



## Validation Opinion on a Revision in Monitoring Plan

Report number BVC/BRAZIL/MP Change/BR.0999643, version 03

The validation of revision to the monitoring plan is for the project activity with the following details

Project reference	UNFCCC 0831 CDMP
Title of the project activity	Rialma Companhia Energética S/A. – Santa Edwiges II Small Hydro Power Plant – Small Scale CDM Project
Methodology	AMS-I.D. Version 9 dated 28 July 2006
Date of registration	02 April 2007
Verification period during which change is requested	From 01 October 2008 onwards
Number of issuances for the project activity before this verification	One 1 <sup>st</sup> Monitoring Period: 02/04/2007 – 30/09/2008

<b><u>Party</u></b>	<b><u>Project Participant</u></b>
Brazil (Host)	Rialma Companhia Energética S.A.
Brazil (Host)	Ecopart Assessoria em Negócios Empresariais Ltda.
Switzerland	CM Capital Markets Holding S.A.
United Kingdom of great Britain and Northern Ireland	Ecopart Assessoria em Negócios Empresariais Ltda.

<b><u>Validation team</u></b>	
Team leader	Rubens da Silva Ferreira
Team member	Marco Francisco Prauchner
Internal reviewer	Marcelo Antoniazzi Porto
Period of validation	August 2011

### **Reason for request for revision in monitoring plan**

Rialma Companhia Energética S/A. – Santa Edwiges II Small Hydro Power Plant – Small Scale CDM Project was registered on 02 April 2007, under CDM methodology AMS-I.D. version 9.

During the 2<sup>nd</sup> Verification Period, the following Corrective action request has been opened by Bureau Veritas Certification – the DOE responsible for that verification, which is still ongoing:

**CAR 01:** *According to MR v.01 Section C: “There are four meters in the project: two at the power plant and two at the substation. Meters located at the power plant collect the total energy produced by Santa Edwiges II (gross energy) and meters located at the substation collect the energy dispatched to the grid (net energy).” During the site visit it was observed that the two meters informed in the MR as being located at the power plant are located in the Santa Edwiges Substation, and the Substation referred in the MR is the Alvorada do Norte Substation (which dispatches the energy to the National Grid). Two other hydro plants (Santa Edwiges I and III) are also connected to the same meters at Alvorada do Norte Substation. A request for revision of the monitoring plan is required.*

According to the DOE’s request, the Project Participants are proposing the revision of the monitoring plan of the project, following EB 49 Annex 28 – Procedures for Revising Monitoring Plans in Accordance with Paragraph 57 of the Modalities and Procedures for the CDM, version 02.

This revision of the monitoring plan should be applicable to the verification periods of the project, from 01 October 2008 onwards.

### **Summary of the proposed revisions to the registered monitoring plan**

#### **Section D.3**

Revised, under “Electricity generation of the Project delivered to grid”, to 1) update improved recording frequency: measurement each five minutes; 2) remove archiving on paper; and 3) update comments, as result of the monitoring practices detailed in Section D.5.

Revised, under “CO<sub>2</sub> emission factor of the grid”, to 1) update comments, as result of the monitoring practices detailed in Section D.5.

Revised to remove paragraph after monitoring data table, since revised Section D.5 covers project management.

#### **Section D.5**

Revised to clarify that “Electricity generation of the Project delivered to grid” is calculated based on the electricity generated in the project activity and other hydro plants (Santa Edwiges I and III) and the total electricity delivered to the grid by all hydro plants (Santa Edwiges I, II and III).

**Information required as per the “Procedures for Revising Monitoring Plans in Accordance with Paragraph 57 of the Modalities and Procedures for the CDM”**

(a) The proposed revision of the monitoring plan ensures that the level of accuracy and completeness in the monitoring and verification process is not reduced as a result of the revision.

The revision of the monitoring plan is being carried out in order to clarify how monitoring is being performed, since registered PDD version 08 does not describe it in a clear manner, such that it lead Bureau Veritas Certification to conclude that the “monitoring of electricity supplied to the grid from the project activity was not conducted in accordance with the monitoring plan”.

Changes incorporated in the proposed revised monitoring plan reflect a metering system which complies with ONS<sup>1</sup> grid procedures “Submodule 12.2: Installation of the Measurement System for Invoicing”, “Annex I, Section 6: Location of Measurement Points”<sup>2</sup> and “Submodule 12.6: Measurement configuration for invoicing”, “Section 5: Measurement Settings for invoicing”<sup>3</sup>, as confirmed by the DOE. Such grid procedures are the same to which the project activity has always been subject. Additionally, CCEE<sup>4</sup>’s official results release procedure “PdC DR.01: Results release”<sup>5</sup> continues to apply.

