



VERIFICATION REPORT

METHANE GAS CAPTURE AND ELECTRICITY PRODUCTION AT KUBRATOVO WASTEWATER TREATMENT PLANT, SOFIA, BULGARIA BY SOFIYSKA VODA

Initial and First Periodic Verification
of the JI Project “Methane gas capture and
electricity production at Sofiyska Voda JSC
WWTP in Kubratovo, Sofia, Bulgaria”

MONITORING PERIOD:
1 JANUARY 2007 TO 31 DECEMBER 2009

REPORT No. BULGARIA- VER #/0002/2010
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BUREAU VERITAS CERTIFICATION

VERIFICATION REPORT

BUREAU
VERITAS

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Client: Sofiyska Voda JSC	Client ref.: Mr. Simidchiev

Summary:

Bureau Veritas Certification has carried out the initial and 1st periodic verification of the JI Track I project "Methane gas capture and electricity production at Kubratovo Wastewater Treatment, Sofia, Bulgaria" 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.

Bureau Veritas Certification has carried out the initial and 1st periodic verification also and has confirmed that the project is implemented as planned and described in determined and approved design documents. Verified emissions of the initial and 1st period are **205 008 t CO2 equivalents**. Initial and First period (from 01/01/2007 to 31/12/2009) was prior to the start of the JI crediting period as part of the early crediting.

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 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. The CAR №5 was conditionally closed as the project proponent provided notification information about the approval for AAU for 2007. A forward action request (FAR No. 3) was opened requiring the project proponent to present an official letter from the Ministry of Environment and Water during the transfer of the AAUs for 2007.

Report No.: BULGARIA- VER #/0002/202010	Subject Group: JI
Project title: "Methane gas capture and electricity production at Sofiyska Voda JSC WWTP in Kubratovo, Sofia, Bulgaria"	
Work carried out by: Team Leader : Konstantin Rachev Team Member : Christo Shvabski	
Work verified by: Ivan Sokolov – Internal technical reviewer	
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Indexing terms

Climate Change, Kyoto Protocol, JI, Emission Reductions, Verification

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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
UNFCCC	United Nations Framework Convention for Climate Change



Table of Contents	Page
1 INTRODUCTION	4
1.1 Objective	4
1.2 Scope	4
1.3 GHG Project Description	5
2 METHODOLOGY	5
2.1 Review of Documents	10
2.2 Follow-up Interviews	10
2.3 Resolution of Clarification, Corrective and Forward Action Requests	10
3 INITIAL AND FIRST PERIODIC VERIFICATION FINDINGS	12
3.1 Remaining issues, CAR's, FAR's from previous verification	12
3.2 Completeness of Monitoring	12
3.3 Accuracy of Emission Reduction Calculations	13
3.4 Quality Evidence to Determine Emissions Reductions	13
3.5 Management System and Quality Assurance	14
4 PROJECT SCORECARD	16
5 INITIAL AND FIRST PERIODIC VERIFICATION STATEMENT	17
6 REFERENCES	18
APPENDIX A: JI PROJECT VERIFICATION PROTOCOL	19
APPENDIX B: VERIFICATION TEAM	29



1 INTRODUCTION

Sofiyska Voda Jsc, has commissioned Bureau Veritas Certification to verify the emission reductions of its JI project “Methane gas capture and electricity production at Kubratovo Wastewater Treatment, Sofia, Bulgaria” (hereafter called “the project”) located in town Sofia, Bulgaria. The order comprises initial and first periodic verification and is related to emission reductions achieved during 1 January 2007 to 31 December 2009.

The emission reduction from 2007 is considered early credits.

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

1.1 Objective

The purpose of this verification is an initial and first periodic verification.

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.

1.2 Scope

The verification of this project is based on the Project Design Document, the Monitoring Report (covers January 1, 2007 to Dec 31, 2009), the monitoring plan as set in the PDD, supporting documents made available to Bureau Veritas Certification, and information obtained through the field visit (on-site) interviews and on-site assessment. The documents and information are reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations.

Bureau Veritas Certification, based on the recommendations in the Validation and Verification Manual (IETA/PCF), has employed a risk-based approach in the verification, focusing on the identification and reporting of significant risks and on reliability of project monitoring and generation of Emission Reductions Units (ERU).

The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations.

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 project is both a methane emissions reduction and energy production project. Methane produced on the Kubratovo wastewater treatment plant will be captured in common methane tanks serving as a buffer and then supplied to the newly installed CHP gas engines for electricity and heat production, which in turn reduces both the plant's electricity purchases from the grid and diesel fuel usage. Excess electricity will be supplied to the grid.

