DETERMINATION REPORT

DETERMINATION OF THE VACHA CASCADE JOINT IMPLEMENTATION PROJECT IN BULGARIA

REPORT NO. 2003-1332

REVISION NO. 01

DET NORSKE VERITAS

DERTERMINATION REPORT

Date of first issue: 2003-11-07	Project No.: 28624563
Approved by: Trygve Røed Larsen ~~Senior Vice~~ President	Organisational unit: DNV Certification, International Climate Change Services
Client: Verbundplan GmbH	Client ref.: Jürgen Wahl

DET NORSKE VERITAS AS

DNV Certification

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
http://www.dnv.com
Org. No: NO 945 748 931 MVA

Summary:

DNV Certification has made a determination of the Vacha Cascade Joint Implementation Project in Bulgaria (hereafter called "the project"). The determination was performed on the basis of the UNFCCC criteria for JI projects, in particular the verification procedures under the Article 6 supervisory committee, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The determination consisted of the following three phases: i) desk review of the project design document, the baseline study and the monitoring plan, ii) follow up interviews with project stakeholders and iii) the resoloution of outstanding issues and the issuance of the final determination report and opinion.

In summary, it is DNV Certification's opinion that the project meets all relevant UNFCCC requirements for Joint Implementation projects. However, the project has not yet obtained written approval by the Bulgarian and Austrian government.

Report No.: 2003-1332	Subject Group: Environment
Report title: Determination of the Vacha Cascade Joint Implementation Project in Bulgaria	
Work carried out by: Michael Lehmann, Elfride Covarrubias Villegas	
Work verified by: Einar Telnes	
Date of this revision: 2003-11-07	Rev. No.: 01 / Number of pages: 11

Indexing terms

Key words Climate Change Kyoto Protocol Validation/Determination Clean Development Mechanism	Service Area Verification Market Sector General Industry

- ☒ No distribution without permission from the client or responsible organisational unit
- ☐ free distribution within DNV after 3 years
- ☐ Strictly confidential
- ☐ Unrestricted distribution

Table of Content *Page*

Abbreviations

BLS	Baseline Study
CAR	Corrective Action Request
CEF	Carbon Emission Factor
CH_4	Methane
CL	Clarification request
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
DNV	Det Norske Veritas
EIA	Environmental Impact Assessment
EPS	Electricity Power Sector
ERU(s)	Emission Reduction Unit(s)
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
HPP	Hydro Power Plant
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
MP	Monitoring Plan
NEK EAD	Natsionalna Elektricheska Kompania EAD Sofia
NGO	Non-governmental Organisation
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change

1 INTRODUCTION

Verbundplan GmbH of Austria has commissioned DNV Certification to make a determination of the Vacha Cascada Joint Implementation Project (hereafter called "the project") in Bulgaria (Note that the validation activity for JI projects is referred to as "determination").

This report summarises the preliminary findings of the determination of the project, performed on the basis of the UNFCCC criteria for JI projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The determination team consists of the following personnel:

Mr Michael Lehmann	DNV Certification Oslo	Team Leader, GHG auditor
Ms Elfride Covarrubias Villegas	DNV Certification Milan	GHG auditor trainee
Mr Einar Telnes	DNV Certification Oslo	Internal verifier

1.1 Objective

The purpose of the determination is to have an independent third party assessing the project design. In particular, the project's baseline, the monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the identified criteria. Determination is a requirement for JI projects following the verification procedures under the Article 6 supervisory committee and it is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of the emission reduction units (ERUs).

1.2 Scope

The determination scope is defined as an independent and objective review of the Project Design Document (PDD), the Baseline Study (BLS), the Monitoring Plan (MP) and other relevant documents. The information contained in those documents is reviewed against the Kyoto Protocol requirements for Joint Implementation (JI) projects, the guidelines for the implementation of Article 6 of the Kyoto Protocol (Decision 16/CP.7) as agreed in the Marrakech Accords, in particular the verification procedures under the Article 6 supervisory committee, and associated interpretations. DNV Certification has, based on the recommendations in the Validation and Verification Manual /5/, employed a risk-based approach in the determination process, focusing on the identification of significant risks for project implementation and the generation of ERUs.

The determination is not meant to provide any consulting towards Verbundplan GmbH and other project participants. However, stated request for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 The Vacha Cascade JI Project

The Vacha Cascade Joint Implementation Project is intended to be designated as a JI project with the generation of ERUs. The project is located in the Rhodope Mountains along the Vacha river in the southern part of Bulgaria in the Smolyan District and the Devin Mihalkovo Community.

The project participants are:

Project Developer: Natsionalna Elektricheska Kompania EAD (NEK) Sofia, a joint-stock company (100% state owned).

Project Sponsor: The Austrian Supplier Group composed by VA Tech Hydro (private company), Alpine Mayreder (private company) and Verbundplan (private company).

The proposed project consists of two main activities:

- Tsankov Kamak Hydro Power Plant (HPP): This activity comprises the construction of the Tsankov Kamak Dam Reservoir with a net volume of 80 million m^3 and the Tsankov Kamak Power Station with an installed power capacity of 80 MW (2x40MW) generating 198 GWh/a (assuming an annual utilization of 2,475 hours). Moreover, the possibility for a mini hydropower plant of 1 MW is considered in the project. The additional regulating volume in the scheme of the Vacha Cascade will allow an optimisation of the water flows from the reservoir to the existing HPPs in the Cascade.
- The rehabilitation of the HPPs Thesel, Devin, Orpheus, Kirchim: The rehabilitation of the four HPPs will improve their efficiency and power production by 16 GWh/a. An overall rehabilitation is foreseen for the Orpheus and Krichim HPPs, while a refurbishment is foreseen for Teshel HPP and Devin HPPs comprising mechanical and electrical parts.

The time schedule of the project is as follows:

Specific time lines for construction of each part of the project:

• HPP Tsankov Kamak	2003-2007
• HPP Teshel	2003-2005
• HPP Devin	2003
• PS HPP Orpheus	2004-2006
• HPP Krichim	2005-2006
Expected operational life time of the project activity:	50 years
Starting date of the crediting period	01/01/2008 (It is intended that emission reductions achieved prior to 2008 will be offset with AAUs transferred from Bulgaria to Austria)
Length of the crediting period	5 years (2008-2012)

2 METHODOLOGY

The determination of the project commenced in September 2003 and was concluded in November 2003. The determination consisted of the following three phases:

i) a desk review of the project design document, the baseline sturdy and the monitoring plan,
ii) follow-up interviews with project stakeholders,
iii) the resolution of outstanding issues (Corrective Action or Clarification Requests) and the issuance of the final determination report and opinion.

