



Industrie Service

Validation Report

Organizacion de Estados Iberoamericanos para la Educacion, la
Ciencia y la Cultura – OEI

Validation of the Santa Ana Hydroelectric Plant

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Summary: The Certification Body "Climate and Energy" has been ordered by Organizacion de Estados Iberoamericanos para la Educacion, la Ciencia y la Cultura – OEI to perform a validation of the above mentioned project. Using a risk based approach, the validation of this project has been performed by document reviews and on-site inspection, audits at the locations of the project and interviews at the offices of the project developer and the project owner. As the result of this procedure, it can be confirmed that the submitted project documentation is in line with all requirements set by the Kyoto Protocol, the Marrakech Accords and relevant guidance by the CDM Executive Board. Additionally the assessment team reviewed the estimation of the projected emission reductions. We can confirm that the indicated amount of emission reductions of 206 424 tonnes CO _{2e} over a crediting period of ten years, resulting in a calculated annual average of 20 642 tonnes CO _{2e} , represent a reasonable estimation using the assumptions given by the project documents.				
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Abbreviations

AE	Applicant Operational Entity
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CR	Clarification Request
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission reduction
GHG	Greenhouse gas(es)
KP	Kyoto Protocol
MP	Monitoring Plan
NGO	Non Governmental Organisation
OEI	Organizacion de Estados Iberoamericanos para la Educacion, la Ciencia y la Cultura
PDD	Project Design Document
TÜV SÜD	TÜV Industrie Service GmbH TÜV SÜD Group
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual



Table of Contents	Page
1 INTRODUCTION	5
1.1 Objective	5
1.2 Scope	5
1.3 GHG Project Description	6
2 METHODOLOGY	7
2.1 Review of Documents	9
2.2 Follow-up Interviews	9
2.3 Resolution of Clarification and Corrective Action Requests	9
3 VALIDATION FINDINGS	10
3.1 Project Design	10
3.1.1 Discussion	10
3.1.2 Findings	11
3.1.3 Conclusion	12
3.2 Baseline and Additionality	12
3.2.1 Discussion	12
3.2.2 Findings	13
3.2.3 Conclusion	14
3.3 Monitoring Plan	14
3.3.1 Discussion	14
3.3.2 Findings	15
3.3.3 Conclusion	15
3.4 Calculation of GHG Emissions	15
3.4.1 Discussion	15
3.4.2 Findings	15
3.4.3 Conclusion	15
3.5 Environmental Impacts	16
3.5.1 Discussion	16
3.5.2 Findings	16
3.5.3 Conclusion	16
3.6 Comments by Local Stakeholders	16
3.6.1 Discussion	16
3.6.2 Findings	16
3.6.3 Conclusion	16
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS	17
5 VALIDATION OPINION	18



Industrie Service

Annex 1: Validation Protocol

Annex 2: Information Reference List

1 INTRODUCTION

1.1 Objective

Organizacion de Estados Iberoamericanos para la Educacion, la Ciencia y la Cultura – OEI - has commissioned TÜV Industrie Service GmbH TÜV SÜD Group (TÜV SÜD) to validate the Santa Ana Hydroelectric Plant Project. The validation serves as a design verification and is a requirement of all CDM projects. The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities as agreed in the Bonn Agreement and the Marrakech Accords.

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. TÜV SÜD has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

The audit team has been provided with a draft PDD in May 2005. Based on this documentation a document review and a fact finding mission in form of an on-site audit has taken place. Afterwards the client decided to revise the PDD according to the CARs and CRs indicated in the audit process also taking into account new developments on the regulatory side (as for example the new PDD format). The final PDD version submitted in October 2005 – also made public for comments in the global stakeholder process - serves as the basis for the assessment presented herewith. In February 2006 a revised final PDD has been submitted in which the latest developments regarding the determination of the baseline emissions in the host country have been considered. This change is not considered to be significant with respect to the qualification of the project as a CDM project based on the two main objectives of the CDM to achieve a reduction of anthropogenic GHG emissions by sources and to contribute to sustainable development. Hence no repetition of the public stakeholder process has taken place.

Studying the existing documentation belonging to this project, it was obvious that the competence and capability of the validation team has to cover at least the following aspects:

- Knowledge of Kyoto Protocol and the Marrakech Accords



- Environmental and Social Impact Assessment
- Skills in environmental auditing (ISO 14000, EMAS)
- Quality assurance
- Technical aspects of hydro power installations and grid operation
- Monitoring concepts
- Political, economical and technical frame conditions in host country

According to these requirements TÜV SÜD has composed a project team in accordance with the appointment rules of the TÜV certification body “climate and energy”:

Michael Rumberg is head of the division CDM/JI at TÜV Industrie Service GmbH TÜV SÜD Group. In his position he is responsible for the implementation of validation, verification and certifications processes for greenhouse gas mitigation projects in the context of the Kyoto Protocol. Before entering this company he worked as an expert for renewable energy, forestry, environmental issues, climate change and sustainability within the environmental branch of an insurance company. His competences are covering risk assessments, quality and environmental auditing (EMS auditor), baseline setting, monitoring and verification due to the requirements of the Kyoto Protocol.

Javier Castro is an energy expert for CDM and JI projects at TÜV Industrie Service GmbH TÜV SÜD Group. He has an academic background in chemical engineering and energy systems. In his position he participates as an expert in energy related projects during the validation, verification and certifications processes for GHG mitigation projects. He has received extensive training in the CDM and JI validation processes.

Mauro Fadda is heading the department “Environmental Services” of ccaQualitas in Santiago de Chile, a local company being member of the TÜV SÜD Group. He has received extensive training in the CDM validation process, is an appointed auditor for CDM projects and participated already in several CDM project assessments all over Latin America.

The audit team covers the above mentioned requirements as follows:

- Knowledge of Kyoto Protocol and the Marrakech Accords (RUMBERG/FADDA)
- Environmental and Social Impact Assessment (RUMBERG/FADDA)
- Skills in environmental auditing (RUMBERG/FADDA)
- Quality assurance (RUMBERG/FADDA)
- Technical aspects of hydro power installations and grid operation (CASTRO/RUMBERG)
- Monitoring concepts (ALL)
- Political, economical and technical random conditions in host country (FADDA/CASTRO)

In order to have an internal quality control of the project, a team of the following persons has been composed by the certification body “climate and energy”:

- Werner Betzenbichler (head of certification body “climate and energy”)

1.3 GHG Project Description

The Santa Ana Hydroelectric Plant Project is a small run of river type hydroelectric plant, introduced into the municipal potable water supply system of Bogota, Columbia, located at the outskirts of the city.