Therefore, the level of accuracy and completeness in the monitoring and verification process is not reduced as a result of the revision of the monitoring plan. On the contrary, a measurement recording frequency improvement is being reported – the former 15-minute interval has been changed to 5 minutes – contributing to better monitoring accuracy.

The remainder of part (a), of this Validation Opinion, includes information already submitted by the DOE, on 04/05/2011, in response to the clarifications for request for revision of the monitoring plan “Rialma Companhia Energética I S/A. – Santa Edwiges I Small Hydro Power Plant – Small Scale CDM Project” (0830), dated 20/04/2011. Such inclusion had been requested by the CDM Team/UNFCCC Secretariat on

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<sup>1</sup> ONS – Electric System National Operator (from the Portuguese, *Operador Nacional do Sistema*)

<sup>2</sup> Current version available at:

[http://extranet.ons.org.br/operacao/prdocme.nsf/identificadorlogico/8FD2111FF385CFC2832577A6004E6C34/\\$file/Submodulo%2012.2\\_Rev\\_1.1.pdf?openelement](http://extranet.ons.org.br/operacao/prdocme.nsf/identificadorlogico/8FD2111FF385CFC2832577A6004E6C34/$file/Submodulo%2012.2_Rev_1.1.pdf?openelement) (accessed on 28/08/2011.)

<sup>3</sup> Current version available at:

[http://extranet.ons.org.br/operacao/prdocme.nsf/identificadorlogico/DC3A74B03D3E0640832577A600500B42/\\$file/Submodulo%2012.6\\_Rev\\_1.1.pdf?openelement](http://extranet.ons.org.br/operacao/prdocme.nsf/identificadorlogico/DC3A74B03D3E0640832577A600500B42/$file/Submodulo%2012.6_Rev_1.1.pdf?openelement) (accessed on 28/08/2011.)

<sup>4</sup> CCEE - Electric Power Commercialization Chamber (from the Portuguese, *Câmara de Comercialização de Energia Elétrica*)

<sup>5</sup> Current version available at:

[http://www.ccee.org.br/StaticFile/Arquivo/biblioteca\\_virtual/Procedimentos\\_Vigentes/pdc\\_dr\\_01\\_versao4.pdf](http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Procedimentos_Vigentes/pdc_dr_01_versao4.pdf) (accessed on 28/08/2011.)

20/06/2011, regarding monitoring plan of project activity 0830. Thus, same inclusion has been made here, since same clarifications are applicable to the monitoring plan of “Rialma Companhia Energética S/A. – Santa Edwiges II Small Hydro Power Plant – Small Scale CDM Project”.

The revenues meters (principal and back-up) at Alvorada do Norte substation, placed at the connection point of the transmission network, will account for the net electricity delivered to the grid by Santa Edwiges I, II and III. Nevertheless, to define Santa Edwiges II generation the measurements provided by Santa Edwiges substation are also required, so CCEE is able to determine the amount of electricity dispatched by each plant taking into account the transmission losses. Therefore, both measurements must be used for emission reduction purposes.

It is important to highlight that the Brazilian Chamber of Electrical Energy Commercialization accounting system provides a conservative value in its official report CB002. This report can be crosschecked with Santa Edwiges substation’s measurements, where the total power generation of the project activity is computed, and consolidated in another CCEE’s official report ME001.

The emission reduction calculation is based on official data provided by CCEE. The official report CB002 presents the amount of net electricity delivered by the project activity into the grid. This report is also used by the electricity buyer, who confirms if the amount of electricity sold was properly delivered.

All measurement points (individual readings of Santa Edwiges I, II and III, and total generation, measured at the transmission network connection point) compose a measuring system that provides the specific net electricity dispatched by each plant.

Rialma Companhia Energética S.A. is responsible for the calibration and maintenance of Santa Edwiges II’s meters<sup>6</sup> (placed at Santa Edwiges substation). Brookfield Energia Renovável (BER)<sup>7</sup> is responsible for the billing meters (at Alvorada do Norte substation). It is important to stress that Rialma Companhia Energética S.A. doesn’t control the other two plants. Santa Edwiges III belongs to Rialma Companhia Energética III S.A. and Santa Edwiges I to Riachão Energética S/A. Furthermore both projects are not part of this project activity and are CDM registered projects, with their own approved monitoring plans.<sup>8</sup>

Therefore, considering that the emission reduction calculation described on the monitoring plan is based on official sources (CB002 report), which takes into account

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<sup>6</sup> The meters placed at Santa Edwiges substation meet the same specification requirements of the ones used at Alvorada do Norte substation.