The determination has been carried out in line with the verification procedure under the Article 6 supervisory committee, as well as, in line with determination process outlined in the Validation and Verification Manual /5/.

In order to ensure transparency, a determination protocol was customised for the project, according to the Validation and Verification Manual. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The determination protocol serves the following purposes:

- It organises, details and clarifies the requirements a JI project is expected to meet;
- It ensures a transparent determination process where the independent entity will document how a particular requirement has been validated and the result of the determination.

The determination protocol consists of three tables. The different columns in these tables are described in Figure 1.

2.1 Review of Documents

The Project Design Document (PDD) of 17 September 2003 /1/ for the Vacha Cascade Joint Implementation Project in Bulgaria, prepared by Natsionalna Elektricheska Kompania EAD and submitted at the end of September 2003 by Verbundplan GmbH to DNV Certification, were reviewed, as well as additional documents supporting the PDD, i.e. the Baseline Study (BLS) /2/ and the Monitoring Plan (MP) /3/ for the project. The project participants also submitted a financial analysis for the Tsankov Kamak HPP /4/.

2.2 Follow-up Interviews

DNV Certification carried out telephone interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. On 31 October 2003, DNV Certification carried out an interview with representatives of the Natsionalna Elektricheska Kompania EAD, VA Tech Hydro and Verbundplan /5/. At the same time, DNV Certification also spoke with a representative of the Bulgarian Ministry of Environment and Water /7/. Finally, a representative of the Austrian Export Promotion Authority (OeKB) /8/ was interviewed on 6 November 2003. The main topics of the interviews are summarised in Table 1.

Determination Protocol Table 1: Mandatory Requirements			
Requirement	***Reference***	***Conclusion***	***Cross reference***
The requirements the project must meet.	*Gives reference to COP decision where the requirement is found.*	*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 determination report.*	*Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent determination process.*

Determination Protocol Table 2: Requirement checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project shall meet. The checklist is organised in six different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	*Gives reference to documents where the answer to the checklist question or item is found.*	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I).*	*The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below). **Clarification (CL)** is used when the independent entity has identified a need for further clarification. N/A means not applicable.*

Determination Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	***Ref. to checklist question in table 2***	***Summary of project owner response***	***Determination conclusion***
If the conclusions from the draft determination are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	*Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.*	*The responses given by the project proponent or other project participants during the communications with the independent entity should be summarised in this section.*	*This section should summarise the independent entity's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".*

Figure 1 Determination protocol tables

Table 1 Interview topics

Interviewed organisation	Interview topics
Natsionalna Elektricheska Kompania EAD, VA Tech Hydro & Verbundplan	➢ Planned operational mode of Tsankov Kamak HPP (base vs. peak load) ➢ Availability of dispatching data to determine the marginal power plant on an hourly basis ➢ Availability and processing of necessary data to determine carbon emission factor (CEF) of power plants at the margin ➢ Procedures for calibration and maintenance of monitoring equipment
Bulgarian Ministry of Environment and Water	➢ Approval of Vacha Cascade Project as JI project between Bulgaria and Austria ➢ Environmental Impact Assessment for Tsankov Kamak HPP
Austrian Export Promotion Authority (OeKB)	➢ Importance of the designation of the Vacha Cascade project as JI project on OeKB decision to offer a significantly higher loan.

2.3 Resolution of Clarification and Corrective Action Requests

Findings established during the determination process can either be seen as a non-fulfilment of determination criteria or where a risk to the fulfilment of project objectives is identified. *Corrective Action Requests* (CAR) are issued, where:

i) mistakes have been made with a direct influence on project results;
ii) JI or host Party requirements have not been met; or
iii) there is a risk that the project would not be accepted as a JI project or that emission reductions will not be certified.

The term *Clarification* may be used where additional information is needed to fully clarify an issue.

A draft determination protocol, summarising DNV Certification's preliminary findings, was submitted to the project participants on 24 October 2003. The preliminary findings identified two *Corrective Action Requests* with regard to: i) the fact that the project the Bulgarian and Austrian Governments have not yet formally approved the project, and ii) the need to provide more detailed information and a monitoring plan for collecting and archiving data used for establishing the carbon emissions factor (CEF) of the marginal plants. Two *Clarifications* were requested related to: i) the need to have further evidence that demonstrates that the Tsankov Kamak HPP plant will provide peaking power into the Bulgarian's energy system, and ii) the requirement to have a better description of the current NEK procedures for calibration and maintenance of monitoring equipment.

On 4 November 2003 the project participants submitted their response to DNV Certification's initial findings. The additional information and clarifications provided by the project participants satisfactorily addressed DNV Certification's concerns.

3 DETERMINATION FINDINGS

The findings of the determination are stated in the following sections. The determination criteria, the means of verification and the results from validating the identified criteria are documented in more detail in the determination protocol in Appendix A.

3.1 Project design

The project design appears to represent good engineering practice. The project intends to introduce state-of-the-art technology from a reputable Austrian supplier group, resulting in a technology transfer from Austria to Bulgaria. The project design engineering for the construction of the Tsankov Kamak Dam Reservoir and HPP and for the refurbishment of the Teshel and Devin HPPs, as well as for the rehabilitation of the Orpheus and Krichim HPPs, reflects good engineering practice. Some existing structures, built in the past but never used, will be used, increasing their original efficiencies.

Due to the nature of the project and NEK EAD's extensive experience with hydropower projects, no extensive training is going to be required to implement and operate the proposed project.

In its letter of endorsement, the Bulgarian Ministry of Environment and Water supports the project and the Austrian and Bulgarian government have signed a Memorandum of Understanding for JI projects. However, the Bulgarian and Austrian Government have not yet formally approved the project and Letters of Approval have not yet been issue by the relevant authorities. Letters of Approval will only be provided after issuance of this determination report.

The project starting date and the crediting period are clearly identified.