Project participants are Empresa de Acueducto y Alcantarillo de Bogota (EAAB), Colombia and the Andean Center for Economics in the Environment (CAEMA), Colombia.

The project starting date is November 20, 2000. The 10 year non renewable crediting period starts August 1, 2005.

2 METHODOLOGY

The project assessment aims at being a risk based approach and is based on the methodology developed in the Validation and Verification Manual (for further information see www.vvmanual.info), an initiative of all Applicant Entities, which aims to harmonize the approach and quality of all such assessments.

In order to ensure transparency, a validation 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 validation protocol serves the following purposes:

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

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

The completed validation protocol is enclosed in Annex 1 to this report.

Validation Protocol Table 1: Mandatory Requirements			
Requirement	Reference	Conclusion	Cross reference
The requirements the project must meet.	Gives reference to the legislation or agreement 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 Validation 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 Validation process.

Validation 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 should meet. The checklist is organised in seven 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). N/A means not applicable.	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 is used when the validation team has identified a need for further clarification.

Validation 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	Validation conclusion
If the conclusions from the draft Validation 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 Client or other project participants during the communications with the validation team should be summarised in this section.	This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".

Figure 1 Validation Protocol Tables



2.1 Review of Documents

The project design document submitted by the Client and additional background documents related to the project design and baseline were reviewed. A complete list of all documents reviewed is attached as annex 2 to this report.

2.2 Follow-up Interviews

In the period of May 30 – June 1, 2005, TÜV SÜD performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of EAAB and CAEMA were interviewed. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation	Interview topics
EAAB and CAEMA	<ul style="list-style-type: none">➤ Project design➤ Technical equipment➤ Sustainable development issues➤ Additionality➤ Crediting period➤ Monitoring plan➤ Management system➤ Environmental impacts➤ Stakeholder process➤ Approval by the host country

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which needed to be clarified for TÜV SÜD's positive conclusion on the project design. The Corrective Action Requests and Clarification Requests raised by TÜV SÜD were resolved during communication between the client and TÜV SÜD. To guarantee the transparency of the validation process, the concerns raised and responses that have been given are summarised in chapter 3 below and documented in more detail in the validation protocol in annex 1.

3 VALIDATION FINDINGS

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

- 1) The findings from the desk review of the final project design document and the findings from interviews during the follow up visit are summarised. A more detailed record of these findings can be found in the Validation Protocol in annex 1.
- 2) Where TÜV SÜD had identified issues that needed clarification or that represented a risk to the fulfilment of the project objectives, a Clarification or Corrective Action Request, respectively, have been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in annex 1. The validation of the project resulted in three Corrective Action Request and seven Clarification Requests.
- 3) Where Clarification or Corrective Action Requests have been issued, the exchanges between the Client and TÜV SÜD to resolve these Clarification or Corrective Action Requests are summarised.
- 4) The final conclusions for validation subject are presented.

The validation findings relate to the project design as documented and described in the final project design documentation.

3.1 Project Design

3.1.1 Discussion

Project participants are Empresa de Acueducto y Alcantarillo de Bogota (EAAB), Colombia and the Andean Center for Economics in the Environment (CAEMA), Colombia. The project has received a Letter of Approval from the Colombian government.

The objective of the project is to reduce GHG emissions by installing a hydro power project.

The design engineering does reflect current good practices. The design has been professionally developed and laid out in project feasibility studies. according to the PDD the project design engineering does reflect current good practices. During the visit on site technical specifications were shown as part 4 of the "Informe Final de Interventoría" finished in June 2003. The document includes aspects regarding the following items:

- Project description
- Contracting,
- Works execution program,
- Contract costs
- Final account and cancelling account
- Provisional and definitive works reception
- Technical information of alternative Usaquén tunnel and its coating,
- Interconnection of Usaquén tunnel with existent conduction works
- Operating of Usaquén tunnel
- Access to Usaquén tunnel exit
- Civil Works of Santa Ana



- Factoring, assembling and testing of project equipment
- Mailing with constructor and list of plans

The project relies on commercial, environmentally safe and sound technological packages as well as the required know-how for implementation, transferred to the host party through the appropriate commercial guarantees and support service packages established for the implementation of the project activity, and which are standard in hydro power development.

The project equipment can be expected to run for the whole project period and it can not be expected that it will be replaced by more efficient technologies.

There is no description related to the necessity and the contents of training. But during the audit on site the audit team observed that 20 of 40 technicians were already trained by an external firm for operating Santa Ana Plant, as a result of a recent decision of EAABs new general manager, who decided to internalize the operation of Santa Ana, planned by the former administration to be operated by a subcontract. This decision has minor structural effects on EAAB, but technical competences, especially at operator level have been demonstrated. Plant engineer in charge of Santa Ana Plant has demonstrable international experience in the generation business, and the two supervisors to be hired will have necessary competences and experience.

The project provides job opportunities for skilled and non-skilled labor during the construction phase. Operation of the project offers new opportunities for long-term employment of skilled professionals and new business development ventures related to operation and maintenance, through the 25 years expected operating life of the project. Investment resulting from the construction and operation of the project will contribute to increase the efficiency of the use of water from reservoirs supplying Bogotá, as well as to the conservation and preservation of the area of influence of the project, helping to preserve and secure long term water supplies to the local population. It can not be expected that the project will create any adverse environmental or social effects

The project complies with the framework of the energy sector policies of Colombia in aspects related to renewable energy electricity generation and technological innovation, being one of the first hydro power projects in the country using treated water from a city aqueduct, and by increasing the efficiency of the use of water from a watershed by using the supply in an optimized manner for dual purposes (drinking water supply and electricity generation).

The same is confirmed in the Letter of Approval from the national government.

The funding for the project does not lead to a diversion of official development assistance as according to the information obtained by the audit team ODA does not contribute to the financing of the project.

The starting date as well as the operational lifetime are clearly defined and also handled in a reasonable manner. The crediting period is with 10 years clearly defined.

