time interval (i.e. methane fraction of landfill gas averaged at hour x should be used with LFG flow which is averaged at the same hour x). See requirement of the baseline methodology ACM0001 "Consolidated baseline and monitoring methodology for landfill gas project activities", section III, page 16).

Response: Revised monitoring Excel spreadsheet (version 4) was provided. Methane fractions of landfill gas used by CHP averaged at 24 hours are used with LFG flow which is averaged at the same 24 hours. Data averaged at hour basis were not used because monitoring system was not able to export these data during 2008-2009 year at hour basis.

CL5: Please, identify in the monitoring report the data source used to determine calorific value of natural gas (see Monitoring report Excel Spread Sheet, Sheet "IMPUT DATA_CHP). There are no requirements in the PDD what data source should be used for this purpose, therefore, please, use reliable national data.

Response: A revised monitoring report (version 3) and revised monitoring Excel spreadsheet (version 4) were provided. Reliable data of national gas company AB "Lietuvos dujos" were used to determine caloric value of natural gas for the monitoring period.

FAR4 (this FAR is issued after response to CAR 1): Please, use a shorter averaged time interval (30 min or 1 hour) for the next monitoring period.

Response: The issue will be closed during the next verification.

4.2.3 Conclusions

Bureau Veritas confirms that:

- CAR 1, CL1, CL5 were resolved efficiently;
- The monitoring is in accordance with the monitoring plan of the approved PDD;

The final monitoring report (version 3) is transparent and complete. Corrective actions have resulted in the decrease of calculated emission reductions to 34384 t CO_2 e.

4.3 Accuracy of Emission Reduction Calculations

4.3.1 Discussion

All monitoring meters maintenance and calibration records have been audited, CL2, CL3, CL4, CL6 and FAR 1 were issued.

4.3.2 Findings

CL2: Please, provide the information about meter inspection during all the monitoring period (e. g. gas analyzer AWITE).

Response: A comprehensive Calibration log sheet was provided. The evidence that gas analyzer AWITE was calibrated at the start of monitoring was also provided (a letter from the metrology institution Vilniaus metrologijos centras, dated 12/02/2010).

CL3: In May 2009 the landfill gas amount meter broke down. Please, in the monitoring report provide the description of this incident including the description of carrying out accountings during the meter repair period.

Response: A revised monitoring report (version 3) was provided, the incident description was provided in clause 4. A separate Excel spreadsheet was prepared to prove calculated LFG amount to CHP during this period. A revised monitoring Excel spreadsheet (version 4) was also provided.

CL4: The on-site audit determined that the Flare temperature meter calibration had not been done. The plant representative explained that temperature measurement was not important particularly as it was not related to Flare safety automation which immediately stopped the gas flow to Flare in case there was no flame. Please, provide the calibration documents or respective technical documents of safety automation.

Response: A revised monitoring report (version 3) was provided, the explanation was provided in the monitoring report clause 4.

CL6: Please, provide evidence that landfill gas meter uses normal temperature and normal pressure values to calculate captured landfill gas amount in m3 under normal conditions, as defined in PDD section D.1.2.2: T0 = 273.15 K, p0 = 101300 Pa. Otherwise, it is not correct to use density ratio 0.0007168 tCH4/m3CH4 to calculate methane destroyed in the CHP plant in tCH4.

Response: Density ratio 0,00068 tCH4/m3CH4 will be used for calculations instead of 0.0007168 tCH4/m3CH4 because landfill gas meter uses 293.15 K (20 0C) temperature value to calculate gas amount in m3 under normal conditions. A revised monitoring Excel spreadsheet (version 4) was provided.

FAR1 (this FAR is issued after response to CL 3): Please, develop monitoring procedures in case of meter failures.

Response: The issue will be closed during the next verification.

4.3.3 Conclusions

Bureau Veritas confirms that:

- CL2, CL3, CL4, CL6 were resolved efficiently;
- The monitoring of emission reduction data is carried out according to the monitoring plan with calibrated measurement equipment without significant mistakes and misstatements.

4.4 Quality Evidence to Determine Emission Reductions

4.4.1 Discussion

When all CAR's and CL's above were resolved, the internal and default values used in the Excel spreadsheet version 4 have been checked against the written meter values in the logbooks, electric power and heat invoices. No errors have been detected.

4.4.2 Findings

None.

4.4.3 Conclusions

Bureau Veritas confirms that:

- CAR 2 was implemented efficiently;
- The monitoring report version 3, based on emission reduction calculations in Excel spreadsheet version 4 is in conformity with requirements to the quality of evidence.

4.5 Management System and Quality Assurance

4.5.1 Discussion

A monitoring management and quality assurance system has been developed and implemented, including necessary forms and procedures:

Form A1a_Process Data Sheet (week)

Form A1b_Process Data Sheet (month)

Form A2_Daily Check Form (LFG Plant)

Form A3_Daily Check Form (CHP)

Form A4_ Monthly QA Check Form

Form A5_Calibration Log Sheet

Procedure B1_Record Keeping

Procedure B2_Data Transfer

Procedure B3a_Daily Check for LFG Plant

Procedure B3b_Daily Check for CHP

Procedure B4_Calibration Records

Procedure B5_Monthly QA Check.