The main purpose of the project is to transform the existing low-tech sludge treatment process at Kubratovo into a modern advanced treatment process matching the best sludge treatment practice available in Western Europe. This transformation will have a major effect on the environment through dramatically reducing the existing methane gas emissions at the plant and sludge disposal site while also reducing the volume of sludge (to as much as 50%) that needs to be transported to the landfill site, hence reducing GHG emissions from transportation as well (not included in GHG abatement calculations). This will proportionally extend the life of the landfill site.

The digesters have been commissioned at the end of 2006 and started generating Early credits) on 01 January 2007 but due to some technical problems in the adjustment of the biological process the generation of biogas has been interrupted in the end of June 2007 and resumed during the first Kyoto crediting period on May, 1st, 2008, so the first Industrial quantities of biogas have been registered in May 2008. The quantities of waste-water treated and biogas generated in the period 01.01.2008 – 31.04.2008 have not been considered in the calculation of the baseline and the project line which is a conservative approach. The CHP has been commissioned and started generating electricity for plant's needs in November, 2009.

The project will reduce greenhouse gas emissions by partially substituting power production in other power plants of Bulgaria that run on fossil fuel.

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

The verification protocol consists of one table under Initial Verification checklist (applicable only for initial verification) 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.	<p>A score is assigned as follows:</p> <ul style="list-style-type: none"> • 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
<p>Identify and list potential reporting risks based on an assessment of the emission estimation procedures, i.e.</p> <ul style="list-style-type: none"> ➤ the calculation methods, ➤ raw data collection and sources of supporting documentation, ➤ reports/databases/information systems from which data is obtained. <p>Identify key source data. Examples of source data include metering</p>	<p>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.</p> <p>Internal controls include (not exhaustive):</p> <ul style="list-style-type: none"> ➤ Understanding of responsibilities and roles ➤ Reporting, reviewing and formal management approval of data; ➤ Procedures for ensuring 	<p>Identify areas of residual risks, i.e. areas of potential reporting risks where there are no adequate management controls to mitigate potential reporting risks</p> <p>Areas where data accuracy, completeness and consistency could be improved are highlighted.</p>



<p>records, process monitors, 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.</p> <p>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:</p> <ul style="list-style-type: none"> ➤ 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. 	<p>data completeness, conformance with reporting guidelines, maintenance of data trails etc.</p> <ul style="list-style-type: none"> ➤ 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 analyzing the GHG data with previous periods, targets and benchmarks. 	
	<p>When testing the specific internal controls, the following questions are considered:</p> <ol style="list-style-type: none"> 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)
<p>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.</p>	<p>The additional verification testing performed is described. Testing may include:</p> <ol style="list-style-type: none"> 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 <ul style="list-style-type: none"> ➤ Check sampling analysis results ➤ Discussions with process engineers who have detailed knowledge of process uncertainty/error bands. 	<p>Having investigated the residual risks, the conclusions should be noted here. Errors and uncertainties should be highlighted.</p> <p>Errors and uncertainty can be due to a number of reasons:</p> <ul style="list-style-type: none"> ➤ 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. <p>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.</p>

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
<p>If the conclusions from the Verification are either a Corrective Action Request or a Clarification Request, these should be listed in this section.</p>	<p>Reference to the checklist question number in Tables 2, 3 and 4 where the Corrective Action Request or Clarification Request is explained.</p>	<p>The responses given by the Client or other project participants during the communications with the verification team should be summarized in this section.</p>	<p>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".</p>



Figure 1 Verification protocol tables

2.1 Review of Documents

The Monitoring Report (MR) submitted by Sofiyska Voda JSC 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, July 2005 and Project Monitoring Report (MR), version June 2010.

2.2 Follow-up Interviews

On 01/03/2010, Bureau Veritas Certification performed field visit (on site) interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Sofiyska Voda and consulting company for this JI Project – “Global Carbon Bulgaria” were interviewed (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
Sofiyska Voda	Implementation of project, monitoring of electricity and heat, calibration and maintenance of the electric power and heating meters, responsibilities and legal requirements. Project specific documentations and monitoring of the main data. Organization scheme and responsibilities. Data collecting and archiving.
Global Carbon Bulgaria (consulting company)	GHG Emission reduction estimation and calculations.

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 to fully clarify an issue.

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



3 INITIAL AND FIRST PERIODIC VERIFICATION FINDINGS

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.