Moreover its is assured that as the start of the crediting period is before the registration of the project that the project activities starting date falls in the period between 1 January 2000 and the registration of the first clean development mechanism project. During the validation process the audit team obtained the information and evidences that the start of project activities has been before the registration date of the first clean development mechanism project.

3.1.2 Findings

Corrective Action Request No. 1:

The project design document does not conform with the Small Scale CDM Project Design Document format. The header and preformatted sections have been changed and/or removed. To be corrected.

Response:

The PDD has been adjusted accordingly in the revised final version.

Clarification Request No. 7:

During the validation process the audit team obtained the information and evidenced that the start of project activities has been before the registration date of the first clean development mechanism project. It is needed to demonstrate that the project starting date has not been before Jan 1, 2000.

Response:

It has been demonstrated that the project starting date – construction date has been chosen which is in line with the definition in the guidelines - has not been before Jan 1, 2000, but in November 2000.

3.1.3 Conclusion

The project does comply with the requirements.

3.2 Baseline and Additionality

3.2.1 Discussion

The project qualifies as a Small Scale Project as it fulfils the requirements defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM by being a project in the category Type-1 i) “renewable energy project activities with a maximum output capacity equivalent to up to 15 megawatts.

The project activity is not a debundled component of a larger project activity according to the rules for “determining the occurrence of debundling” as they are outlined in Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project activities. According to the PDD there is currently no other small scale project activity already registered or in the process of applying for registration - done by the same project participant.

The available data for baseline determination are taken from UPME, Unidad de Planificación Minero Energética.

The PDD elaborates on various barriers faced by the project. The description indicates that the project faces barriers and can be considered to be additional, but further clarification is needed in order to demonstrated clearly that the project fullfills the requirements.

The project is consistent with the Sustainable Development Criteria established by the Colombian NDACDM, “Ministerio de Ambiente, Vivienda y Desarrollo Territorial. Local host country sustainable development criteria include compliance with local law and relevant norms, coherence and contribution to government policies and contribution to the economic and social welfare of communities in the long run.

3.2.2 Findings

Corrective Action Request No. 2:

The data vintage for the OM are the years 1995-2003. This is in contrast to the methodology which asks for most recent data, which could be 2003 or 2004. To be corrected, but see also CR 6.

Response:

The project proponent has responded and adjusted the data used for the calculation of the CEF. Hereby the most updated data has been used (see CR 6). The emission factor for the vintage chosen (2002-2004) is correctly calculated.

Clarification Request No. 1:

As per investment barrier, IRR of the project is 8.09% in the absence of CER revenues, and as per prevailing practice barrier, EAAB reduces the water flowing of the project electricity generation by 45% because of increasing the efficiency of water usage in the city. However, the additionality of the project depends on water quantity supplied to the project and therefore it is unclear whether the additionality is kept or not because e.g. if EAAB increased the water flow to the project due to increasing water demands in the city, electricity generation would be also increased and therefore the project would become profitable even without CER revenue. This should be clarified.

Response:

It has been demonstrated by planning data that no significant increase in water demand has neither been realised nor is to be expected.

Clarification Request No. 2:

Initial IRR rates (page 11 of PDD), were calculated on the basis of water demand trend observed until 1995, as shown by a demand curve presented by EAAB during the on site audit. But an independent evidence of kWh price of the year 1995 has not been issued yet (the project developer is requested to submit evidence that demonstrate a price of near 0,035 USD/kWh as declared in the PDD) .

Response:

Evidence for actually used price indicators in project feasibility studies has been submitted and the electricity price has been adjusted accordingly to allow a proper demonstration of the project design and financial return expectations.

Clarification Request No. 3:

PDD information that suggests a pre-feasibility IRR between 11,8% and 14,7% was supported during the on site audit by a document called "Pre-feasibility of Altern Usaquén Tunnel". But it has still to be demonstrated, that these data correspond exclusively to Santa Ana Project (excluding tunnel, which was a "must" to ensure potable water supply to the city of Bogotá), otherwise the base for the pre-feasibility IRR calculation is not the same as for feasibility (which base is Santa Ana Plant and Transmission Lines exclusively), and therefore not valid. It should hereby be remembered that generation infrastructure investment for this project should consider exclusively the infrastructure that is additional to the potable water supply system.

Response:



Evidence for pre-feasibility IRR expectations has been submitted and the data has been adjusted accordingly in the PDD to allow a proper demonstration of the financial return expectations.

Clarification Request No. 4:

Neither the PDD nor the project owner during the visit on site could submit a document of evidence which makes clear that the CDM has been a relevant trigger in the decision making process for this project – although testimonial evidence has been available. Respective documentation should be submitted.

Response:

A document of a meeting at the Ministry for environment has been presented dating the consideration of the project back until February 1998.

Clarification Request No. 6:

But updated information of the carbon emission factor for small scale CDM projects has been received by the audit team. According to information in the legislative act No, 181422 from November 25, 2005, the CEF figure is determined to be 0.4392 kgCO₂/kWh. This differs from the figures in the PDD. To be clarified and demonstrated that the factor given by the resolution is calculated in accordance with the rules defined in the underlying methodology.

Response:

The project proponent has adjusted the CEF figure to the latest source. The audit team has verified that the factor given by the resolution is calculated in accordance with the rules defined in the underlying methodology.

Clarification Request No. 7:

It is needed to demonstrate that the project starting date has not been before Jan 1, 2000.

Response:

It has been demonstrated that the project starting date – construction date has been chosen which is in line with the definition in the guidelines - has not been before Jan 1, 2000, but in November 2000.

3.2.3 Conclusion

The project does comply with the requirements.

3.3 Monitoring Plan

3.3.1 Discussion

The selected monitoring methodology is in line with the monitoring methodologies provided for the relevant project category as the Simplified Modalities and Procedures for Small-Scale CDM project activities ask for the metering of the electricity generated by the renewable technology.



Monitoring methods have been chosen as suggested in accordance to Appendix B of the Simplified M&P for Small-Scale CDM Project Activities.

The project itself does not cause any relevant project and leakage emissions. Hence no project and leakage emissions become reported.

Although the project participants are mentioned, detailed authority and responsibility for project operation, monitoring and reporting are not described in PDD. But during the audit on site the respective information has been submitted. Hereby existent calibration plans and procedures affect only flow meters. Calibration procedures and plans of generation meters will be defined and included in ISO 9001:2000 QMS.