However, FAR 2 and FAR were issued.

4.5.2 Findings

FAR2: Some data from SCADA system are transferred to process data sheets by manual method and then transferred to the final spreadsheet; it is recommended to use direct SCADA data transfer to the final spreadsheet where possible revising Procedure B2_Data Transfer respectively.

Response: The issue will be closed during the next verification.

FAR3: Please, describe requirements for data storage and access restrictions to SCADA system in the Procedure B1_Record Keeping.

Response: The issue will be closed during the next verification.

4.5.3 Conclusions

Bureau Veritas confirms that the project Management System and Quality Assurance comply with the requirements.

5 PROJECT SCORECARD

Risk Areas		Conclusions			Summary of findings and comments
		Baseline Emissions	Project Emissions	Calculated Emission Reductions	
Completeness	Source coverage/ boundary definition	✓	✓	✓	Relevant sources are covered by the monitoring plan. Boundaries of the project are defined transparently and correctly.
Accuracy	Physical Measurement and Analysis	✓	✓	✓	Physical measurements and analysis are reliable.
	Data calculations	✓	✓	✓	Data are calculated correctly.
	Data management & reporting	✓	✓	✓	Data management and reporting are reliable.
Consistency	Changes in the project	✓	✓	✓	There are no changes in the project; results are consistent to underlying raw data.

6 INITIAL AND FIRST PERIODIC VERIFICATION STATEMENT

Bureau Veritas Certification has performed the initial and 1st periodic verification of the project "Lapes Landfill Gas Utilization and Energy Generation". The verification is based on the currently valid documentation of the United Nations Framework Convention on the Climate Change (UNFCCC).

The management of EKORESURSAI, UAB is responsible for the preparation of the GHG emission data and the reported GHG emission reductions of the project on the basis set out within the project Monitoring and Verification Plan indicated in the final PDD version 9. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project is the responsibility of the management of the project.

Bureau Veritas Certification verified the Project Monitoring Report version 3 for the reporting period as indicated below. Bureau Veritas Certification confirms that the project is implemented as planned and described in validated and registered project design documents. The installed equipment, essential for generating emission reductions, runs reliably and is calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions.

Bureau Veritas Certification can confirm that the GHG emission reduction is calculated without material misstatements. Our opinion relates to the project's GHG emissions and resulting GHG emission reductions reported and related to the determined and approved project baseline and monitoring, and its associated documents. On the grounds of the information we have seen and evaluated we confirm the following statement:

Reporting period: From 01/07/2008 to 31/12/2009

Emission Reductions: 34384 CO_2 equivalents.

7 REFERENCES

Category 1 Documents:
Documents provided by Renerga, UAB that relate directly to the GHG components of the project.

/1/ PDD "Lapes Landfill Gas Utilization and Energy Generation", version 9

/2/ Determination report No. 806960, Revision 6, issued by *TUV SUD Industries Service GmbH* on 10 November 2009

/3/ Monitoring report, version 3

Category 2 Documents:
Background documents related to the design and/or methodologies employed in the design or other reference documents.

/1/ Monitoring calculations Excel spreadsheet, version 4

/2/ FG to CHP amount calculation Excel spreadsheet (22 April 2009 to 29 May 2009)

/3/ Monitoring management and quality assurance system procedures

/4/ Monitoring management and quality assurance system training records

/5/ Daily LFG plant check records, shown on-site (July 2008-December 2009)

/6/ Generated electric power selling invoices (August 2008-Dcember 2009)

/7/ Generated heat power selling invoices (August 2008-December 2009)

/8/ Consumed electric power purchase invoices (July 2008-December 2009)

/9/ Consumed natural gas purchase invoices (August 2008-December 2009)

/10/ Metering equipment calibration records (calibration covers July 2008-December 2009 period).

Persons interviewed:

The list of persons interviewed during the verification or persons that contributed with other information that are not included in the documents listed above.