<sup>7</sup> BER is the controller of Riachão Energética S/A, owner of Santa Edwiges I small hydropower plant.

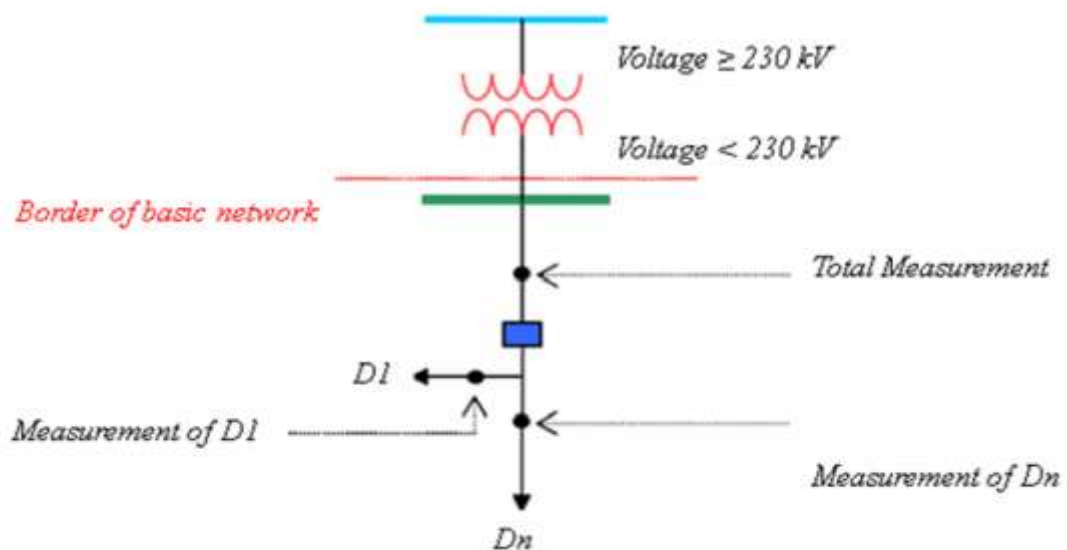
<sup>8</sup> CDM Project 0830: <http://cdm.unfccc.int/Projects/DB/BVQI1167141448.3/view>  
CDM Project 2165: <http://cdm.unfccc.int/Projects/DB/TUEV-SUED1218634643.54/view>

the net and gross electricity delivered by all plants connected to the transmission line, and that the only plant controlled by Rialma Companhia Energética S.A. and included in this specific project activity is Santa Edwiges II, it is the PP's and the DOE's understanding that the electricity generated from Santa Edwiges I and III should not be included in the monitoring plan.

As formerly explained the monitoring system of Santa Edwiges II is based on a measurement configuration that considers the individual readings of the amount of electricity generated by three hydropower plants, Santa Edwiges I, II and III, in addition to their total generation, measured at the connection point with the transmission network (Alvorada do Norte substation).

Such configuration is approved by ONS – National Power System Operator of the Brazilian electricity system – in accordance to its grid procedures, “Submodule 12.2: Installation of the Measurement System for Invoicing (Rev. 1.1)”, “Section 6: Location of Measurement Points”, in paragraph 6.5:

*6.5 At the connection point with the basic or distribution network, whose line is shared by more than one distributor or free consumer, the measurement must be at this point and at the connection points of each one.*



Source (translated into English, since grid procedures are only available in Portuguese):

[http://www.ons.org.br/download/procedimentos/modulos/Modulo\\_12/Submodulo%2012.2\\_Rev\\_1.1.pdf](http://www.ons.org.br/download/procedimentos/modulos/Modulo_12/Submodulo%2012.2_Rev_1.1.pdf)

The entire grid (electric system) comprises assets pertaining to measurement (power plants, generating units and loads), as well as the use of main and backup meters at defined measurement points. Transmission losses occur between the assets and the relevant measurement points.