3.3.2 Findings

Clarification Request No. 5:

Interim measures regarding calibration, uncertainty adjustments, internal audits, performance reviews and corrective actions as part of the project management and planning should be provided.

Response:

Respective information has been submitted.

3.3.3 Conclusion

The project does comply with the requirements.

3.4 Calculation of GHG Emissions

3.4.1 Discussion

The project spatial boundaries are clearly described. All components and facilities used to mitigate GHG's are covered.

The project does properly account for all relevant emissions

GHG calculations documented in a complete and transparent manner

All emissions have been determined according to the methodology applied at this project.

Uncertainties have been addressed in a proper manner.

3.4.2 Findings

None

3.4.3 Conclusion

The project does comply with the requirements.



3.5 Environmental Impacts

3.5.1 Discussion

EAAB fulfils local Colombian requirement with respect to Environmental Impact Assessment of the project and completed the Environmental Management Plan (EMP) of the project approved by the Corporación Autónoma Regional de Cundinamarca¹⁹ (CAR, the regional environmental authority).

Negative environmental effects are not expected to be created by the project.

As no significant environmental impacts are expected, such impacts have not influenced the project design.

3.5.2 Findings

None

3.5.3 Conclusion

The project does comply with the requirements.

3.6 Comments by Local Stakeholders

3.6.1 Discussion

A series of stakeholder consultation activities were implemented, such as:

1. Meetings with local chambers of commerce in the project area.
2. Meetings with the local neighborhoods, and community social action committees.
3. Meetings with local school principals, religious institutions, local universities and local NGO's.
4. Meetings with local villagers in the area of direct influence of the project.

No evidence of a specific stakeholder process for Santa Ana was shown.

The consultation was implemented in accordance to the provisions established in EMP.

3.6.2 Findings

Corrective Action Request No. 3:

No evidence of a specific stakeholder process for Santa Ana was shown. To be added and/or carried out.

Response:

Evidence has been submitted that shows that the stakeholder process carried out explicitly also included Santa Ana.

3.6.3 Conclusion

The project does comply with the requirements.



Industrie Service

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

TÜV SÜD published the project documents on its website on October 28, 2005 and invited comments within 30 days, until November 26, 2005 by Parties, stakeholders and non-governmental organisations. No comments were received.

5 VALIDATION OPINION

TÜV SÜD has performed a validation of the Santa Ana Hydroelectric Plant Project in Colombia. The validation was performed on the basis of UNFCCC criteria and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and subsequent decisions by the CDM Executive Board.

The review of the project design documentation and the subsequent follow-up interviews have provided TÜV SÜD with sufficient evidence to determine the fulfilment of stated criteria. In our opinion, the project does meet all relevant UNFCCC requirements for the CDM and all relevant host country criteria. The project will hence be recommended by TÜV SÜD for registration with the UNFCCC.

By displacing fossil fuel-based electricity in principal with electricity generated from a renewable source, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. An analysis of the investment and financial 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. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

Additionally the assessment team reviewed the estimation of the projected emission reductions. We can confirm that the indicated amount of emission reductions of 206 424 tonnes CO_{2e} over a crediting period of ten years, resulting in a calculated annual average of 20 642 tonnes CO_{2e}, represent a reasonable estimation using the assumptions given by the project documents.

The validation is based on the information made available to us and the engagement conditions detailed in this report. The validation has been performed using a risk based approach as described above. The only purpose of this report is its use during the registration process in the CDM project cycle. Hence, TÜV SÜD can not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

Munich, 2006-04-03



Werner Betzenbichler
**Head of certification body "climate
and energy"**

Munich, 2006-04-03



Michael Rumberg
Project Manager

Annex 1: Validation Protocol

Table 1 Mandatory Requirements for Small Scale Clean Development Mechanism (CDM) Project Activities

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference/Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	☑	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	☑	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	☑	Table 2, Section E.4.1
4. The project shall have written approval of voluntary participation from the designated national authorities of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	☑	The project is a unilateral project. A Letter of Approval of the government of Colombia has been submitted to the validation team. The document contains all required elements.
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	☑	Table 2, Section E.1 to E.4
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	☑	Table 2, Section B.2.1



Industrie Service

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference/Comment
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Marrakech Accords (Decision 17/CP.7)	☑	No public funding is used for financing the project.
8. Parties participating in the CDM shall designate a national authority for the CDM	Marrakesh Accords (CDM modalities§ 29)	☑	A designated national authority is defined in Colombia.
9. The host country shall be a Party to the Kyoto Protocol	Marrakesh Accords (CDM modalities§ 30)	☑	Colombia has ratified the Kyoto Protocol on November 30, 2001.
10. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	☑	Table 2, Section A.1
11. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	<p>CAR 1</p> <p>☑</p>	<p>The project design document does not conform with the Small Scale CDM Project Design Document format.</p> <p><u>Corrective Action Request No. 1:</u></p> <p>The header and preformatted sections have been changed and/or removed. To be corrected.</p> <p><u>Recommendation:</u></p> <p>For chapter A.3 the table from standard scale project PDDs should be used and version 02 of the SSC PDD should be used.</p>
12. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and	Simplified Modalities and Procedures for Small Scale CDM Project	☑	Table 2, Section A.1.3 and B.1



Industrie Service

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference/Comment
monitoring methodology for that project category	Activities §22e		
13. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	<input checked="" type="checkbox"/>	Table 2, Section G
14. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	<input checked="" type="checkbox"/>	Table 2, Section F
15. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	<input checked="" type="checkbox"/>	A global public stakeholder process on the UNFCCC website has taken place from October 28, 2005 for 30 days. Until the end of the stakeholder process, November 26, 2005, no comment has been received.