/1/ Gerardas Zukauskas, director, EKORESURSAI, UAB

/2/ Arunas Plukas, JI manager, EKORESURSAI, UAB

/3/ Antanas Bajoras, Manager of the technical department, MANFULA, UAB

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APPENDIX A: PROJECT VERIFICATION PROTOCOL

Table 1: Initial Verification Protocol

Objective	Reference	Comments	Conclusion (CARs/FARs)
1. Opening Session			
1.1. Introduction to audits		Before the audit a draft verification protocol and the audit plan were prepared and agreed with the client. The on-site visit was carried out on 27 January 2009. The initial meeting was performed in *EKORESURSAI, UAB* head office, where the director and the project manager were interviewed, taking into the account items of the draft verification protocol.	O.K.
1.2. Clarification of access to data archives, records, plans, drawings etc.		Access to all data and documents necessary for the audit team to perform its tasks was ensured. All the necessary documents and records are archived in *EKORESURSAI, UAB* head office and SCADA system in the MANFULA, UAB premises.	O.K.
1.3. Contractors for equipment and installation works Who has installed the equipment? Who was contracted for planning etc.?		The plant was supplied and installed by the contracted company MANFULA, UAB.	O.K.
1.4. Actual status of installation works Project installation should be finished at time of initial verification in so far as the project should be ready to generate emission reductions afterwards.	PDD section C.1.	The plant started to extract and flare landfill gas on June 2008 and was ready to generate emission reductions before the start of the 1st monitoring period (1 July 2008). Production and monitoring of the electric and heat power using landfill gas was started on 22 August 2008. The contract for selling – purchasing electricity was signed with VST,UAB on 20 August 2008. The contract for selling heat power was signed with KAUNO ENERGIJA, UAB on 30 May 2008. The official document recognizing that the electric power generator was built according to the applicable national legislation was issued on 14 August 2008 by national authorities.	O.K.

2. Open issues indicated in validation report Especially in projects which are not yet registered at CDM-EB or JI-SB, there might be some outstanding issues which should have been indicated by the validation report.			
2.1. Missing steps to final approval		None reported	O.K.
3. Implementation of the project This part is covering the essential checks during the on-site inspection at the project's site, which is indispensably for an initial verification			
3.1. Physical components Check the installation of all required facilities and equipment as described by the PDD.	PDD section A.4.2	All the equipment has been installed as specified in the PDD, including: - wells; - measuring, pumping and regulation (MPR) station; - flare; - landfill gas pipeline; - gas mixing equipment; - Cogeneration plant including electricity and heat interconnections. CHP plant Installed electrical capacity is 1,1 MW and installed heat power capacity is 1,4 MW.	O.K.
3.2. Project boundaries Check whether the project boundaries are still in compliance with the ones indicated by the PDD.	PDD section B.3.	The project boundaries are without changes and are in compliance with the ones indicated by the PDD.	O.K.
3.3. Emission reductions achieved	PDD section A.4.3.1	Estimated amount of emission reductions over 2008-2009 is 44394 t while in the Monitoring report Version 2 the amount is 36782 t. There might be a few reasons for less emission reductions: - Landfill covering works have not been finished completely yet by landfill owner; - Production of heat and electric power was started with delay (22.08.2008 instead of 01.07.2008).	O.K.
3.4. Monitoring and metering systems Check whether the required metering systems have been installed. The meters have to comply with appropriate quality standards applicable for the used technology.	PDD section D.1.2.1.	All the required metering systems have been installed as described in the PDD section D.1.2.1. All meters have been calibrated according to the national law requirements before the start of measurements (see Table 2 section 11.2 for more details on calibration status).	O.K.
3.5. Data uncertainty How will data uncertainty be determined for later calculations of emission reductions? Is		A special requirement for data uncertainty was not defined in the PDD. The technical specifications (including metering scale) are sufficient to ensure reliable measurement results.	O.K.

this in compliance with monitoring and metering equipment?			
3.6. Calibration and quality assurance Check how monitoring and metering systems are subject to calibration and quality assurance routines a) with installation b) during future operation	PDD section D.1.2.1.	All meters had been calibrated before the monitoring measurements were started (see Table 2 section 11.2 for more details on calibration status).	O.K.
3.7. Data acquisition and data processing systems Check the eligibility of used systems.	PDD section D.1.2.1.	The monitoring was implemented by continuous collecting and transferring data to the dispatch room server through SCADA system. Also see sections 3.8, 3.9 below.	O.K.
3.8. Reporting procedures Check how reports with relevance for the later determination of emission reductions will be generated	PDD section D	The Monitoring Management and Quality Assurance System has been developed and implemented to ensure reliability of reporting results. Reporting procedures were audited according to the requirements of the monitoring plan and, on the whole, were found acceptable, however, see CAR1 in Table 5 below.	O.K.
3.9. Documented instructions Check whether the personnel performing tasks with sensitivity for the monitoring of emission reductions have access and knowledge of documented instructions, forming a part of the project's management system.		The Monitoring Management and Quality Assurance System procedures (listed below) clearly define the requirements for the personnel performing monitoring tasks: Procedure B2_Data Transfer; Procedure B3a_Daily Check for LFG Plant; Procedure B3b_Daily Check for CHP.	O.K.
3.10. Qualification and training Check whether the personnel performing tasks with sensitivity for the monitoring of emission reductions has the appropriate competences, capabilities and qualifications to ensure the required data quality.		A full-scale training was given to the staff at the beginning of monitoring. The training material and training records were presented to the audit and were found acceptable. The interviewed personnel also demonstrated sufficient knowledge and competences.	O.K.