The ONS specification detailed on paragraph 5.9.5 of “Submodule 12.6: Configurations of the Measurement System for Invoicing (Rev. 1.1)”, establishes that

the net electricity generated by each plant (generation agent) at the point of connection to the transmission network is calculated according to the following equations:

$$D\% \Big|_{j=1 \rightarrow n} = \frac{D_j}{\sum_{i=1}^n D_i} \times 100$$

$$AD \Big|_{j=1 \rightarrow n} = \frac{D\%_j}{100} \times N$$

Where:

$D\% \Big|_{j=1 \rightarrow n}$  = Share of the plant's generation at the point of connection

$D_j$  = Measurement of the total power generation of the plant ("D<sub>1</sub>")<sup>9</sup>

$\sum_{i=1}^n D_i$  = Is the sum of the measurement of the total power generation of all plants connected to the measuring system<sup>10</sup>

$N$  = Total Measurement at the connection point<sup>11</sup>

$AD \Big|_{j=1 \rightarrow n}$  = Amount of net electricity delivered by each plant to the grid<sup>12</sup>

(b) The proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity.

AMS-I.D. version 9 establishes that "Monitoring shall consist of metering the electricity generated by the renewable technology".

The electricity delivered to the grid by the project activity is calculated based on the electricity generated in the project activity and other hydro plants (Santa Edwiges I and III) and the total electricity delivered to the grid by all hydro plants (Santa Edwiges I, II and III).

<sup>9</sup> In the present case, this parameter would be acquired by Santa Edwiges II specific meters at Santa Edwiges substation.

<sup>10</sup> In the present case, this sum would be acquired by CCEE, who possesses access to meters readings of Santa Edwiges I, II, and III (source: official CCEE's ME001 reports of each plant).

<sup>11</sup> In the present case, this parameter would be acquired by Alvorada do Norte meters.

<sup>12</sup> This value is obtained at CCEE's official report (source: official CB002).

The metering of the electricity delivered to the grid by the project activity takes into account four couples (principal and backup) of energy meters: three exclusively dedicated for metering each hydro plant's generation (upstream of grid delivery) and one at Alvorada do Norte Substation (point of grid delivery), where the total electricity delivered to the grid by all three plants (including the project activity) is measured.

The DOE has confirmed that such metering system complies with ONS grid procedures "Submodule 12.2: Installation of the Measurement System for Invoicing", "Annex I, Section 6: Location of Measurement Points" and "Submodule 12.6: Measurement configuration for invoicing", "Section 5: Measurement Settings for invoicing".

The DOE has confirmed the validity of a distribution agreement<sup>13</sup> between all three plants and the distribution company, which legally enforces the former ones, as energy producers, to comply with all ONS calibration procedures.

The DOE has verified that the energy meters of Santa Edwiges II (project activity) and Alvorada do Norte Substation have been calibrated<sup>14</sup>.

Therefore, the DOE concludes that the proposed revision of the monitoring plan is in accordance with the approved methodology applicable to the project activity.

(c) The findings of previous verification reports, if any, have been taken into account.

The findings of previous verification reports, from first monitoring period, have been taken into account, by reviewing all CARs, CLs, means of verification and conclusions.

### **Validation Opinion**

Bureau Veritas Certification has performed a validation of the revised monitoring plan for the CDM project activity "Rialma Companhia Energética S/A. – Santa Edwiges II Small Hydro Power Plant – Small Scale CDM Project".

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<sup>13</sup> Contract PRGE. N° 667/07 CCD, for connection to CELG's distribution system

<sup>14</sup> At Santa Edwiges Substation:

- Main meter: Certificate # 0012/09
- Back-up meter: Certificate # 0011/09

At Alvorada do Norte Substation:

- Main meter: certificates # DC SLM 0177/07 and # DC SLM 0160/09
- Back-up meter: certificates # DC SLM 0184/07, # 0077/08 and # DC SLM 0161/09

The validation of the revised monitoring plan has been performed for the subsequent verification periods (From 01 October 2008 onwards).

Bureau Veritas Certification has performed this validation on the basis of the following documents:

1. "Procedures for Revising Monitoring Plans in Accordance with Paragraph 57 of the Modalities and Procedures for the CDM" (Version 02 – EB 49 Report – Annex 28);
2. "Clarification for Project Participants on When to Request a Revision, Clarification to an Approved Methodology or Deviation" (Version 02 – EB 31 Report – Annex 12);
3. "Validation and Verification Manual" (Version 01.2 – EB 55 Report – Annex 1);
4. "Guidelines on Assessment of Different Types of Changes from the Project Activity as Described in the Registered PDD" (EB 48 Report – Annex 67).
5. Approved methodology AMS-I.D. - "Grid connected renewable electricity generation", Version 9, dated 28 July 2006.