Initial Verification: The objective of an initial verification is to verify that the project is implemented as planned, to confirm that the monitoring system is in place and fully functional, and to assure that the project will generate verifiable emission reductions. A separate initial verification prior to the project entering into regular operations is not a mandatory requirement.

Periodic Verification: The objective of the periodic verification is to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan; furthermore the periodic verification evaluates the GHG emission reduction data and express a conclusion with a high, but not absolute, level of assurance about whether the reported GHG emission reduction data is free of material misstatements; and verifies that the reported GHG emission data is sufficiently supported by evidence, i.e. monitoring records. If no prior initial verification has been carried out, the objective of the first periodic verification also includes the objectives of the initial verification.

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.

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

There are no remaining issues and FAR's from previous periodic verification.

From the Determination Protocol issued by TÜV Industrie Service GmbH TÜV SÜD Group from 2006-01-25, there was one remaining issues, which is.

Corrective Action Request (CAR1):

It is envisaged that the project has to be approved by both countries (Netherlands and Bulgaria) at the end of the validation process. Written letters of approval were not available at the time of this determination.

Response:

The Approvals are checked during the Initial and first verification. Letter of approval from Ministry of Environment and water, Bulgaria was issued during August 2007 and Declaration of Approval from the State of the Netherlands during July 2007.

3.2 Completeness of Monitoring

3.2.1 Discussion

Monitoring routines have been checked. It can be stated that monitoring routines are implemented in accordance with the monitoring plan.

Internal and external data are clearly demonstrated in the monitoring report.

3.2.2 Findings

Comments	Conclusion
<p>During the verification there were documented the following deviations:</p> <p><u>Corrective Action Request CAR №1</u> Please check the procedure of electricity meters QA&QC. The checking of accuracy of electrometers could be made by authorized laboratory of NEK, but the Bulgarian Institute of Metrology publish the methodology for electrometers checking and licensing the laboratories authorized to perform the checks for accuracy. Please check again the accuracy-checking interval for the project electrometers. The checking interval seems quite long – 6 years. Normally the respective checking is conduct in intervals of 1 or 2 years.</p> <p><u>Corrective Action Request CAR №4</u> Please provide flow chart with procedures for monitoring reporting and data flow as a separate item in the MR. The flow chart have to include also roles, responsibility, position and names of the persons in charge for each item of the project monitoring.</p> <p><u>Clarification Request CR №1</u> Please provide information in item A.2 of Monitoring Report (MR) about the respective implementation procedure for approval of this JI project (Track 1 or Track 2) and is the project PDD submitted to JISC for registration.</p> <p><u>Clarification Request CR №3</u> Persons responsible for the preparation and submission of the monitoring report have to provide contact information for themselves together with their identity in item A.10 of MR.</p> <p><u>Clarification Request CR №5</u> Evidences for conducted different courses for staff practical training responsible for operation of project specific equipment - digesters CHP and etc., have to be listed in separate item of the MR. The related documentation have to be available for verifying in the General Manager Office responsible for the project monitoring.</p> <p><u>Clarification Request CR №6</u> A procedure for periodic internal verification of data and estimation of GHG reductions as well as cross check procedures should be included in the MR.</p>	<p>All discussing items were implemented efficiently in the latest version of the Monitoring Report.</p> <p>All CARs and CRs are now closed. Please also refer to Table 5 from this Report.</p>

3.2.3 Conclusions

Bureau Veritas confirms that:

Documented CAR 1; CAR 4; CR 1; CR 3; CR 5; CR 6 were implemented efficiently in the latest version of the Monitoring Report. All of them were closed during the verification.

The Monitoring Report is transparent and complete.

3.3 Accuracy of Emission Reduction Calculations

3.3.1 Discussion

Calculations of the emission reductions presented in the monitoring report have been checked and discussed.

3.3.2 Findings

Comments	Conclusion
<p>During the verification there were documented the following deviations:</p> <p><u>Corrective Action Request CAR №2</u></p> <p>Please provide additional information and explanations in separate item of MR about the formulas using in columns K and M in the Table "Methane gas capture and electricity production at Kubratovo Wastewater Treatment, Sofia Bulgaria" on page32 of MR. The relevant data are shown in Excel file: "Data_flows_MR"</p> <p><u>Corrective Action Request CAR №3</u></p> <p>Please revise the Excel file 20100319_SD6_MR_ER_SV_ver3_0(1) following chronological consistent between parameters in the formulas and the spreadsheet tables to facilitate reproducing of calculations and easy cross-check.</p> <p>Each parameter in the formulas and in the respective table has to be number for easy check and verifying.</p>	<p>All discussing items were implemented efficiently in the latest version of the Monitoring Report.</p> <p>All CARs and CRs are now closed. Please also refer to Table 5 from this Report.</p>

3.3.3 Conclusions

Bureau Veritas confirms that:

Emission reduction calculations are carried out according to the monitoring plan of the approved PDD without mistakes and misstatements.