3.11. Responsibilities Check whether all tasks required to gather data and prepare a monitoring report with the necessary quality have been allocated to responsible employees.		All responsibilities are defined in the Monitoring Management and Quality Assurance System procedures. JI manager is responsible for transferring monitoring data to the final Excel spread sheet and for the preparation of the monitoring report (according to the requirements of the Procedure B2_Data Transfer).	O.K.
3.12. Troubleshooting procedures Check whether there are possibilities of redundant data monitoring in case of having problems with the used monitoring equipment. Such procedures may reduce risks for the buyers of emission reductions (e.g. the Client)		The Monitoring Management and Quality Assurance System procedures (Procedure B3a_Daily Check for LFG Plant and Procedure B3b_Daily Check for CHP) are implemented. A responsible operator should visit every relevant meter/installation and visually check that each meter/installation is working properly and is not damaged, the results of these inspections are recorded according to the requirements of these procedures. In case of any meter failure, data discrepancy will be found within one day and the monitoring of emission reduction will be stopped until the meter is substituted by a working one. See related CL3 and FAR 1 in Table 5 below.	O.K.
4. Internal Data Identifying the internal GHG data sources and ways in which the data have been collected, calculated, processed, aggregated and stored should be part of initial verification to assess accuracy and reliability of the internal GHG data.			
4.1. Type and sources of internal data Acquire information on type and source of internal GHG data, which is used in calculations of emission reductions. E.g..” continuous direct measurements”, “site-specific correlations”, “periodic direct measurements”, “use of models” and/or “use of default emissions factors”.		Internal data sources can be divided into these types: 1) Continuous direct measurements: e) Methane fraction in LFG, vol. %; f) Amount of LFG to CHP plant, nm3. g) Amount of LFG flared, nm3. h) Flare temperature, ^{0}C. 2) Periodic direct measurements: f) Electricity generated, MWh; g) Electricity consumed, MWh; h) Heat generated, MWh; i) Natural gas consumed, nm3; j) Natural gas calorific value, kcal/nm3. 3) Use of default emissions factors: c) Emission factor for heat generation; d) Emission factor for natural gas. See related CL5 and CL6 in Table 5 below.	O.K.

4.2. Data collection How is data collected and processed? What are the means of quantifying emissions from the different data sources?		Procedure B2_Data Transfer is implemented to define the requirements for data collection and transfer. Results of the continuous direct measurements are saved in the SCADA system and daily reports. Periodic electric and heat power measurements are saved in daily reports and are monthly invoiced to electric and heat buyers. Period consumed natural gas measurements and natural gas calorific values are reported in natural gas supplier invoices.	O.K.
4.3. Quality assurance Does internal data collection underlie sufficient quality assurance routines?		Procedure B5_Monthly QA Check is implemented to control internal data collection. JI manager performs checks on a monthly basis in accordance with Monthly QA check form.	O.K
4.4. Significance and reporting risks Assess the significance and reporting risks related to the different internal data sources. Potential reporting risks may be related to the calculation methods, accuracy of data sources and data collection and/or the information systems from which data is obtained. The significance of and risks associated with the data source indicate the level of verification effort required at a later stage.		See Table 4 below.	O.K.
5. External Data Especially for data of baseline emissions there might be the necessity to include external data sources. The access to such data and a proof of data quality should be part of initial verification. If it is deemed to be necessary, an entity delivering such data should be audited.			
5.1. Type and sources of external data Acquire information on type and source of external data, which is used in calculations of emission reductions	PDD section D.1.1.4.	There is only one measurable external data source: natural gas calorific value. Note: this data source was not identified in the PDD.	O.K.
5.2. Access to external data How is data transferred? How can reproducibility of data set be ensured?		Not applicable, see 5.1 above.	O.K.
5.3. Quality assurance		Not applicable, see 5.1 above.	O.K.

Does external data underlie any quality assurance routines?			
5.4. Data uncertainty Is it possible to assess the data uncertainty of external data? Are such routines included in reporting procedures?		Not applicable, see 5.1 above.	O.K.
5.5. Emergency procedures Are there any procedures, which will be applicable if there is no access to relevant external data?		Not applicable, see 5.1 above.	O.K.
6. Environmental and Social Indicators A Monitoring Plan may comprise environmental and/or social indicators, which could be necessary to monitor for the success of the project activity.			
6.1. Implementation of measures A project activity may demand for the installation of measures (e.g. filtering systems or compensation areas), which are exceeding the local legal requirements. A check of the implementation or realization of such measures should be part of the initial verification.	PDD section F	The monitoring plan does not comprise to monitor any environmental and/or social indicators, there aren't any legal requirements forcing to implement such kind of measurements.	O.K.
6.2. Monitoring equipment Check where necessary whether the required metering systems have been installed. The meters have to comply with appropriate quality standards applicable for the used technology.		Not applicable, see 6.1 above.	O.K.
6.3. Quality assurance procedures What quality assurance procedures will be applied for such data?		Not applicable, see 6.1 above.	O.K.
6.4. External data Check the quality, reproducibility and uncertainty of external data.		Not applicable, see 6.1 above.	O.K.