3.2 Baseline

The Baseline Study (BLS) /2/ describes five different approaches (found in the pertinent literature) and selects in a transparent way the *Marginal Plant Only* (Least cost dispatch analysis) baseline methodology. This methodology for the electricity sector sets out in economic terms which technologies or specific generation units that are likely to be displaced by a new generation plant added to the grid. The methodology requires an evaluation of the last units to be switched on for each hour in the year. The least cost dispatch analysis methodology is appropriate when: i) necessary data for the despatch is available, and ii) the renewable energy plant is likely to replace peak load electricity. Both requirements are fully accomplished by the project.

In fact, i) dispatch data is available from NEK EAD and the National Dispatch Centre, and ii) the Tsankov Kamak HPP will be operated mainly as a peaking plant, as well as the other 4 rehabilitated plants, while nuclear power plant units are providing base-load electricity generation in Bulgaria.

The baseline takes sufficiently into account relevant national and sectoral circumstances. The BLS analyses the Bulgarian Electricity Power Sector (EPS) for the period 2004-2012 with and without the capacity added to the Bulgarian electricity sector by the proposed project. Bulgarian energy exports as well as the expected future developments in the electricity sector in Bulgaria in the years 2002-2020, including the expected decommissioning of two units at the Kozlodui nuclear power plant in 2006, are analysed in the BLS.

Conservative assumptions have been used to determine baseline emissions. The selected energy demand scenario (maximum scenario) is conservative as it rather underestimates baseline emissions than overestimates baseline emissions.

The additionality of the project activity is demonstrated through an qualitative assessment of investment barriers and a quantitative financial analysis /4/ which shows that the expected ERU revenues improve the financial viability of the project. Prevailing investment barriers have been overcome by designating the Vacha Cascade project as a JI project. Designation of the project as a JI project is a prerequisite for a substantial part of the project funding. Although the Tsanskov Kamak HPP has been under discussion for a number of years and there were some funding available from the Austrian Export Promotion Authority, it is sufficiently demonstrated that the necessary funding could only be secured due to the realisation of the project as a JI activity.

3.3 Monitoring Plan

The monitoring methodology allows a transparent, accurate and complete *ex-post* calculation of baseline emission. It also mitigates monitoring errors and uncertainties to the extent that it is reasonably possible.

As the project itself does not produce a significant project emission, no data has to be collected to monitor project emissions. Moreover, the project is not expected to cause leakage effects.

The monitoring methodology for determining baseline emissions builds on measuring electricity generation by the Tsankov Kamak HPP and the additional electricity generated by Teshel, Devin, Orpheus and Krichim HPPs. The amount of electricity produced by the project is eventually multiplied with an carbon emission factor (CEF) of the marginal power plant, which electricity generation is assumed to be displaced by the project. The boundary for determining baseline emissions is the entire Bulgarian EPS. Emission in the electricity sector in neighbouring countries are not likely to be significantly affected and hence not considered.

Data on the hourly dispatching order will be collected and archived to determine the marginal power plant, which electricity generation is assumed to be displaced by the project. For determining the CEF of the marginal plants at the margin, electricity generation, fuel consumption and specific heat rate and carbon content of the fuel used for generation are determined and a carbon emission factor is calculated for each month at each thermal power plant.

Dispatching order data and fuel characteristics of marginal plants will be furnished by NEK EAD. However, the monitoring plan does not yet make the necessary provisions for collecting and archiving the necessary data for determining the CEF of the power plant operating at the margin. Records on the CEF of the plants operating at the margin are necessary for a later verification of emission reductions attributable of the Vacha Cascade JI project. The necessary provisions (measuring plans, agreement with independent power producers, etc) for collecting and archiving data necessary for determining the CEFs of these plants, i.e. electricity generation, fuel consumption and the specific heat rate and carbon content of the fuel, will hence have to be developed prior to the starting date of the crediting period of the project.

Authorities and responsibilities for monitoring activities are defined. Calibration and maintenance of monitoring equipment will be carried out in accordance with the Bulgarian Measurement Act.

NEK AED is responsible for the development and implementation of the management and operational system of the monitoring plan. Internal auditing procedures to identify and consequently mitigate potential monitoring and reporting errors are not described, and such procedures should be developed and implemented prior to the starting date of the crediting period. Also procedures for project performance reviews and handling of corrective actions should be developed prior the project commissioning.

3.4 Calculation of GHG Emissions

Changes, due to the proposed project, on the CO_2 emissions of the Bulgarian electricity sector were determined in a complete and transparent manner. The proposed project is likely to displace fossil-fuel based electricity generation and it is demonstrated that the emission scenario for the Bulgarian EPS for the period 2004-2012 results in fewer GHG emissions in the project scenario (whith the capacity added to the Bulgarian electricity sector by the proposed project) than in the baseline scenario.

The calculations are transparently documented and conservative assumptions were used, where applicable, regarding expected electricity generation by the Tsanko Kamuk HPP and expected additional electricity generation by the Teshel, Devin, Orpheus and Krichim HPPs. The assumed utilisation factor of 28% for the Tsankov Kamak HPP is comparable with other Bulgarian HPPs. Hydrological data from the period 1951-2000 has been analysed for the electricity generation forecasts. The period 1951-2000 is representative and presents a full cycle of wet and dry periods. However, due to the consequences of global climate change, the dry period observed in recent years may continue.

The likely marginal plants have been determined using the IRP Manager Model and taking into account future developments in the Bulgarian electricity sector previously identified in the least costs development plan of the Bulgarian electricity sector for the period 2002-2020. In order to determine the emission factor of the marginal plants, fuel characteristics and plant specific operation information were taken in consideration.

Uncertainties are sufficiently addressed in the emission estimations and will be mitigated by the monitoring plan.

3.5 Environmental Impacts

For the Tsankov Kamak HPP a comprehensive EIA has been carried out by registered independent experts. The EIA was approved by the Bulgarian Ministry of Environment in decision n° 36-16/2002 of 22 October 2002. The approval is given under the condition that stated requirements for the project design, construction and operation will be met. Compliance with these requirements needs to be verified as part of the initial verification or during the first periodical verification of ERUs attributable to the proposed project.