3.4 Quality Evidence to Determine Emission Reductions

3.4.1 Discussion

The data are and will be collected continuity during the crediting period. The CO₂ emissions following the project implementation are determined from the parameters monitored, as described. The monitoring plan describes the procedures for the collection of the data, and the procedures for the auditing required for the projects, in order to determine and verify emissions reductions achieved by the project.

3.4.2 Findings

Comments	Conclusion
<p>During the verification there were documented the following deviations:</p> <p><u>Clarification Request CR №2</u></p> <p>Please provide explanations in separate item of MR for all primary and secondary sludge thickened and digested measures implemented in the project as per EU recommendations and guidelines and link to website related to these issues.</p> <p><u>Clarification Request CR №4</u></p> <p>Please provide official document from Bulgarian Ministry of Environment and Waters for using of Electricity Power Industry Baseline Emission Factor published on the website of the Ministry in the ex-post emission estimations for the project monitoring.</p>	<p>All discussing items were implemented efficiently in the latest version of the Monitoring Report.</p> <p>All CRs are now closed. Please also refer to Table 5 from this Report.</p>

3.4.3 Conclusions

Bureau Veritas confirms that:

Documented CR 2 and CR 4 were implemented efficiently in the latest version of the Monitoring Report. All of them were closed during the verification. The monitoring report is transparent and complete.

The monitoring report is in conformity with requirements to the quality of evidence.

3.5 Management System and Quality Assurance

3.5.1 Discussion

The quality assurance procedures are documented and implemented effectively. However there were documented two FARs.

3.5.2 Findings

Comments	Conclusion
<p><u>Forward Action Request FAR №1</u></p> <p>A logbook of the JI project concerning all key parameters monitoring variables values have to be summarized and available in electronic form at the project general manager office and present for verification at the next project monitoring period.</p> <p><u>Forward Action Request FAR №2</u></p> <p>The project specific "Monitoring Manual" (MM) of the JI project should be available for the verifying after next monitoring period. Part of this MM should be all reporting procedures, data flow, work instructions, internal reviews, calibration requirements and frequencies, necessity for trainings, QA&QC and etc.).</p>	<p>Measures to prepare the required documents are taken in order to be presented to the Verifier during the next periodic verification.</p>

3.5.3 Conclusions

Bureau Veritas confirms that:

The monitoring is in accordance with the PDD requirements for the management system and operational control.

The monitoring report is transparent and complete.

4 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.



5 INITIAL AND FIRST PERIODIC VERIFICATION STATEMENT

Bureau Veritas Certification has performed the initial and 1st periodic verification of the project “Methane gas capture and electricity production at Kubratovo Wastewater Treatment, Sofia, Bulgaria”. The verification is based on the currently valid documentation of the United Nations Framework Convention on the Climate Change (UNFCCC).

The management of “Sofiyska Voda” JSC and consulting company “Global Carbon Bulgaria” are responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions of the project on the basis set out within the project Monitoring and Verification Plan indicated in the final PDD version July 2005. 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 for the reporting period as indicated below.

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 emissions reductions reported and related to the valid and approved project baseline and monitoring, and its associated documents. Based on the information we have seen and evaluated that we confirm the following statement:

Reporting period:

- ❖ Monitoring period starting date (before Kyoto): 01.January.2007, 00.00 h
- ❖ Monitoring period closing date (before Kyoto): 31.December.2007, 24.00 h
- ❖ Monitoring period starting date (inside Kyoto): 01.January.2008, 00.00 h
- ❖ Monitoring period closing date (inside Kyoto): 31.December.2009, 24.00 h

Total Emission Reductions from the project is shown in the table below.

Reductions	Unit	total	2007	2008	2009
Baseline emissions, BE	tCO ₂ e	240,739	42,504	79,892	118,344
Project emissions, PE	tCO ₂ e	35,732	6,291	11,571	17,870
Total Emission Reductions, ER	tCO ₂ e	205,008	36,213	68,321	100,474



6 REFERENCES

Category 1 Documents:

Documents provided by “Sofiyska Voda” JSC and consulting company “Global Carbon Bulgaria” that relates directly to the GHG components of the project.