7. Management and Operational System In order to ensure a successful operation of a Client project and the credibility and verifiability of the ERs achieved, the project must have a well-defined management and operational system.			
7.1. Documentation The system should be documented by manuals and instructions for all procedures and routines with relevance to the quality of emission reductions. The accessibility of such documentations to persons working on the project has to be secured.		A monitoring management and quality assurance system has been developed and implemented, including necessary forms and procedures: Form A1a_Process Data Sheet (week) Form A1b_Process Data Sheet (month) Form A2_Daily Check Form (LFG Plant) Form A3_Daily Check Form (CHP) Form A4_ Monthly QA Check Form Form A5_Calibration Log Sheet Procedure B1_Record Keeping Procedure B2_Data Transfer Procedure B3a_Daily Check for LFG Plant Procedure B3b_Daily Check for CHP Procedure B4_Calibration Records Procedure B5_Monthly QA Check	O.K.
7.2. Qualification and training The system should describe the requirements on qualification and the need of training programs for all persons working on the emission reduction project. Performed training programs and certificates should be archived by the system.		See 3.10 above.	O.K.
7.3. Allocation of responsibilities The allocation of responsibilities should be documented in written manner.		See 3.11 above	O.K.
7.4. Emergency procedures The system should contain procedures, which provide emergency concepts in case		See 3.12 above	O.K.

of unexpected problems with data access and/or data quality.			
7.5. Data archiving The system should provide routines for the archiving of all data, which is required for verifying the project's performance in the context of consecutive verifications.		Procedure B1_Record Keeping is implemented and provides clear archiving requirements for monitoring data, monitoring reports, training, calibration, Q/A records.	O.K.
7.6. Monitoring report The system includes procedures for the calculation of emission reductions and the preparation of the monitoring report.		See 3.8 above	O.K.
7.7. Internal audits and management review The system includes internal control procedures, which allow the identification and solution of problems at an early stage.		See 4.3 above.	O.K.

APPENDIX A: VERIFICATION PROTOCOL

Table 2: 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/controls' 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 best-practice expectations is implemented.
- Limited - this should be given if little or none of the system components are in place.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
8. Defined organisational structure, responsibilities and competencies		
8.1. 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.	Full	Position and roles are defined in the Monitoring Management and Quality Assurance System procedures. The evidence of implementation of these procedures and forms has been proved and checked during the on-site audit. The majority of roles are performed by JI manager and the staff supervising LFG plant and CHP plant equipment. The Monitoring Management and Quality Assurance System has been approved by plant administration and has been functioning since 01/01/2009. Senior management, represented by director Gerardas Zukauskas has participated actively during verification and has clearly demonstrated his personal accountability and awareness.
8.2. Responsibilities Specific monitoring and reporting tasks and responsibilities are included in job descriptions or special instructions for employees.	Full	Maintenance and monitoring activities of the LFG plant and CHP are carried out completely by the contracted company MANFULA, UAB. The employees of MANFULA, UAB have undergone necessary training to get acquainted with specific requirements of JI monitoring and Monitoring Management and Quality Assurance System. The training attendance list is prepared, the interviewed MANFULA, UAB employees were fully aware of their tasks and responsibilities.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
8.3. Competencies needed Competencies needed for each aspect of the GHG determination process are analysed. Personnel competencies are assessed and training programme implemented as required.	Full	A full-scale training was given to the staff at the beginning of 2009; since then neither the staff nor the monitoring requirements have changed and no problems related with insufficient staff competence have been identified. Hence, there is no need for additional training programmes so far. In the middle of 2010 EKORESURSAI, UAB are going to abandon hiring a contracted company and will start to perform all maintenance and daily monitoring activities themselves. In this case the competence of new employees is going to be assessed and necessary training will be provided.
9. Conformance with monitoring plan		
9.1. 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.	Full	Reporting procedures, described in the Monitoring Management and Quality Assurance System, do not contradict the requirements of the Monitoring plan.
9.2. Necessary Changes Necessary changes to the monitoring plan are identified and changes are integrated in local procedures as necessary.	Full	No need for changes during the monitoring period was identified.
10. Application of GHG determination methods		
10.1. Methods used There are documented descriptions 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.	Partial	Description of the methods used to determine GHG emissions and justification for chosen methods is provided in the PDD. CAR1: Emission reductions from methane avoidance (LFG utilization) are calculated using annual averages of the methane fraction and LFG flow. Please, use paired values of the methane fraction of the landfill gas and LFG flow which are averaged for the same time interval (i.e. methane fraction of landfill gas averaged at hour x should be used with LFG flow which is averaged at the same hour x). Data averaged at hour basis are not used in the calculation of emission reductions (requirement of the baseline methodology ACM0001 “Consolidated baseline and monitoring methodology for landfill gas project activities”, section III, page 16). FAR1: Please, develop monitoring procedures in case of meter failures, also see CL 3.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
10.2. Information/process flow An information/process flow diagram, describing the entire process from raw data to reported totals is developed.	Partial	Procedure B2_Data Transfer adds to the requirements of the monitoring plan describing the process of collection and transferring the data necessary for monitoring. CL1: Please, explain in the monitoring report how the data necessary for monitoring were collected and transferred during the period 01/07/2008-31/12/2008, i.e. before the implementation of the procedure B2_Data Transfer.
10.3. 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.	Partial	There is no very complex data transfer between or within systems/spreadsheets; the manual data input from the process data sheets to the final spreadsheet is used. FAR2: Some data from SCADA system are transferred to process data sheets by manual method and then transferred to the final spreadsheet; it is recommended to use direct SCADA data transfer to the final spreadsheet where possible revising Procedure B2_Data Transfer respectively.
10.4. Data trails Requirements for documented data trails are defined and implemented and all documentation are physically available.	Full	All documents with the input data are available and all input data which were retrieved on a random basis could be confirmed: - amount of LFG flared (SCADA system and process data log sheet); - Methane fraction in LFG (SCADA system and process data log sheet); - Electricity consumed in the MPR Module (power supply invoices); - Total amount of LFG to CHP (SCADA system and process data log sheet); - Total amount of natural gas consumed (supply invoices); - Natural gas calorific value (supply invoices). - Total amount of electricity produced (supply invoices).
11. Identification and maintenance of key process parameters		
11.1. 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.	Full	All key parameters are identified.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
11.2. Calibration/maintenance Appropriate calibration/maintenance requirements are determined.	Partial	Requirements for calibration and maintenance are defined in procedures: - Procedure B3a_Daily Check for LFG Plant - Procedure B3b_Daily Check for CHP - Procedure B4_Calibration Records. The calibration documents and calibration log sheet of all monitoring meters have been checked. CL2: Please, in the monitoring report provide the information about meter inspection during the monitoring period and the documentation of previous inspections (e. g. gas analyzer AWITE). CL3: in May 2009 the landfill gas amount meter broke down. Please, in the monitoring report provide the description of this incident including the description of carrying out accountings during the meter repair period. CL4: The on-site audit determined that the Flare temperature meter calibration had not been done. The plant representative explained that temperature measurement was not important as it was not related to Flare safety automation which immediately stopped the gas flow to Flare in case there was no flame. Please, provide the documents of calibration or technical documents of safety automation. FAR1: Please, establish a documented procedure addressing measures in case of failures of measuring equipment.
12. GHG Calculations		