The approval of the EIA by the Bulgarian Ministry of Environment is taken as confirmation that the project complies with Bulgarian environmental legislation. According to the EIA there are not relevant adverse environmental effects due to the proposed project.

3.6 Comments by Parties, Stakeholders and NGOs

According to the modalities for the determination of JI projects, the validator shall make publicly available the project design document and receive, within 30 days, comments from Parties, stakeholders and UNFCCC accredited observers and make them publicly available.

The PDD of September 2003 was published on DNV Certification's Climate Change website (http://www.dnv.com/certification/ClimateChange) on 3 October 2003. The same day parties, stakeholders and observers have been invited through the Climate-L mailing list to provide comments on the determination requirements during a period of 30 days until 2 November 2003. No comments were received.

4 DETERMINATION OPINION

DNV Certification has made a determination of the Vacha Cascade Joint Implementation Project in Bulgaria (hereafter called "the project"). The determination was performed on the basis of the UNFCCC criteria for JI projects, in particular the verification procedures under the Article 6 supervisory committee, as well as criteria given to provide for consistent project operations, monitoring and reporting.

It is DNV Certification's opinion that the project meets all relevant UNFCCC requirements for JI projects with the exception that neither Bulgaria nor Austria have yet formally approved the project and Letters of Approval will only be provided after issuance of this determination report.. However, in its Letter of Endorsement the Bulgarian Ministry of Environment and Water supports the project, and the Austrian and Bulgarian government have signed a Memorandum of Understanding for JI projects.

The project design appears to represent good engineering practice and the project will introduce state of the art technology developed in Austria, resulting in technology and capacity transfer to Bulgaria. For the Tsankov Kamak HPP a comprehensive EIA has been carried out by registered independent experts, and the EIA was approved by the Bulgarian Ministry of Environment.

The selected "Marginal Plant Only" (Least cost dispatch analysis) baseline methodology is appropriate because the Tsankov Kamak HPP will be operated mainly as a peaking plant, as well as the other 4 rehabilitated plants, and the electricity generated by the project will hence likely displace electricity generation at thermal power plants operating at the margin. The baseline is determined in a transparent manner and takes sufficiently into account relevant national and sectoral circumstances.

It is demonstrated that the emission scenario for the Bulgarian EPS for the period 2004-2012 results in fewer GHG emissions in the project scenario (with the capacity added to the Bulgarian electricity sector by the proposed project) than in the baseline scenario. A qualitative and quantitative analysis of the investment barriers demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

Emission calculations are transparently documented and conservative assumptions were used, where applicable, regarding expected electricity generation by the the Tsanko Kamuk HPP and expected additional electricity generation by the Teshel, Devin, Orpheus and Krichim HPPs.

The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators. However, the monitoring plan does not yet make the necessary provisions for collecting and archiving the necessary data for determining the CEF of the power plant operating at the margin. Procedures for this will have to be developed prior to the starting date of the crediting period of the project to ensure later verification of ERUs. Moreover, detailed QA/QC procedures and are not yet describe and will need to be developed.

The determination is based on the information made available to us and the engagement conditions detailed in this report. DNV Certification can not guarantee the accuracy or correctness of this information. Hence, DNV Certification can not be held liable by any party for decisions made or not made based on the determination opinion.

5 REFERENCES

Category 1 Documents:

List documents provided by the Client that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the determination conclusions.

/1/ Natsionalna Elektricheska Kompania EAD Sofia: Project Design Document for the Vacha Cascade Joint Implementation Project. 17 September 2003.

/2/ KWI Consultants & Engineers: Vacha Cascade Joint Implementation Project - Baseline Study. September 2003

/3/ KWI Consultants & Engineers: Vacha Cascade Joint Implementation Project – Monitoring Plant. September 2003

Category 2 Documents:

Background documents related to the design and/or methodologies employed in the design or other reference documents. Where applicable, Category 2 documents should have been used to check project assumptions and confirm the validity of information given in the Category 1 documents.

/4/ Financial analysis. Fax submitted by VA Tech on 21 October 2003.

/5/ DNV Certification et al.: *Validation and Verification Manual*. http://www.vvmanual.info

Persons interviewed:

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

/6/ Telephone interview on 31 October 2003 with
- Mr Christo Schwabski, Natsionalna Elektricheska Kompania EAD,
- Mr Konrad Autengruber, VA Tech Hydro &
- Jürgen Wahl, Verbundplan

/7/ Telephone interview on 31 October 2003 with Ms Ivona Grozeva, Bulgarian Ministry of Environment and Water

/8/ Telephone interview on 6 November 2003 with Ms Reutner, Austrian Export Promotion Authority (OeKB)

- o0o -

APPENDIX A

JI DETERMINATION PROTOCOL

Table 1 Mandatory Requirements for Joint Implementation (JI) Project Activities

Requirement	Reference	Conclusion	Cross Reference / Comment
1. The project shall have the approval of the Parties involved	Kyoto Protocol Article 6.1 (a)	CAR 1	In its letter of 17 December 2002 the Bulgarian Ministry of Environment and Water endorses the Vacha Cascade project as a Joint Implementation project in the context of the MoU between Bulgaria and Austria. The Bulgarian and Austrian Government have not yet formally approved the project and Letters of Approval have not yet been issued by the relevant authorities. Letters of Approval will only be provided after issuance of this determination report.
2. Emission reductions, or an enhancement of removal by sinks, shall be additional to any that would otherwise occur	Kyoto Protocol Article 6.1 (b)	OK	Table 2, Section B.2
3. The sponsor Party shall not aquire emission reduction units if it is not in compliance with its obligations under Articles 5 & 7	Kyoto Protocol Article 6.1 (c)	OK	The validation has not in detail assessed Austria's compliance with article 5 and 7 of the Kyoto Protocol. However, Austria has in place a national system for estimating GHG emissions and reported on 15 April 2003 its national GHG inventory for the years 1990 – 2001.
4. The acquisition of emission reduction units shall be supplemental to domestic actions for the purpose of meeting commitments under Article 3	Kyoto Protocol Article 6.1 (d)	OK	The validation has not in detail assessed Austria's domestic actions for meeting commitments under Article 3. However, Austria is undertaking several measures to reduce domestic GHG emissions, such as the implementation of the EU directive on emission trading and other measures listed in the Klimastrategie 2008/2012 adopted on 18 June 2002 by the Austrian council of ministers.