- /1/ PDD “Methane gas capture and electricity production at Kubratovo Wastewater Treatment, Sofia, Bulgaria”
- /2/ Determination Report No. 743691, Revision 00 from 2006-01-25, issued by TUV SUD Industrie Service GmbH
- /3/ Monitoring Report of JI Project - “Methane gas capture and electricity production at Kubratovo Wastewater Treatment, Sofia, Bulgaria”
- /4/ Baseline and project emission estimations – excel file
- /5/ Data flow – excel file
- /6/ Letter of approval from Ministry of Environment and water, Bulgaria issued during August 2007
- /7/ Declaration of Approval from the State of the Netherlands during July 2007.

Category 2 Documents:

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

- /1/ Company Monitoring Instructions
- /2/ Company schemes, diagrams, protocols and data flows
- /3/ Measurements devices calibrations files
- /4/ Technical descriptions on used measurement devices

Persons interviewed:

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

- /1/ Mr. Jeliaz Rangelov, Process Manager, Waste Water Treatment Plant
- /2/ Mr. Rayno Popov, sludge installation chief
- /3/ Mrs. Vesela Stefanova, plant laboratory supervisor
- /4/ Mr. Victor Milkov, consultant (Global Carbon Bulgaria)



APPENDIX A: PROJECT VERIFICATION PROTOCOL

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.

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/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 <i>Forward Action Requests</i>)
1. Defined organisational structure, responsibilities and competencies		
1.1. 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.	Limited	Mr. Rangelov, process manager and the other staff clearly demonstrated their accountability and awareness during the on-site visit. Nevertheless, the responsibilities, roles and the staff position for monitoring and reporting are not clearly stated in the Monitoring Report. <u>Corrective action request № 4: (please refer to Table №5)</u> <u>Clarification request № 3: (please refer to Table №5)</u>
1.2. Responsibilities Specific monitoring and reporting tasks and responsibilities are included in job descriptions or special instructions for employees.	Limited	The responsibilities of the staff is appointed in C.1.1 of the MR. During the on site visit the appointed staff clearly demonstrated his accountability and awareness for collecting and reporting the required data. Please refer also to CAR №4.
1.3. Competencies needed Competencies needed for each aspect of the GHG determination process are analysed. Personnel competencies are assessed and training programme implemented as required.	Limited	The appointed staffs that have the necessary competence and skills carry out the monitoring of power production. The consultant's competence regarding the preparation of monitoring reports is also sufficient. Furthermore, during the on site visit, there were checked the conducted training of the used measurements devices, equipment and used monitoring software. Nevertheless, it was documented a CR. <u>Clarification request № 5: (please refer to Table №5)</u>
2. Conformance with monitoring plan		
2.1. 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	The reporting procedures are described in the monitoring plan in the PDD and in the Monitoring Report. There are no deviations or revisions to the Monitoring Plan.
2.2. Necessary Changes Necessary changes to the monitoring plan are identified and changes are integrated in local procedures as necessary.	Full	There were not identified any changes.



VERIFICATION REPORT

Expectations for GHG data management system/controls	Score	Verifiers Comments (including <i>Forward Action Requests</i>)
3. Application of GHG determination methods		
3.1. 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.	Limited	The method to determine GHG emissions is clearly documented in the Monitoring Report. <u>Clarification request № 1: (please refer to Table №5)</u>
3.2. Information/process flow An information/process flow diagram, describing the entire process from raw data to reported totals is developed.	Limited	Please refer point 1.1 and CAR 4 (Table 5)
3.3. 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.	Full	There is no data transfer between or within systems/spreadsheets. All the information is collecting in the used software.
3.4. Data trails Requirements for documented data trails are defined and implemented and all documentation are physically available.	Full	All documents with required data are physically available (daily and monthly documents). During the on site visit was proved that there is good data trails.
4. Identification and maintenance of key process parameters		
4.1. 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	Key monitoring activities according to the monitoring plan for the stated monitoring period is explain in Monitoring report. Tables with fixed default values and variables are also documented in the Monitoring report.
4.2. Calibration/maintenance Appropriate calibration/maintenance requirements are determined.	Limited	During the on site visit were checked all measuring devices calibration. All devices were calibrated from authorized laboratory and regarding Bulgarian Laws. All necessary protocols were physically available and checked. There is no deviation found. In the MR is documented a table providing information for used measuring equipment and calibrating procedures. However, it was documented a CAR. <u>Corrective action request № 1: (please refer to Table №5)</u>