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
12.1. Use of estimates and default data Where estimates or default data are used, these are validated and periodically evaluated to ensure their ongoing appropriateness and accuracy, particularly following changes to circumstances, equipment etc. The validation and periodic evaluation of this is documented.	Partial	IPCC standard values, CO2 emission intensity of the electricity displaced, CO2 emission intensity of the thermal energy displaced have already been described in the PDD and have been confirmed in the determination report. CL5: Please, identify in the monitoring report the data source used to determine the calorific value of natural gas (see Monitoring report Excel Spread Sheet, Sheet "IMPUT DATA_CHP). There are no requirements in the PDD what data source should be used for this purpose, therefore, please, use reliable national data. CL6: Please, provide evidence that landfill gas meter uses normal temperature and normal pressure values to calculate captured landfill gas amount in m3 under normal conditions, as defined in PDD section D.1.2.2: T0 = 273.15 K, p0 = 101300 Pa. Otherwise, it is not correct to use density ratio 0.0007168 tCH4/m3CH4 to calculate methane destroyed in the CHP plant in tCH4.
12.2. 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.	Full	Procedure B5_Monthly QA Check has been developed and implemented efficiently since 2009; this was confirmed during the on-site audit.
12.3. Internal verification Internal verifications include the GHG data management systems, to ensure consistent application of calculation methods.	Full	Yes, also see 5.2 and 5.4.
12.4. 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.	Full	The reported data is checked and transferred from SCADA system and supply invoices to Form A1a_Process Data Sheet (week) Form and A1b_Process data Sheet (month) and finally to the spreadsheet by JI manager Arunas Plukas. The interview and on-site checks confirmed that JI manager is fully qualified for these tasks.
12.5. Data protection measures Data protection measures for databases/spreadsheets should be in place (access restrictions and editor rights).	Full	Some data protection measures (requirements for data keeping) are defined in the Procedure B1_Record Keeping. Requirements for access restrictions and editor rights for the spreadsheet are not necessary, because only JI manager uses this calculation tool.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
12.6. IT systems IT systems used for GHG monitoring and reporting should be tested and documented.	Partial	FAR3: Please, describe requirements for data storage and access restrictions to SCADA system in the Procedure B1_Record Keeping.