Requirement	Reference	Conclusion	Cross Reference / Comment
5. Parties participating in JI shall designate national focal points for approving JI projects and have in place national guidelines and procedures for the approval of JI projects	Marrakech Accords, JI Modalities, §20	OK	The Bulgarian focal point is the Ministry of Environment and Water. The Austrian focal point is the Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft.
6. The host Party shall be a Party to the Kyoto Protocol	Marrakech Accords, JI Modalities, §21(a)/24	OK	Bulgaria is a Party to the Kyoto Protocol and has ratified the Kyoto Protocol on 15. August 2002.
7. The host Party's assigned amount shall have been calculated and recorded in accordance with the modalities for the accounting of assigned amounts	Marrakech Accords, JI Modalities, §21(b)/24	OK	Bulgaria's assigned amount is 92% of the base year emissions, i.e. 1998 emissions.
8. The host Party shall have in place a national registry in accordance with Article 7, paragraph 4	Marrakech Accords, JI Modalities, §21(d)/24	OK	Bulgaria has in place a national registry and reported on 23 May 2003 its national GHG inventory for the years 2000 and 2001.
9. Project participants shall submit to the independent entity a project design document that contains all information needed for the determination	Marrakech Accords, JI Modalities, §31	OK	A Project Design Document (PDD) in accordance with the "Leitfaded zur Durchführung von JI Projekten im Rahmen des österreichischen JI/CDM Programms" has been submitted for determination. The PDD is further supported by a Baseline Study and a Monitoring Plan.
10. The project desing document shall be made publicly available and Parties, stakeholders and UNFCCC accredited observers shall be invited to, within 30 days, provide comments	Marrakech Accords, JI Modalities, §32	OK	The PDD has been published on http://www.dnv.com/certification/ClimateChage on 3 October 2003. The same day Parties, stakeholders and observers have been invited through the Climate-L mailing list to provide comments on the PDD during a period of 30 days until 2 November 2003. No comments have yet been received.

Requirement	Reference	Conclusion	Cross Reference / Comment
11. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, in accordance with procedures as determined by the host Party shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out	Marrakech Accords, JI Modalities, §33(d)	OK	Table 2, Section F
12. The baseline for a JI project shall be the scenario that reasonably represents the GHG emissions or removal by sources that would occur in absence of the proposed project	Marrakech Accords, JI Modalities, Appendix B	OK	Table 2, Section B.2
13. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	Marrakech Accords, JI Modalities, Appendix B	OK	Table 2, Section B.2
14. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure	Marrakech Accords, JI Modalities, Appendix B	OK	Table 2, Section B.2
15. The project shall have an appropriate monitoring plan	Marrakech Accords, JI Modalities, §33(c)	OK	Table 2, Section D