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. Project Description The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	1, 3, 5, 6, 14, 17	DR, I	The project qualifies as a Small Scale Project as it fulfils the requirements defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM by being a project in the category Type-1 i) “renewable energy project activities with a maximum output capacity equivalent to up to 15 megawatts.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	1, 3, 5, 6, 14, 17	DR, I	The project activity is not a debundled component of a larger project activity according to the rules for “determining the occurrence of debundling” as they are outlined in Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project activities. According to the PDD there is currently no other small scale project activity already registered or in the process of applying for registration - done by the same project participant.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	1, 3, 5, 6, 14,	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-4



Industrie Service

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	17				
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes, the PDD does clearly define the project's spatial boundaries.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes, the PDD does define the project's system boundaries by description of the project components. All components and facilities used to mitigate GHG's are covered.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.2.3. Does the project design engineering reflect current good practices?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes, according to the PDD the project design engineering does reflect current good practices. During the visit on site technical specifications were shown as part 4 of the "Informe Final de Interventoría" finished in June 2003. The document includes aspects regarding the following items: <ul style="list-style-type: none"> - Project description - Contracting, - Works execution program, - Contract costs - Final account and cancelling account - Provisional and definitive works reception 	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-5



Industrie Service

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<ul style="list-style-type: none"> - Technical information of alternative Usaquén tunnel and its coating, - Interconnection of Usaquén tunnel with existent conduction works - Operating of Usaquén tunnel - Access to Usaquén tunnel exit - Civil Works of Santa Ana - Factoring, assembling and testing of project equipment - Mailing with constructor and list of plans 		
A.2.4. Will the project result in technology transfer to the host country?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes. The project relies on commercial, environmentally safe and sound technological packages as well as the required know-how for implementation, transferred to the host party through the appropriate commercial guarantees and support service packages established for the implementation of the project activity, and which are standard in hydro power development.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions for meeting training and maintenance needs?	1, 3, 5, 6, 14, 17, 19	DR, I	There is no description related to the necessity and the contents of training. But during the audit on site the audit team observed that 20 of 40 technicians were already trained by an external firm for operating Santa Ana Plant, as a result of a recent decision of EAABs new general manager, who decided to internalize the operation of Santa Ana, planned by the former administration to be operated by a subcontract. This decision has minor structural effects on EAAB, but technical	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-6



Industrie Service

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			competences, especially at operator level have been demonstrated. Plant engineer in charge of Santa Ana Plant has demonstrable international experience in the generation business, and the two supervisors to be hired will have necessary competences and experience.		
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes. The project provides job opportunities for skilled and non-skilled labor during the construction phase. Operation of the project offers new opportunities for long-term employment of skilled professionals and new business development ventures related to operation and maintenance, through the 25 years expected operating life of the project. Investment resulting from the construction and operation of the project will contribute to increase the efficiency of the use of water from reservoirs supplying Bogotá, as well as to the conservation and preservation of the area of influence of the project, helping to preserve and secure long term water supplies to the local population.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.3.2. Will the project create any adverse environmental or social effects?	1, 3, 5, 6, 14, 17,	DR, I	It can not be expected that the project will create any adverse environmental or social effects	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-7



Industrie Service

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	19				
A.3.3. Is the project in line with sustainable development policies of the host country?	1, 3, 4, 5, 6, 14, 17, 19	DR, I	<p>Yes. The project complies with the framework of the energy sector policies of Colombia in aspects related to renewable energy electricity generation and technological innovation, being one of the first hydro power projects in the country using treated water from a city aqueduct, and by increasing the efficiency of the use of water from a watershed by using the supply in an optimized manner for dual purposes (drinking water supply and electricity generation).</p> <p>The same is confirmed in the Letter of Approval from the national government.</p>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.3.4. Is the project in line with relevant legislation and plans in the host country?	1, 3, 4, 5, 6, 14, 17, 19	DR, I	<p>Yes. The Santa Ana project is part of a huge plan for the construction of sanitary infrastructure called Santa Fe. The following documents have been reviewed during the audit process:</p> <ul style="list-style-type: none"> - Water Rights (Resolution 157, August 31st, 2004, UAPN) - Santa Fe Environmental License (Resolution 692, May 21st, 1997), including tunnel and power house - Environmental Management Plan Approval (Resolution 1913, November 23rd, 2000) - Compliance of environmental requirements related to landscape and tree planting (Resolución 693, May 10th, 2001) - Compliance with environmental requirements assessed by inspection during 	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-8



Industrie Service

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			construction phase (Auto 191, Oct 8 th , 2001)		
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 selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes, the selected baseline methodology is in line with the baseline methodologies provided for the relevant project category.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.1.2. Is the baseline methodology applicable to the project being considered?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes, the selected baseline methodology is generally applicable to the project.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview



Industrie Service

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					

* MoV = Means of Verification, DR= Document Review, I= Interview



Industrie Service

<p>B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?</p>	<p>1, 3, 5, 6, 7, 8, 9, 14, 17, 19, 20, 21</p>	<p>DR, I</p>	<p>The PDD elaborates on various barriers faced by the project. The description indicates that the project faces barriers and can be considered to be additional, but further clarification is needed in order to demonstrated clearly that the project fullfills the requirements.</p> <p><u>Clarification Request No. 1:</u></p> <p>As per investment barrier, IRR of the project is 8.09% in the absence of CER revenues, and as per prevailing practice barrier, EAAB reduces the water flowing of the project electricity generation by 45% because of increasing the efficiency of water usage in the city. However, the additionality of the project depends on water quantity supplied to the project and therefore it is unclear whether the additionality is kept or not because e.g. if EAAB increased the water flow to the project due to increasing water demands in the city, electricity generation would be also increased and therefore the project would become profitable even without CER revenue. This should be clarified.</p> <p><u>Clarification Request No. 2:</u></p> <p>Initial IRR rates (page 11 of PDD), were calculated on the basis of water demand trend observed until 1995, as shown by a demand curve presented by EAAB during the on site audit. But an independent evidence of kWh price of the year 1995 has not been issued yet (the project developer is requested to submit evidence that demonstrate a price of near</p>	<p>CR 1-4</p>	<p><input checked="" type="checkbox"/></p>
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* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-11



Industrie Service

			<p>0,035 USD/kWh as declared in the PDD) .</p> <p><u>Clarification Request No. 3:</u> PDD information that suggests a prefeseability IRR between 11,8% and 14,7% was supported during the on site audit by a document called “Prefeseability of Altern Usaquén Tunnel”. But it has still to be demonstrated, that these data correspond exclusively to Santa Ana Project (excluding tunnel, which was a “must” to ensure potable water supply to the city of Bogotá), otherwise the base for the prefeseability IRR calculation is not the same as for feseability (which base is Santa Ana Plant and Transmission Lines exclusively), and therefore not valid. It should hereby be remembered that generation infrastructure investment for this project should consider exclusively the infrastructure that is additional to the potable water supply system.</p> <p><u>Clarification Request No. 4:</u> Neither the PDD nor the project owner during the visit on site could submit a document of evidence which makes clear that the CDM has been a relevant trigger in the decision making process for this project. Respective documentation should be submitted.</p>		
B.2.2. Is the application of the baseline	1, 3, 5, 6,	DR,	Yes.	CR 6	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-12