Table 3: GHG calculation procedures and management control testing

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
Failure in data collection and management: - Total amount of landfill gas captured ; - Methane fraction in LFG; - Amount of LFG flared; - Electricity used in the MPR Station; - Amount of LFG to CHP-plant ; - Amount and calorific value of natural gas used; - Electricity generated by the project; - Heat generated by the project.	Errors because of incorrect data input and management are possible.	There are some risks related to manual data transfer and input, see FAR 2.
Failure of the monitoring meters	Errors because of technical failure or insufficient calibration and maintenance are possible.	The meters should be calibrated according to the legal requirements. All monitoring meters are controlled permanently from the control room. However, the risk to get unreliable monitoring data still exists in case of meters failure.
Errors in calculation	Errors because of wrong data input or false formulae are possible.	The Monitoring report and spreadsheet were prepared by a consulting company and checked additionally by EKORESURSAI. However, errors are possible since this is the first monitoring report.
Failure of consistent faultless reporting	Errors in the monitoring report (including inappropriate reporting format)	JI manager and Director has been trained to perform monitoring and reporting activities by the consulting company. However, errors are possible because of lack of experience.

Table 4: 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*)
Failure in data collection and management	1) Interview with employees involved in data collection and management. 2) All input data which were used in the spreadsheet will be audited and aligned with data monitoring records. 3) To perform energy balance calculation to prove reliability of the input data.	See verifier's comments in Table 2, clause 10.2-10.4. Results of the energy balance calculation: Electric power delivered to the grid, MW/h 7389 Heat sold, MW/h 6610 Energy from natural gas, MW/h 3851 Energy from LFG, MW/h 20068 Efficiency of the electric power generation, % 31 Efficiency, total, % 59 Efficiency of the electric power generation is lower than was declared by the equipment manufacturer (31 % instead of 37 %). There were few acceptable reason of lower energy efficiency: - delay of CHP commissioning works (LFG was flared on 06-08/2008 only and was not used to produce power); - some electricity power produced is not delivered to the grid, because it is used to circulation pumps, cooling equipment, also looses in the transformer should be taken into account); - not all heat produced is sold during summer time.
Unreliable monitoring data in case of meters failure	1) Inspection of maintenance and calibration records for all monitoring meters. 2) Inspection of how procedures are operated in case of meters failure.	See verifier's comments in Table 2, clause 11.2.

Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)
Errors in spreadsheet links and formulas	1) Re-calculation of GHG emission reductions and spreadsheet links and formulas audit.	There are no errors in spreadsheet links and formulas, but the calculation should be performed once again bearing in mind CAR1, CL5, CL6.
Failure of consistent faultless reporting	1) Detailed inspection of the monitoring report	There were identified few minor monitoring report inconsistencies during audit (e.g. missing document dating, version, lack of references). These inconsistencies were resolved in the final Monitoring report (version 3.2).

Table 5: Resolution of Corrective Action and Clarification Requests

Report clarifications and corrective action requests	Reference to checklist question	Summary of project owner response	Verification conclusion
CAR1: Emission reductions from methane avoidance (LFG utilization) are calculated using annual averages of the methane fraction and LFG flow. Please, use paired values of the methane fraction of the landfill gas and LFG flow which are averaged for the same time interval (i.e. methane fraction of landfill gas averaged at hour x should be used with LFG flow which is averaged at the same hour x). See requirement of the baseline methodology ACM0001 "Consolidated baseline and monitoring methodology for landfill gas project activities", section III, page 16).	Table 2, clause 10.1.	A revised monitoring Excel spreadsheet (version 4) was provided. Methane fractions of landfill gas used by CHP averaged at 24 hours are used with LFG flow which is averaged at the same 24 hours. Data averaged at hour basis were not used because the monitoring system was not able to export these data during 2008-2009 year.	The revised monitoring Excel spreadsheet version 4 was verified and found acceptable; also taking into the account that methane fraction of landfill gas is quite stable. Hence CAR1 is closed. FAR4: Please, use a shorter averaged time interval (30 min or 1 hour) for the next monitoring period.
CL1: Please, explain in the monitoring report how the data necessary for monitoring were collected and transferred during the period 01/07/2008-31/12/2008, i.e. before the implementation of the procedure B2_Data Transfer.	Table 2, clause 10.2.	Monitoring Management for the respective period 01/06/ 2008 – 31/12/ 2008 was implemented by collecting data and transferring the collected data to the dispatch room server through SCADA every day. The SCADA data were transferred to the spreadsheet as monitoring management reports for the mentioned period. This explanation is added in the revised monitoring report (version 3).	The revised monitoring report (version 3) clause 4 was reviewed and found acceptable. Hence, CL1 is closed.
CL2: Please provide the information about meter inspection during the all the monitoring period (e. g. gas analyzer AWITE).	Table 2, clause 11.2.	A comprehensive Calibration log sheet was provided. The evidence that gas analyzer AWITE was calibrated at the start of monitoring was also provided (a letter from the metrology institution Vilniaus metrologijos centras, dated 12/02/2010).	The evidence is sufficient, hence CL2 is closed.
CL3: in May 2009 the landfill gas amount meter broke down. Please, in the monitoring report provide the description of this incident including the description of carrying out accountings during the meter repair period.	Table 2, clause 11.2.	A revised monitoring report (version 3) was provided, the incident description was provided in clause 4. A separate Excel spreadsheet was	The revised monitoring report and calculated LFG amount to CHP monitoring results were audited and found acceptable. However, FAR1