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity *The project design is assessed.*					
A.1. Project Boundaries *Project boundaries are the limits and borders defining the GHG emission reduction project.*					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/ A.2.1 A.4.1 A.4.2	DR	The project is going to be located on the Rhodope Mountains along the Vacha River in the Southern part of Bulgaria on the Smolyan District and the Devin Mihalkovo Community.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/ A.3	DR	Yes, the project consists of two main parts: 1. Tsankov Kamak hydropower project comprises the construction of the Tsankov Kamak Dam Reservoir & the Tsankov Kamak Power Station (2x40 MW) with the aim to produce 198 GWh/y., 2. Teshel, Devin, Orpheus, Krichim Rehabilitation Project consists of the rehabilitation of these four power stations with the aim to increase existing power generation by 16 GWh/y. Project developer: Natsionalna Elektricheska Kompania EAD (NEK EAD) Project Sponsor: The Austrian Supplier Group consisting of 1) VA Tech Hydro, 2) Alpine Mayreder and 3) Verbundplan.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.2. Technology to be employed *Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.*					
A.2.1. Does the project design engineering reflect current good practices?	/1/ A.6.1	DR	Construction of Tsankov Kamak Power Station: The project intends to introduce state-of-the-art technology from a reputable Austrian supplier group. Construction of Tsankov Kamak Dam Reservoir (on current structure): The dam design appears to be good practise. A fracture zone will be reinforced with cement. Refurbishment of Teshel HPP & Devin HPP: The planned refurbishment appears to represent good practise. Overall rehabilitation of Orpheus PSHPP & Krichim HPP: The planned rehabilitation appears to represent good practise.		OK
A.2.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/ /2/	DR	The project intends to introduce state-of-the-art technology from a reputable Austrian supplier group. The project will result in a technology transfer from Austria to Bulgaria. In addition, some existing structures will be used (built in the past but never used), and the existing HPP efficiency will be increased.		OK
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	The project introduces state-of-the-art technology that is not likely to be substituted.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1/	DR	The project does not require extensive training and maintenance efforts.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	It was considered not necessary (see A.2.4)		OK
B. *Project Baseline* *The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					
B.1. Baseline Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
B.1.1. Is the discussion and selection of the baseline methodology transparent?	/2/	DR	The BLS discuses the different approaches described in literature for establishing baselines for grid-connected renewable energy projects. The "marginal plant only (least costs dispatch analysis" is eventually selected as the baseline methodology. Although not yet approved by the CDM Executive Board, similar baseline methodologies have been proposed for CDM projects.		OK
B.1.2. Does the baseline methodology specify data sources and assumptions?	/2/	DR	Yes, the baseline methodology clearly specifies all data sources and assumption. Most of data used is managed by National Electric Company of Bulgaria (NEK EAD).		OK
B.1.3. Does the baseline methodology sufficiently describe the underlying rationale for the algorithm/formulae used to determine baseline emissions (e.g. marginal vs.	/2/ /6/	DR I	The proposed least cost dispatch analysis is appropriate when a) necessary data for a dispatch analysis is available and b) the renewable energy plant is likely to replace peak load electricity.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
average, etc.)			Both requirements above are fulfilled: a) Dispatch data is available by National Company of Electricity of Bulgaria (NEK EAD) and the National Dispatch Centre. b) Nuclear power plant units are providing base-load electricity generation. Tsankov Kamak hydropower plant will be operated mainly as a peaking plant and the additional power generated due to rehabilitating of four existing power plants is also likely to provide peak load power. Nonetheless, further evidence is requested that demonstrates that the Tsankov Kamak hydropower plant will provide peaking power.	CL 1	
B.1.4. Does the baseline methodology specify types of variables used (e.g. fuels used, fuel consumption rates, etc)?	/2/	DR	Yes it is. The baseline methodology specifies all variables used, i.e. above all data from NEK EAD.		OK
B.1.5. Does the baseline methodology specify the spatial level of data (local, regional, national)?	/2/	DR	Yes. The baseline study describes a scenario for the Bulgarian Electricity Power System (EPS) for the period 2004-2012 with and without the capacity added to the Bulgarian electricity sector by the proposed project. Energy exports to neighbouring countries are addressed as well.		OK
B.2. Baseline Determination *The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.*					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/2/	DR	Yes it is. All assumption and data sources are stated. The baseline determination is well documented and transparent.		OK
B.2.2. Has the baseline been determined using	/2/	DR	Yes. The selected energy demand scenario (i.e. the		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
conservative assumptions where possible?			Maximum scenario) is conservative, as it rather underestimates baseline emissions than overestimates baseline emissions.		
B.2.3. Has the baseline been established on a project-specific basis?	/2/	DR	An emission scenario with and without the capacity added to the Bulgarian electricity sector by the proposed project is developed to determine the emissions displaced by the proposed project.		OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/2/	DR	The baseline is based on the least costs development plan of the electricity sector in Bulgaria for the period 2002-2020 published in March 2002 by NEK EAD. It also addresses the likely consequences of Bulgaria's accession to the EU, i.e. the decommission of units 3 and 4 of the Kozloduy nuclear power plant and the likely rehabilitation programme for existing thermal and hydropower plants.		OK
B.2.5. Is the baseline determination compatible with the available data?	/2/	DR	Yes, the baseline is determined using data available by NEK EAD.		OK
B.2.6. Does the selected baseline represent a likely scenario in the absence of the project?	/2/	DR	Yes, The proposed project is likely to replace electricity generation by marginal power plants), i.e. TPP Bobov dol (lignite), TPP Maritsa 3 (lignite) and TPP Rouse (anthracite).		OK
B.2.7. Is it demonstrated that the project activity itself is not a likely baseline scenario (e.g. through (a) a flow-chart or series of questions that lead to a narrowing of potential baseline options, (b) a qualitative or quantitative assessment of different potential options and an indication of why the non-project option is more likely, (c) a qualitative or quantitative assessment of	/1/ B4 /2/ /4/ /8/	DR I	The additionality of the project activity is demonstrated through an qualitative assessment of investment barriers and a quantitative financial analysis which shows that the expected ERU revenues improve the financial viability of the project. It is demonstrated that investment barriers have been overcome by designating the Vacha Cascade project as a Joint Implementation project and that ERU revenues is important for the financial		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
one or more barriers facing the proposed project activity or (d) an indication that the project type is not common practice in the proposed area of implementation, and not required by a Party's legislation/regulations)?			viability of the project. Although the Tsankov Kamak HPP has been under discussion for a number of years and there were some funding available from through the Austrian Export Promotion Authority, it is sufficiently demonstrated that the necessary funding could only be secured due to the realisation of the project as a JI project activity.		
B.2.8. Have the major risks to the baseline been identified?	/2/	DR	Yes, the risks in predicting the likely development in the Bulgarian electricity sector is mitigated by the monitoring plan, which identifies, on a hourly basis, the actual power plant operating at the margin.		OK
B.2.9. Is all literature and sources clearly referenced?	/2/	DR	Yes it is.		OK
C. *Duration of the Project/ Crediting Period* *It is assessed whether the temporary boundaries of the project are clearly defined.*					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/ A.5.1 /2/	DR	Construction of the Tsankov Kamak HPP is planned to start in 2003 and concluded in 2007. Refurbishment of the Teshel, Devin, Orpheus and Krichim HPPs are planned to be carried out in the period 2003-2006 (Teshel: 2003-2005, Devin: 2003, Orpheus: 2004-2006, Krichim: 2005-2006.		OK
C.1.2. Is the project's crediting time clearly defined?	/1/ A.5.2	DR	The crediting period is the first commitment period and starts on 01/01/2008 and lasts 5 years. It is intended that emission reductions resulting from the refurbishment of the Teshel, Devin, Orpheus and Krichim HPPs will be offset with AAUs transferred from Bulgaria to Austria.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D. *Monitoring Plan* *The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.*					
D.1. Monitoring Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
D.1.1. Does the monitoring methodology reflect good monitoring and reporting practices?	/3/	DR	Yes. The monitoring methodology builds upon measuring electricity generation by the Tsankov Kamak HPP and the additional electricity generated by the Teshel, Devin, Orpheus and Krichim HPPs. Baseline emissions will be monitored and determined based on data furnished by NEK EAD.		OK
D.1.2. Is the selected monitoring methodology supported by the monitored and recorded data?	/3/	DR	Yes, the monitoring methodology is tailored towards data available by the project and NEK EAD.		OK
D.1.3. Are the monitoring provisions in the monitoring methodology consistent with the project boundaries in the baseline study?	/3/	DR	Yes.		OK
D.1.4. Have any needs for monitoring outside the project boundaries been evaluated and if so, included as applicable?	/3/	DR	The baseline boundary covers the entire Bulgarian EPS. Emissions in the electricity sector in neighbouring countries are not likely to be significantly affected by the project.		OK
D.1.5. Does the monitoring methodology allow for conservative, transparent, accurate and complete calculation of the ex post GHG emissions?	/3/	DR	The monitoring methodology allows for transparent, accurate and complete ex-post baseline emission calculations.		OK
D.1.6. Is the monitoring methodology clear and	/3/	DR	Yes		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
user friendly?					
D.1.7. Does the methodology mitigate possible monitoring errors or uncertainties addressed?	/3/	DR	The monitoring methodology addresses possible monitoring errors and uncertainties to the extent that is reasonably possible. Internal audit procedures should be implemented to mitigate potential errors due to manual transfer of data.		OK
D.2. Monitoring of Project Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/3/	DR	As the project does not produce significant project emissions, no data has to be collected to monitor emissions.		OK
D.3. Monitoring of Leakage *It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.*					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/3/		NA. The project is not expected to cause leakage effects (see also D.1.4)		NA