VERIFICATION REPORT

Expectations for GHG data management system/controls	Score	Verifiers Comments (including <i>Forward Action Requests</i>)
5. GHG Calculations		
5.1. 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.	Limited	The default value of the emission factor has been already described in the PDD and has been confirmed in the determination report. Tables with fixed default values and variables are also documented in the Monitoring report. However there were documented next deviations: <u>Corrective action request № 2: (please refer to Table №5)</u> <u>Corrective action request № 3: (please refer to Table №5)</u> <u>Clarification request № 2: (please refer to Table №5)</u> <u>Clarification request № 4: (please refer to Table №5)</u>
5.2. 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	The grid owner (National electrical Company) controls monthly values of electricity supplied to the grid. The calculation process was done by process manager and checked from company consultant and then has been fully checked by the Bureau Veritas verifiers.
5.3. Internal verification Internal verifications include the GHG data management systems, to ensure consistent application of calculation methods.	Limited	The internal audits and control measures are documented in C.3 of the Monitoring Report. However, it was documented a CR. <u>Clarification request № 6: (please refer to Table №5)</u>
5.4. 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	A responsible engineer validates data reported.
5.5. Data protection measures Data protection measures for databases/spreadsheets should be in place (access restrictions and editor rights).	Full	The responsible persons protect the used spreadsheets. No specific protections are used.



VERIFICATION REPORT

Expectations for GHG data management system/controls	Score	Verifiers Comments (including <i>Forward Action Requests</i>)
5.6. IT systems IT systems used for GHG monitoring and reporting should be tested and documented.	Full	No specific IT systems are used for GHG monitoring and reporting.

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 of the monitoring meters (measuring devices)	Errors because of technical failure or insufficient calibration are possible.	All monitoring meters (measuring devices) are controlled permanently from the competent laboratory and company responsible staff. The meters are calibrated according to the requirements of the manufacturer and regarding Bulgarian legislation, by external authorized laboratory. There is documented in the MR an Instruction for insurance of quality control of measuring devices. Hence, a severe failure of the monitoring meters is rather unlikely.
Failure in data collection and management	Failures because of incorrect computer handling or incorrect data input are possible.	Specialists handle the computers. Responsible persons verify the data input. Hence, errors in data collection and management are unlikely.
Errors in calculation	Errors because of wrong data input or false formulae are possible	The calculation spreadsheets were checked during the verifications. Experts do the input of the data. Hence, the risk of calculation errors is considered low. Hence, the calculations are check also by the consultant.

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 <i>Forward Action Requests</i>)
Monitoring failure of the electricity supplied to the grid	1) Inspection of maintenance and calibration records. 2) Inspection how procedures are operated in case of meters failure (if applicable).	Responsible persons were interviewed regarding calibration status and cases of failure of the used meters. In addition, a documented procedure describes the activity in case of damages and temporary replacing of the measuring device and Instruction for insurance of quality control of measuring devices. Maintenance records and calibration records have been reviewed and valid calibration records have been delivered to all meters. All interviewed staff showed competence and has been trained well.
Human mistakes in measurements and data processing.	During the on-site visit the persons involved in the data acquisition process have been interviewed and asked concerning their role and competencies, furthermore they had to describe the procedures for which they are responsible.	All interviewed staff showed competence and has been trained well. Hence, human mistakes in measurements and data processing are very unlikely.
Random testing of the data and calculations	<ul style="list-style-type: none"> • Sample cross checking of transfers of data: All data that were used in the .xl -sheet of the calculation file were explicitly checked. On a random basis data were checked at their primary source. • Re-calculation Recalculation of the workbook files was performed. • Spreadsheet 'walk throughs' to check equations All numbers, equations and algorithms used in the different workbook sheets were checked. • Inspection of calibration and maintenance records for key equipment 	The data files have been checked on the basis of primary data. No errors have been found. Hence, data errors are very unlikely. The done calculation has been checked random wise. No significant errors have been found. The calibration of all monitoring meters has been checked. For all meters, valid calibration protocols have been delivered. Hence, severe calibration errors are unlikely.