Report clarifications and corrective action requests	Reference to checklist question	Summary of project owner response	Verification conclusion
		prepared to prove calculated LFG amount to CHP during this period.	is issued.
CL4: The on-site audit determined that the Flare temperature meter calibration had not been done. The plant representative explained that temperature measurement was not important particularly as it was not related to Flare safety automation which immediately stopped the gas flow to Flare in case there was no flame. Please, provide the calibration documents or respective technical documents of safety automation.	Table 2, clause 11.2.	A revised monitoring report (version 3) was provided, the explanation is provided in the monitoring report clause 4.	Flare is equipped with safe automation which immediately stops the gas flow to Flare in case of flame absence. In addition, Flare is a minor emission reduction source (6 % from total emission reduction); therefore, CL4 is closed.
CL5: Please, identify in the monitoring report the data source used to determine calorific value of natural gas (see Monitoring report Excel Spread Sheet, Sheet "IMPUT DATA_CHP). There are no requirements in the PDD what data source should be used for this purpose, therefore, please, use reliable national data.	Table 2, clause 12.1.	A revised monitoring report (version 3) and revised monitoring Excel spreadsheet (version 4) were provided. Reliable data of national gas company AB "Lietuvos dujos" were used to determine caloric value of natural gas for the monitoring period.	The referenced data of caloric value of natural gas were verified and found acceptable. Therefore, CL5 is closed.
CL6: Please, provide evidence that landfill gas meter uses normal temperature and normal pressure values to calculate captured landfill gas amount in m3 under normal conditions, as defined in PDD section D.1.2.2: T0 = 273.15 K, p0 = 101300 Pa. Otherwise, it is not correct to use density ratio 0.0007168 tCH4/m3CH4 to calculate methane destroyed in the CHP plant in tCH4.	Table 2, clause 12.1.	Density ratio 0,00068 tCH4/m3CH4 will be used for calculations instead of 0.0007168 tCH4/m3CH4, because landfill gas meter uses 293.15 K (20 ^{0}C) temperature value to calculate gas amount in m3 under normal conditions. A revised monitoring Excel spreadsheet (version 4) was provided.	The referenced density ratio and calculation were verified and found acceptable. Therefore, CL6 is closed.
FAR1: Please, establish a documented procedure addressing measures in case of failures of measuring equipment.	Table 2, clause 11.2.		This FAR1 will be verified during the next periodic verification.
FAR2: Some data from SCADA system are transferred to process data sheets by manual method and then transferred to the final spreadsheet; it is recommended to use direct SCADA data transfer to the final spreadsheet where possible revising Procedure B2_Data Transfer respectively.	Table 2, clause 10.3.		This FAR2 will be verified during the next periodic verification.
FAR3: Please, describe requirements for data storage and access restrictions to SCADA system in the Procedure B1_Records Keeping.	Table 2, clause 12.6.		This FAR3 will be verified during the next periodic verification.
FAR4: Please use a shorter averaged time interval (30 min or 1	Table 2, clause 10.1.		This FAR4 will be verified during

Report clarifications and corrective action requests	Reference to checklist question	Summary of project owner response	Verification conclusion
hour) for the next monitoring period.			the next periodic verification.

APPENDIX B: VERIFICATION TEAM

The verification team consists of the following personnel:

Ashok Mammen, PhD
Bureau Veritas Certification Team Leader, Climate Change Verifier
Dr. Mammen is a lead auditor for the environment, safety and quality management systems and a lead verifier for GHG projects with over 20 years of experience in chemical and petrochemical field with a Ph. D. in oils and lubricants. He has been involved in the validation and verification processes of more than 75 CDM/JI and other GHG projects.

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Tomas Paulaitis is a lead auditor for the environment and quality management systems and a lead GHG verifier (EU ETS, JI) with over 10 years of experience and was/is involved in the determination/verification of 8 JI projects. He holds a Master's degree in chemical engineering.

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Leonid Yaskin, PhD (thermal engineering)
Internal Technical Reviewer
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He has over 30 years of experience in heat and power R&D, engineering, and management, environmental science and investment analysis of projects. He worked in Krzhizhanovsky Power Engineering Institute, All-Russian Teploelectroproject Institute, JSC Energoperspectiva. He worked for 8 years on behalf of European

Commission as a monitor of Technical Assistance Projects. He is a Lead auditor of Bureau Veritas Certification for Quality Management Systems (IRCA registered), Environmental Management System (IRCA registered), Occupational Health and Safety Management System (IRCA registered). He has performed over 250 audits since 2002. Also he is a Lead Tutor of the IRCA registered ISO 14000 EMS Lead Auditor Training Course, and a Lead Tutor of the IRCA registered OHSAS 18001 Lead Auditor Training Course. He is an Assuror of Social Reports. He has undergone intensive training on Clean Development Mechanism /Joint Implementation and was/is involved in the determination of over 20 JI projects.