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.4. Monitoring of Baseline Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining the baseline emissions during the crediting period?	/3/ /6/	DR I	The monitoring plan collects data on the electricity generation by the Tsankov Kamak HPP and the additional electricity generated by the the Teshel, Devin, Orpheus and Krichim HPPs. Data on the hourly dispatching order for the whole Bulgarian electrical system (data from NEK EAD) and the emission factor for the marginal plants will be collected and archived in an electronic system for determining baseline emissions. For determining the emission factor of the marginal plants, the specific heat rates are manually calculated for each month at each TPP. The carbon contents are measured accordingly. Until the 10th of the following month the project operator NEK EAD and the NDC will receive the calculated plant specific emission factors for each month. However, the monitoring plan does not make sufficient provisions for collecting and archiving data used for establishing the emission factor of the marginal plans. In order to enable third party verification of these emission factors, the monitoring plan should be amended accordingly.	CAR 2	The necessary provisions for collecting and archiving data necessary for determining the CEFs will have to be developed.
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/3/	DR	The selected indicators are reasonable.		OK
D.4.3. Will it be possible to monitor the specified baseline indicators?	/3/	DR	Electricity generation by the Tsankov Kamak, Teshel, Devin, Orpheus and Krichim HPPs and the		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			efficiency of the Teshel, Devin, Orpheus and Krichim HPPs before and after refurbishment (carried out by a third party) will be monitored to determine the additional electricity generated by the proposed project. Hourly dispatch orders and fuel consumption and fuel characteristics of the marginal plants dispatching electricity to the Bulgarian EPS will be monitored to determine the baseline emissions.		
D.5. Project Management Planning *It is checked that project implementation is properly prepared for and that critical arrangements are addressed.*					
D.5.1. Is the authority and responsibility of project management clearly described?	/3/	DR	Authorities and responsibility of project management is clearly described. The responsibility for management and operation of the Vacha Cascade Project rests with the project operator, NEK EAD.		OK
D.5.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/3/	DR	It is the responsibility of NEK EAD to develop and implement a management and operational system that meets the requirements stated in the monitoring plan.		OK
D.5.3. Are procedures identified for training of monitoring personnel?	/3/	DR	NEK EAD owns and operates several hydropower plants in Bulgaria. Provisions for training are identified.		OK
D.5.4. Are procedures identified for emergency preparedness where emergencies can result in unintended emissions?	/3/	DR	NA. No emergency situations resulting in unintended emissions are expected.		NA
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/ /3/	DR	The current NEK procedures for calibration of monitoring equipment will be used, but these are not described. A clarification is requested with regard to NEK procedures for calibration of monitoring	CL 2	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			equipment.		
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/ /3/	DR	No procedures for maintenance of monitoring equipment are described. A clarification is requested with regard to NEK procedures for maintenance of monitoring equipment.	CL 2	OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/1/ /3/	DR	Yes		OK
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/1/ /3/	DR	Yes		OK
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/ /3/	DR	This possibility is nominated, but not further investigations on it were done.		OK
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/ /3/	DR	No procedures for internal audits are described, but should be developed prior to project commissioning.		(OK)
D.5.11. Are procedures identified for project performance reviews?	/1/ /3/	DR	No procedures for project performance reviews are described, but should be developed prior to project commissioning.		(OK)
D.5.12. Are procedures identified for corrective actions?	/1/ /3/	DR	No procedures for corrective actions are described, but should be developed prior to project commissioning.		(OK)