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
<u>Corrective Action Request CAR №1</u> Please check the procedure of electricity meters QA&QC. The checking of accuracy of electrometers could be made by authorized laboratory of NEK, but the Bulgarian Institute of Metrology publish the methodology for electrometers checking and licensing the laboratories authorized to perform the checks for accuracy. Please check again the accuracy-checking interval for the project electrometers. The checking interval seems quite long – 6 years. Normally the respective checking is conduct in intervals of 1 or 2 years.	Table 2, p. 4.2	According to Order NoA-412/16.08.2004 of the Chairman of the State agency for metrological control (http://www.rcz-shumen.icon.bg/metrologija/zap_damtn_metrology.htm) the intermediate period for calibration of electric meters for up to 10 MVA capacity is 4 years. The capacity of the electric meters in Kubratovo WWTP is in that range so the calibration period is 4 years. The Monitoring Report is revised in B.1.2 and the period to the next calibration of electric meter ABB AINRTAL-X, ser. No 02364831 is changed to 4 years.	The verification team checks the additional information present in the revised MR and considers that the information is correct and closed CAR №1.
<u>Corrective Action Request CAR №2</u> Please provide additional information and explanations in separate item of MR about the formulas using in columns K and M in the Table "Methane gas capture and electricity production at Kubratovo Wastewater Treatment, Sofia Bulgaria" on page32 of MR. The relevant data are shown in Excel file: "Data_flows_MR"	Table 2, p. 5.1	Additional information and explanations regarding the formulas used in columns K and M in Table 9 (p.32 of the MR) are amended in item B.2.3.1 of the Monitoring Report, ver.3.1.	The verification team checks the additional information present in the revised MR and considers that the information is correct and closed CAR №2.
<u>Corrective Action Request CAR №3</u> Please revise the Excel file 20100319_SD6_MR_ER_SV_ver3_0(1) following chronological consistent between parameters in the formulas and the spreadsheet tables to facilitate reproducing of calculations and easy cross-check. Each parameter in the formulas and in the respective table has to be number for easy check and verifying.	Table 2, p. 5.1	The Excel file 20100319_SD6_MR_ER_SV_ver3_0 is revised correspondingly and attached. The new file-name is 20100428_SD6_MR_ER_SV_ver3_1.	The verification team checks the additional information present in the revised MR and considers that the information is correct and closed CAR №3.
<u>Corrective Action Request CAR №4</u> Please provide flow chart with procedures for monitoring reporting and data flow as a separate item in the MR. The flow chart have to include also roles, responsibility, position and names of the	Table 2, p. 1.1	The required flow chart is amended in item C.1.1 of the Monitoring Report, ver.3.1.	The verification team checks the additional information present in the revised MR and considers that the information is correct and



VERIFICATION REPORT

Report clarifications and corrective action requests	Reference to checklist question	Summary of project owner response	Verification conclusion
persons in charge for each item of the project monitoring.			closed CAR №4.
Corrective Action Request CAR №5 The project is not yet been formally approved by the Bulgarian focal point (Ministry of environment and water) for requesting early credits from 2007.			Information from the MOEW was received concerning issuing a Letter of confirmation for approval of early credits for this JI project. The official letter is in process of issuance and will be released within 1 month. This CAR is closed and a new FAR is documented, requiring the project proponent to enclose the official letter from MOEW during the transfer of the emissions.
Clarification Request CR №1 Please provide information in item A.2 of Monitoring Report (MR) about the respective implementation procedure for approval of this JI project (Track 1 or Track 2) and is the project PDD submitted to JISC for registration.	Table 2, p. 3.1	The required information was amended in item A.2 of the Monitoring Report, ver.3.1	The verification team checks the additional information present in the revised MR and considers that the information is correct and closed CR №1.
Clarification Request CR №2 Please provide explanations in separate item of MR for all primary and secondary sludge thickened and digested measures implemented in the project as per EU recommendations and guidelines and link to website related to these issues.	Table 2, p. 5.1	Additional information and explanations regarding the fulfillment of EU recommendations and guidelines have been added in a separate item A.3.1 (p.3) of the MR, ver.3.1.	The verification team checks the additional information present in the revised MR and considers that the information is correct and closed CR №2.
Clarification Request CR №3 Persons responsible for the preparation and submission of the monitoring report have to provide contact information for themselves together with their identity in item A.10 of MR.	Table 2, p. 1.1	The required information was amended in item A.2 of the Monitoring Report, ver.3.1.	The verification team checks the additional information present in the revised MR and considers that the information is correct and closed CR №3.
Clarification Request CR №4 Please provide official document from Bulgarian Ministry of Environment and Waters for using of Electricity Power Industry Baseline Emission Factor published on the website of the Ministry in the ex-post emission estimations for the project monitoring.	Table 2, p. 5.1	The required document – an official e-mail from the Bulgarian Ministry of Environment and Water is attached to the present report - file name 20100430_SD8_BgEF_bg.msg The letter confirms the possibility to use the Baseline Emission Factor of the Bulgarian Power Industry	The verification team checks the additional information present in the revised MR and considers that the information is correct and closed CR №4.