Industrie Service

methodology and the discussion and determination of the chosen baseline transparent and conservative?	14, 17, 19, 20, 22	I	<p><u>Clarification Request No. 6:</u></p> <p>But updated information of the carbon emission factor for small scale CDM projects has been received by the audit team. According to information in the legislative act No, 181422 from November 25, 2005, the CEF figure is determined to be 0.4392 kgCO2/kWh. This differs from the figures in the PDD. To be clarified and demonstrated that the factor given by the resolution is calculated in accordance with the rules defined in the underlying methodology.</p>		
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes. The project is consistent with the Sustainable Development Criteria established by the Colombian NDACDM, "Ministerio de Ambiente, Vivienda y Desarrollo Territorial. Local host country sustainable development criteria include compliance with local law and relevant norms, coherence and contribution to government policies and contribution to the economic and social welfare of communities in the long run.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.2.4. Is the baseline selection compatible with the available data?	1, 3, 5, 6, 14, 17, 19	DR, I	<p>Basically yes. The available data are taken from UPME, Unidad de Planificación Minero Energética.</p> <p><u>Corrective Action Request No. 2:</u></p> <p>The data vintage for the OM are the years 1995-2003. this is in contrast to the methodology which asks for most recent data, which could be 2003 or 2004. To be corrected, but see also CR 6.</p>	CAR 2	<input checked="" type="checkbox"/>

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Page A-13

B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	1, 3, 5, 6, 14, 17, 19	DR, I	In case all open issues related to the additionality of the project can be resolved the project is considered to be the most likely scenario describing what would have occurred in absence of the project activity	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes. The project's starting date is defined as the starting date of construction 20/11/2000 and the operational lifetime is 25 years.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C.1.2. Is the crediting period clearly defined (seven years with two possible renewals or 10 years with no renewal)?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes. 10 years crediting period is chosen.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C.1.3. Is it assured that in case the start of the crediting period is before the registration of the project that the project activities starting date falls in the period between 1 January 2000 and the registration of the first clean development mechanism project?	1, 3, 5, 6, 9, 14, 17, 19, 20, 23	DR, I	<p>During the validation process the audit team obtained the information and evidenced that the start of project activities has been before the registration date of the first clean development mechanism project.</p> <p><u>Clarification Request No. 7:</u></p> <p>It is needed to demonstrate that the project starting date has not been before Jan 1, 2000, hence the investment decision has not been prior to this data as this would disqualify the project under CDM.</p>	CR 7	<input checked="" type="checkbox"/>



Industrie Service

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 monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes, the selected monitoring methodology is in line with the monitoring methodologies provided for the relevant project category as the Simplified Modalities and Procedures for Small-Scale CDM project activities ask for the metering of the electricity generated by the renewable technology.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.1.2. Is the monitoring methodology applicable to the project being considered?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes. Monitoring methods have been chosen as suggested in accordance to Appendix B of the Simplified M&P for Small-Scale CDM Project Activities.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.1.3. Is the application of the monitoring methodology transparent?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	1, 3, 5, 6, 14,	DR, I	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-15



Industrie Service

	17, 19				
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. Are the choices of project emission indicators reasonable?	1, 3, 5, 6, 14, 17, 19	DR, I	No to be expected.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.2.2. Will it be possible to monitor / measure the specified project emission indicators?	1, 3, 5, 6, 14, 17, 19	DR, I	See D.2.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.2.3. Do the measuring technique and frequency comply with good monitoring practices?	1, 3, 5, 6, 14, 17, 19	DR, I	See D.2.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.2.4. Are the provisions made for archiving project emission data sufficient to enable later verification?	1, 3, 5, 6, 14, 17, 19	DR, I	See D.2.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



Industrie Service

D.3. Monitoring of Leakage It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. If applicable, are the choices of leakage indicators reasonable?	1, 3, 5, 6, 14, 17, 19	DR, I	Not applicable.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.3.2. If applicable, will it be possible to monitor / measure the specified leakage indicators?	1, 3, 5, 6, 14, 17, 19	DR, I	Not applicable.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.3.3. If applicable, do the measuring technique and frequency comply with good monitoring practices?	1, 3, 5, 6, 14, 17, 19	DR, I	Not applicable.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.3.4. If applicable, are the provisions made for archiving leakage data sufficient to enable later verification?	1, 3, 5, 6, 14, 17, 19	DR, I	Not applicable.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



Industrie Service

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. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes, see D.1.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.4.2. Will it be possible to monitor / measure the specified baseline emission indicators?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.4.3. Do the measuring technique and frequency comply with good monitoring practices?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.4.4. Are the provisions made for archiving baseline emission data sufficient to enable later verification?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



Industrie Service

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?	1, 3, 5, 6, 10, 14, 17, 19	DR, I	Although the project participants are mentioned, detailed authority and responsibility for project operation, monitoring and reporting are not described in PDD. But during the audit on site the respective information has been submitted.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	1, 3, 5, 6, 10, 14, 17, 19	DR, I	See D5.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.5.3. Are procedures identified for training of monitoring personnel?	1, 3, 5, 6, 10, 14, 17, 19	DR, I	Nearly 20 employees of EAAB were trained recently (assistance act has been evidenced during audit on site) for each of the systems of the operation, i.e.: - Supervision and Control - Generation - Turbine - Regulator - Alstom PLC - Bridge - Half Tension Cells - Valves (Different types) - Fire Control System Training was made by ATG Constructora y Capacitadora and included Net Division of EAAB,	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Page A-19



Industrie Service

			Environmental Division of EAAB, Responsibilities of Programa Santa Fe and Accounting Division of EAAB.		
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	1, 3, 5, 6, 10, 14, 17, 19	DR, I	No unintended emissions are to be expected.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.5.5. Are procedures identified for calibration of monitoring equipment?	1, 3, 5, 6, 10, 14, 17, 19	DR, I	Existent calibration plans and procedures affect only flow meters. Calibration procedures and plans of generation meters will be defined and included in ISO 9001:2000 QMS. <u>Clarification Request No. 5:</u> Interim measures should be provided.	CR5	<input checked="" type="checkbox"/>
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	1, 3, 5, 6, 10, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.5.7. Are procedures identified for monitoring, measurements and reporting?	1, 3, 5, 6, 10, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.5.8. Are procedures identified for day-to-day records handling (including what records	1, 3, 5, 6,	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Page A-20