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E. Calculation of GHG Emissions by Source *It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.*					
E.1. Predicted Project GHG Emissions *The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.*					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/	DR	The project does not result in significant project emissions. Emissions related to construction of the Tsankov Kamak dam are negligible.		OK
E.2. Leakage Effect Emissions *It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.*					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/	DR	NA. The project is not expected to cause leakage effects (see also D.1.4)		
E.3. Baseline Emissions *The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.*					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/ /2/	DR	The expected baseline emissions have been estimated based on the expected electricity generated by the Tsankov Kamak HPP and the expected additional electricity generated by the the Teshel, Devin, Orpheus and Krichim HPPs. The likely marginal plants have been determined		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			using the IRP Manager Model and taking into account future developments in the Bulgarian electricity sector identified in the least costs cost development plan of the Bulgarian electricity sector for the period 2002-2020. Plant specific operation and fuel characteristics, i.e. are used to determine the emission factor of the marginal plants.		
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/ /2/	DR	The baseline boundaries confine the power plants dispatching electricity to the Bulgarian EPS.		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/ /2/	DR	DNV Certification has not verified primary data used to estimate baseline emissions, but the baseline emission calculations are transparent and well documented. The changes to the CO_2 emissions of the Bulgarian electricity sector due to the proposed project activity are determined in a complete and transparent manner. Primary data for calculating baseline emission for the determination of ERUs will be monitored and verified during periodic verification of ERUs attributable to the proposed project.		OK
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/ /2/	DR	The selected utilisation factor of 28% for estimating electricity generation by the Tsankov Kamak HPP is representative for Bulgarian hydropower plants. The underlying assumptions for estimating additional electricity generated by the the Teshel, Devin, Orpheus and Krichim HPPs are reasonable. Hydrological data from the period 1951-2000 has been analysed for the electricity generation forecasts.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			The period 1951-2000 is representative and presents a full cycle of wet and dry periods. However, due to the consequences of global climate change, the dry period observed in recent years may continue.		
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/ /2/	DR	Baseline emissions have been calculated based on conservative assumptions, where applicable. Uncertainties in the baseline emission calculations forming the basis for ERUs are mitigated by the monitoring plan, which identifies, on an hourly basis, the actual power plant operating at the margin and the fuel characteristics necessary to determine the emission factor of the marginal plants.		OK
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1/ /2/	DR	Yes		OK
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/ /2/	DR	The proposed project is likely to displace fossil-fuel based electricity generation, i.e. by electricity generated from a renewable source. It is demonstrated that the emission scenario for the Bulgarian Electricity Power System (EPS) for the period 2004-2012 results in fewer GHG emissions in the project scenario (with the capacity added to the Bulgarian electricity sector by the proposed project) than in the baseline scenario.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
F. *Environmental Impacts* *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/ B	DR	For the Tsankov Kramak HPP project a comprehensive EIA has been carried out by registered independent experts.		OK
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/ B /7/	DR I	Yes. The EIA was approved by the Bulgarian Ministry of Environment in decision No. 36 – 16/2002 of 22 October 2002. The approval is given under the condition that stated requirements for the project design, construction and operation will be met. Compliance with these requirements needs to be verified as part of the initial verification or the first periodic verification of ERUs attributable to the proposed project.		OK
F.1.3. Will the project create any adverse environmental effects?	/1/ B	DR	According to the EIA, there are not relevant adverse environmental effects.		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/ B	DR	No, and no transboundary environmental impacts are expected.		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/ B	DR	Yes, measures to reduce environmental impacts during the construction and operational phase have been identified.		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1/ B	DR	The approval of the EIA by the Bulgarian Ministry of Environment is taken as confirmation that the project complies with Bulgarian environmental legislation.		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Determination conclusion
CAR 1: The Bulgarian and Austrian Government have not yet provided Letters of approval.	-	The Letter of Approval on behalf of the Bulgarian Government will be issued by the Ministry of Environment and Waters (MoEW). The procedure for project approval requires to submit the following documents to MoEW: PDD, BS, MP and positive validation report. After examination and review of the project documents by a Steering Committee, MoEW will officially approved the Project and issued a Letter of Approval.	DNV Certification acknowledges that Letters of Approval by the Bulgarian and Austrian Government will only be provided after issuance of this determination report.
CAR 2: In order to enable third party verification of emission factors, the monitoring plan should make the provisions for collecting and archiving data used for establishing the emission factor of the marginal plans.	D.4.1	The problem has 3 aspects: First, the forecast show that it could be expected 3 Thermal Power Plants (TPP's Maritsa, Rousse and Bobov Dol) to be marginal base load TPP in the commitment period 2008-2012. Depending of the load schedules in this period additional TPP could be classified and operated as marginal plants. It means, that if load schedules in the commitment period are with lower curve compared with the anticipated we could expect 2 additional TPP's (Maritsa East 2 and Varna) to operate as marginal. If the load schedules are with higher curve additional 2 new TPP's (which are not commissioned at present - new Maritsa East 1 and new GTCS), most probably would operate as marginal due to there relatively high costs for power generation. All expected marginal plants have to be equipped with continuously measuring equipment for precisely determine of CEF. Additionally Gross Heat Rate of the power Unit for the previous month, have to determined most probably with reverse balance. Since we are not sure about the exact number of the marginal plants, measuring equipment have to be fit to all existing marginal units - 24Units! Second, CEF have to be determined. There are 2 approaches. To measure carbon content and NCV directly in-situ in the coal, or to measure CO_2 content in the flue gases. The second approach is more precise, but require a lot of measuring equipment due to the large number of units. Third, software program have to be elaborated which would	The current provisions for collecting and archiving the necessary data for determining the carbon emission factor (CEF) of the power plant operating at the margin is currently not sufficient. Records on the CEF of the plants operating at the margin are necessary for a later verification of emission reductions attributable of the Vacha Cascade JI project. The necessary provisions (measuring plans, agreement with independent power producers, etc) for collecting and archiving data necessary for determining the CEFs of these plants, i.e. electricity generation, fuel consumption, NCV and carbon content of the fuel, will have to be developed as

Draft report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Determination conclusion
		received the data acquisition from the TPP's and actual figures for power generation of HPP's, and will report them to whom it may concern. This program have to be linked and receive data from the software of NEK - SCADA (System Control and Data Acquisition). The necessary data for monitoring of the marginal unit of the system and his specific characteristics for determining CEF, together with the power generation of the Project will be available in real time for verification. This is our intention and the developing of this particular issue will commence from the beginning of the next year after the corporate budget of NEK is been accepted. The measuring equipment for carbon content, NCV and fuel consumption shall be agreed with the management of TPP's, because they are independent producers. NEK have to sign on agreement with them for data acquisition and transfer the data to NEK. Something more, NEK most probably have to invest certain amount of money in measuring equipment for this particular aim. The data base will be record at NEK and will be available for verification at NEK and also in the marginal TPP's. NEK will implement special software for the purpose.	soon as possible, at the latest prior to the starting date of the crediting period of the project, i.e. 2008.
CL 1: More information that supports the claim that Tsankov Kamak HPP will be operated as peaking plant is requested.	B.1.3	We are going to construct hydro power plant (HPP) with a reservoir. NEK rely on this project for better utilization of the waters passing through the water cascade. The average operation hours of the HPPs at Vacha cascade are between 1500 up to 2500 hours, and depends on the meteorological conditions. We suppose that same operating hours for the new Tsankov Kamak hydro Project. It means that the Tsankov Kamak is typical peak load power plant. Despite of the fact, that HPP will operate with multiyear compensating basin, Tsankov Kamak Project could not operate more than 2800hours annually due to restrictions of the water volume in the dam lake. If we fit HPP on the running water at the same place of Tsankov Kamak Project, the power output	The additional information provided by the project participants sufficiently demonstrates that the Tsankov Kamak HPP will be operated as peak-load plant.

Draft report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Determination conclusion
		will be several times lower. We have no big HPP in Bulgaria (greater than 5MW) on running water, thus all big HPP's are operating as a peak load capacities. For the last year the total annual power generation of HPP is 7% of the total power generation of the country. This fact presume that the big HPP's in Bulagria combine in 4 water cascades operate as peak load power plants.	
CL 2: A clarification is requested with regard to NEK procedures for calibration and maintenance of monitoring equipment.	D.5.5 D.5.6	All monitoring equipment will be calibrated and maintained according to the Bulgarian Measurement Act. The calibration is performed, according to the Act, by an authorized external organization. It is mandatory that all measuring devices shall be checked and approved before installation by the Bulgarian Standardization Committee. The measuring devices are checked periodically according Measurement Act and depending of the measuring type of the devices. Written report is available for calibration and checking of each device and it is record at the power plant. These reports are available for the validator and will be available for the new one measuring equipment.	The clarifications on the calibration requirements in Bulgaria sufficiently ensure that electricity meters will be calibrated and maintained to enable accurate measurement of additional electricity generated by the project.

- o0o -