VERIFICATION REPORT

Report clarifications and corrective action requests	Reference to checklist question	Summary of project owner response	Verification conclusion
		published on the website of MoEW for "ex-post" calculations of Emission Reductions from JI projects in Bulgaria.	
Clarification Request CR №5 Evidences for conducted different courses for staff practical training responsible for operation of project specific equipment - digesters CHP and etc., have to be listed in separate item of the MR. The related documentation have to be available for verifying in the General Manager Office responsible for the project monitoring.	Table 2, p. 1.3	Protocols for conducting of different courses and training are included in the attached file 20100504_SD8_MR_SV_Training.rar The annexes to the EPC contracts for major equipment that arrange the training for operation of the digesters, CHP and flares are kept together with the protocols in the office of the Process Manager Mr. Jelyaz Rangelov. The evidences are listed in item C.1.2 of the Monitoring Report, ver.3.1.	The verification team checks the additional information present in the revised MR and considers that the information is correct and closed CR №5.
Clarification Request CR №6 A procedure for periodic internal verification of data and estimation of GHG reductions as well as cross check procedures should be included in the MR.	Table 2, p. 5.3	The relevant procedures for periodic internal verification of data and estimation of GHG reductions as well as cross check procedures are added in item C.3 of the Monitoring Report, ver.3.1.	The verification team checks the additional information present in the revised MR and considers that the information is correct and closed CR №6.
Forward Action Request FAR №1 A logbook of the JI project concerning all key parameters monitoring variables values have to be summarized and available in electronic form at the project general manager office and present for verification at the next project monitoring period.		Measures to prepare the required logbook have been taken in order to present it to the Verifier during the next periodic verification.	The FAR 1 will be check during the next periodic verification.
Forward Action Request FAR №2 The project specific "Monitoring Manual" (MM) of the JI project should be available for the verifying after next monitoring period. Part of this MM should be all reporting procedures, data flow, work instructions, internal reviews, calibration requirements and frequencies, necessity for trainings, QA&QC and etc.).		Measures to prepare the required Monitoring Manual have been taken in order to present it to the Verifier during the next periodic verification.	The FAR 2 will be check during the next periodic verification.
Forward Action Request FAR №3 On the day of transfer of the 2007 AAUs an official Letter of MOEW stating permission for transfer should be enclosed.			



APPENDIX B: VERIFICATION TEAM

The verification team consists of the following personnel:

Mr. Ivan G. Sokolov, Dr. Sci. (biology, microbiology)

Bureau Veritas Certification - Internal Technical Reviewer, Climate Change Lead Verifier, Bureau Veritas Certification Holding SAS Local Climate Change Product Manager for Ukraine.
Acting CEO Bureau Veritas Black Sea District

He has over 25 years of experience in Research Institute in the field of biochemistry, biotechnology, and microbiology. He is a Lead auditor of Bureau Veritas Certification for Environment Management System (IRCA registered), Quality Management System (IRCA registered), Occupational Health and Safety Management System, and Food Safety Management System. He performed over 140 audits since 1999. Also he is Lead Tutor of the IRCA registered ISO 14000 EMS Lead Auditor Training Course, and Lead Tutor of the IRCA registered ISO 9000 QMS Lead Auditor Training Course. He is Lead Tutor of the Clean Development Mechanism /Joint Implementation Lead Verifier Training Course and he was involved in the determination/verification over 50 JI/CDM projects.

Mr. Konstantin Rachev (KDR):

“Bureau Veritas Certification – Lead Auditor and Lead Verifier (M.Sc. Ecology)

He has 10 years of experience in environmental field, Mr. Rachev is a lead auditor for environment, safety and quality management systems and lead verifier for GHG projects (CDM Verifier / Lead Verifier Training Course held on February 25-29, 2008). He has been involved in the validation processes of 10 CDM/VCS/JI projects.

Mr. Christo Schwabski

“Bureau Veritas Certification – Auditor (M.Sc. Thermal Power)

He has 30 years of experience in energy and environment field. Mr. Schwabski has been involved in GHG reduction projects since 2002. Since that time he has extensive experience in establishing PDD, baselines setting, monitoring plans, GHG estimations and investment and financial analysis's of GHG projects. He participates as a consultant in 7 JI projects and develops estimation of Bulgarian CO2 emission factor for the Electricity Power System.

Mr. Schwabski participates as auditor and verifier trainee in 10 CDM/VCS/JI projects since 2008.