Industrie Service

to keep, storage area of records and how to process performance documentation)	10, 14, 17, 19				
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	1, 3, 5, 6, 10, 14, 17, 19	DR, I	No. <u>Clarification Request No. 5:</u> Interim measures should be provided.	CR5	<input checked="" type="checkbox"/>
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	1, 3, 5, 6, 10, 14, 17, 19	DR, I	No. Internal verification procedure has still to be defined in order to cross check dispatch information received by EMGESA <u>Clarification Request No. 5:</u> Interim measures should be provided.	CR5	<input checked="" type="checkbox"/>
D.5.11. Are procedures identified for project performance reviews?	1, 3, 5, 6, 10, 14, 17, 19	DR, I	No. <u>Clarification Request No. 5:</u> Interim measures should be provided.	CR5	<input checked="" type="checkbox"/>
D.5.12. Are procedures identified for corrective actions?	1, 3, 5, 6, 10, 14, 17, 19	DR, I	No. <u>Clarification Request No. 5:</u> Interim measures should be provided.	CR5	<input checked="" type="checkbox"/>



Industrie Service

E. Calculation of GHG emission 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. 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 project emissions captured in the project design?	1, 3, 5, 6, 14, 17, 19	DR, I	No project emissions are to be expected.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.1.2. Have all relevant greenhouse gases and sources been evaluated?	1, 3, 5, 6, 14, 17, 19	DR, I	See above E.1.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.1.3. Do the methodologies for calculating project emissions comply with existing good practice?	1, 3, 5, 6, 14, 17, 19	DR, I	See above E.1.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.1.4. Are the calculations documented in a complete and transparent manner?	1, 3, 5, 6, 14, 17,	DR, I	See above E.1.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-22



Industrie Service

	19				
E.1.5. Have conservative assumptions been used?	1, 3, 5, 6, 14, 17, 19	DR, I	See above E.1.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.1.6. Are uncertainties in the project emissions estimates properly addressed?	1, 3, 5, 6, 14, 17, 19	DR, I	See above E.1.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.2. Leakage 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 leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	1, 3, 5, 6, 14, 17, 19	DR, I	No leakage is identified for the project due to the project design.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.2.2. Are potential leakage effects properly accounted for in the calculations (if applicable)?	1, 3, 5, 6, 14, 17, 19	DR, I	See above in E.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Page A-23



Industrie Service

E.2.3. Do the methodologies for calculating leakage comply with existing good practice (if applicable)?	1, 3, 5, 6, 14, 17, 19	DR, I	See above in E.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.2.4. Are the calculations documented in a complete and transparent manner and (if applicable)?	1, 3, 5, 6, 14, 17, 19	DR, I	See above in E.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.2.5. Have conservative assumptions been used (if applicable)?	1, 3, 5, 6, 14, 17, 19	DR, I	See above in E.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.2.6. Are uncertainties in the leakage estimates properly addressed (if applicable)?	1, 3, 5, 6, 14, 17, 19	DR, I	See above in E.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3. Baseline GHG Emissions The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-24



Industrie Service

E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3.5. Are the calculations documented in a complete and transparent manner?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3.6. Have conservative assumptions been used?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Page A-25



Industrie Service

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 case?	1, 3, 5, 6, 14, 17, 19	DR, I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F. Environmental Impacts It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	1, 3, 5, 6, 14, 17, 19	DR	Yes. EAAB fulfils local Colombian requirement with respect to Environmental Impact Assessment of the project and completed the Environmental Management Plan (EMP) of the project approved by the Corporación Autónoma Regional de Cundinamarca19 (CAR, the regional environmental authority).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.1.2. Does the project comply with environmental legislation in the host country?	1, 3, 5, 6, 14, 17, 19	DR	See F1.1.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.1.3. Will the project create any adverse environmental effects?	1, 3, 5, 6, 14, 17,	DR	No.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Page A-26



Industrie Service

	19				
F.1.4. Have environmental impacts been identified and addressed in the PDD?	1, 3, 5, 6, 14, 17, 19	DR	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
G. Comments by Local Stakeholder					
Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	1, 3, 5, 6, 11, 14, 17, 19	DR	<p>Partly. A series of stakeholder consultation activities were implemented, such as:</p> <ol style="list-style-type: none"> 1. Meetings with local chambers of commerce in the project area. 2. Meetings with the local neighbourhoods, and community social action committees. 3. Meetings with local school principals, religious institutions, local universities and local NGO's. 4. Meetings with local villagers in the area of direct influence of the project. <p><u>Corrective Action Request No. 3:</u> But no evidence of a specific stakeholder process for Santa Ana was shown. To be added and/or carried out.</p>	CAR 3	<input checked="" type="checkbox"/>
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	1, 3, 5, 6, 14, 17, 19	DR	See G.1.1.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-27



Industrie Service

G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	1, 3, 5, 6, 14, 17, 19	DR	Yes. The consultation was implemented in accordance to the provisions established in EMP.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
G.1.4. Is a summary of the comments received provided?	1, 3, 5, 6, 14, 17, 19	DR	See G.1.1.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
G.1.5. Has due account been taken of any comments received?	1, 3, 5, 6, 14, 17, 19	DR	See G.1.1.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>The project design document does not conform with the Small Scale CDM Project Design Document format.</p> <p><u>Corrective Action Request No. 1:</u></p> <p>The header and preformatted sections have been changed and/or removed. To be corrected.</p> <p><u>Recommendation:</u></p> <p>For chapter A.3 the table from standard scale project PDDs should be used and version 02 of the SSC PDD should be used.</p>	Table 1	The PDD has been adjusted accordingly in the revised final version.	<input checked="" type="checkbox"/>
<p>Basically yes. The available data are taken from UPME, Unidad de Planificación Minero Energética.</p> <p><u>Corrective Action Request No. 2:</u></p> <p>The data vintage for the OM are the years 1995-2003. This is in contrast to the methodology which asks for most recent data, which could be 2003 or 2004. To be corrected, but see also CR 6.</p>	B.2.4	The project proponent has responded and adjusted the data used for the calculation of the CEF. Hereby the most updated data has been used (see CR 6). The emission factor for the vintage chosen (2002-2004) is correctly calculated.	<input checked="" type="checkbox"/>



Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>Partly. A series of stakeholder consultation activities were implemented, such as:</p> <ol style="list-style-type: none"> 1. Meetings with local chambers of commerce in the project area. 2. Meetings with the local neighbourhoods, and community social action committees. 3. Meetings with local school principals, religious institutions, local universities and local NGO's. 4. Meetings with local villagers in the area of direct influence of the project. <p><u>Corrective Action Request No. 3:</u> But no evidence of a specific stakeholder process for Santa Ana was shown. To be added and/or carried out.</p>	G.1.1	Evidence has been submitted that shows that the stakeholder process carried out explicitly also included Santa Ana.	<input checked="" type="checkbox"/>
<p><u>Clarification Request No. 1:</u></p> <p>As per investment barrier, IRR of the project is 8.09% in the absence of CER revenues, and as per prevailing practice barrier, EAAB reduces the water flowing of the project electricity generation by 45% because of increasing the efficiency of water usage in the city. However, the additionality of the project depends on water quantity supplied to the</p>	B.2.1	It has been demonstrated by planning data that no significant increase in water demand has neither been realised nor is to be expected.	<input checked="" type="checkbox"/>



Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
project and therefore it is unclear whether the additionality is kept or not because e.g. if EAAB increased the water flow to the project due to increasing water demands in the city, electricity generation would be also increased and therefore the project would become profitable even without CER revenue. This should be clarified.			
<u>Clarification Request No. 2:</u> Initial IRR rates (page 11 of PDD), were calculated on the basis of water demand trend observed until 1995, as shown by a demand curve presented by EAAB during the on site audit. But an independent evidence of kWh price of the year 1995 has not been issued yet (the project developer is requested to submit evidence that demonstrate a price of near 0,035 USD/kWh as declared in the PDD) .	B.2.1	Evidence for actually used price indicators in project feasibility studies has been submitted and the electricity price has been adjusted accordingly to allow a proper demonstration of the project design and financial return expectations	<input checked="" type="checkbox"/>
<u>Clarification Request No. 3:</u> PDD information that suggests a pre-feasibility IRR between 11,8% and 14,7% was supported during the on site audit by a document called "Pre-feasibility of Altern	B.2.1	Evidence for pre-feasibility IRR expectations has been submitted and the data has been adjusted accordingly in the PDD to allow a proper demonstration of the financial return	<input checked="" type="checkbox"/>



Industrie Service


Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>Usaquén Tunnel”. But it has still to be demonstrated, that these data correspond exclusively to Santa Ana Project (excluding tunnel, which was a “must” to ensure potable water supply to the city of Bogotá), otherwise the base for the pre-feasibility IRR calculation is not the same as for feasibility (which base is Santa Ana Plant and Transmission Lines exclusively), and therefore not valid. It should hereby be remembered that generation infrastructure investment for this project should consider exclusively the infrastructure that is additional to the potable water supply system.</p>		<p>expectations</p>	
<p><u>Clarification Request No. 4:</u> Neither the PDD nor the project owner during the visit on site could submit a document of evidence which makes clear that the CDM has been a relevant trigger in the decision making process for this project – although testimonial evidence has been available. Respective documentation should be submitted.</p>	<p>B.2.1</p>	<p>A document of a meeting at the Ministry for environment has been presented dating the consideration of the project back until February 1998.</p>	<p><input checked="" type="checkbox"/></p>



Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
<u>Clarification Request No. 5:</u> Interim measures regarding calibration, uncertainty adjustments, internal audits, performance reviews and corrective actions as part of the project management and planning should be provided.	D.5.5/9/10/11/12	Respective information has been submitted.	<input checked="" type="checkbox"/>
<u>Clarification Request No. 6:</u> But updated information of the carbon emission factor for small scale CDM projects has been received by the audit team. According to information in the legislative act No, 181422 from November 25, 2005, the CEF figure is determined to be 0.4392 kgCO ₂ /kWh. This differs from the figures in the PDD. To be clarified and demonstrated that the factor given by the resolution is calculated in accordance with the rules defined in the underlying methodology.	B.2.2	The project proponent has adjusted the CEF figure to the latest source. The audit team has verified that the factor given by the resolution is calculated in accordance with the rules defined in the underlying methodology.	<input checked="" type="checkbox"/>
During the validation process the audit team obtained the information and evidenced that the start of project activities has been before the registration date of the first clean development mechanism project. <u>Clarification Request No. 7:</u>	C.1.3	It has been demonstrated that the project starting date – construction date has been chosen which is in line with the definition in the guidelines - has not been before Jan 1, 2000, but in November 2000.	<input checked="" type="checkbox"/>

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
It is needed to demonstrate that the project starting date has not been before Jan 1, 2000.			

Annex 2: Information Reference List

Final Report 2006-04-03	Validation of the “Santa Ana Hydroelectric Plant”, Colombia Information Reference List	Page 2 of 2	 Industrie Service
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Reference No.	Document or Type of Information
11	Documentation with clarification on stakeholder consultation with respect to the subproject Santa Ana, Empresa del Acueducto y Alcantarillado de Bogotá (EAAB)), submitted September 2005
12	National Strategy Study for Implementation of CDM in Colombia, World Bank August 2000
13	Agreement between EAAB and Parques Nacionales Naturales de Colombia, dated September 7, 2005, submitted September 2005
14	Approved Baseline & Monitoring Methodology ASM I.D, UNFCCC 2005
15	UNFCCC: CDM. Tool for Demonstration and Assessment of Additionality approved by EB (EB 16 Annex 1)
16	Validation & Verification Manual, IETA / World Bank (PCF) http://www.vvmanual.info
17	Final Project Design Document, submitted October 2005
18	Grid factor for GHG emission in Colombia, email of Colombian DNA, dated November 29, 2005
19	Revised Final Project Design Document, submitted February 2006
20	Response to Draft Validation Report, dated December 16, 2005
21	Meeting minutes, Vice Minister of Ministerio del Medio Ambiente, dated February 20, 1998, submitted December 2005
22	Colombian Government Official Decree 181401
23	Official audit construction report, dated June 2003, submitted December 2005