The validation consisted of the following three phases:

- i) A desk review of the revised monitoring plan;
- ii) Follow-up interviews with project stakeholders;
- iii) The resolution of issues and the issuance of the final validation report and opinion.

The review of the revised monitoring plan has provided Bureau Veritas Certification with sufficient evidence to determine the fulfillment of stated criteria. In our opinion:


- The proposed revision of the monitoring plan ensures that the level of accuracy and completeness in the monitoring and verification process is not reduced as a result of the revision;
- The proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity, whilst ensuring the conservativeness in the monitoring and verification process and the emission reduction calculations;
- The findings of previous verification reports have been taken into account.

Bureau Veritas Certification therefore requests the acceptance, from the Chair of the Board, of this request for revision of the monitoring plan.

Rio de Janeiro, January 31<sup>st</sup>, 2012



Rubens da Silva Ferreira  
Verification Team Leader



Marcelo Antoniazzi Porto  
Internal Technical Reviewer



## **References**

1. PDD version 08, dated 10/11/2006, registered on 02/04/2007;
2. Proposed revised monitoring plan, dated 28/06/2011;
3. Proposed revised monitoring plan, dated 19/12/2011;
4. Proposed revised monitoring plan, dated 30/01/2012;
5. First Verification Report # 8000364932 – 08/358 V01 - Rialma Companhia Energética S/A. – Santa Edwiges II Small Hydro Power Plant – Small Scale CDM Project – 02/04/2007 to 30/09/2008 – TÜV NORD;
5. ONS grid procedures “Submodule 12.2: Installation of the Measurement System for Invoicing”, “Section 6: Location of Measurement Points”. Current version available at [http://extranet.ons.org.br/operacao/prdocme.nsf/identificadorlogico/8FD2111FF385CFC2832577A6004E6C34/\\$file/Submodulo%2012.2\\_Rev\\_1.1.pdf?openelement](http://extranet.ons.org.br/operacao/prdocme.nsf/identificadorlogico/8FD2111FF385CFC2832577A6004E6C34/$file/Submodulo%2012.2_Rev_1.1.pdf?openelement);
6. ONS grid procedures “Submodule 12.6: Measurement configuration for invoicing”, “Section 5: Measurement Settings for invoicing”. Current version available at [http://extranet.ons.org.br/operacao/prdocme.nsf/identificadorlogico/DC3A74B03D3E0640832577A600500B42/\\$file/Submodulo%2012.6\\_Rev\\_1.1.pdf?openelement](http://extranet.ons.org.br/operacao/prdocme.nsf/identificadorlogico/DC3A74B03D3E0640832577A600500B42/$file/Submodulo%2012.6_Rev_1.1.pdf?openelement);
7. CCEE’s official results release procedure “PdC DR.01: Results release”. Current version available at [http://www.ccee.org.br/StaticFile/Arquivo/biblioteca\\_virtual/Procedimentos\\_Vigentes/pdc\\_dr\\_01\\_versao4.pdf](http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Procedimentos_Vigentes/pdc_dr_01_versao4.pdf);
8. Contract PRGE. No 667/07 CCD, for Santa Edwiges I, II and III connections to CELG’s distribution system;
9. Calibration certificates of Santa Edwiges II energy meters: Certificates # 0012/09 and # 0011/09;
10. Calibration certificates of Alvorada do Norte Substation energy meters: Certificates # DC SLM 0177/07, # DC SLM 0160/09, # DC SLM 0184/07, # 0077/08 and # DC SLM 0161/09;
11. Request for clarifications for request for revision of the monitoring plan “Rialma Companhia Energética I S/A. – Santa Edwiges I Small Hydro Power Plant – Small Scale CDM Project” (0830), dated 20/04/2011, and relevant BVC’s response, dated 04/05/2011

### **CVs of the validation team members**

Rubens da Silva Ferreira	Bureau Veritas Certification, Brazil	<u>Team Leader</u> Graduated in Chemical Engineering with experience in Quality and Environmental management in glass industries. He is ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007 Lead Auditor and has also experience in the implementation of Environmental Management Systems. Rubens is qualified as Lead Verifier GHG – Green House Gases.
Marco Francisco Prauchner	Bureau Veritas Certification, Brazil	<u>Team member</u> graduated in Mechanical Engineering with experience in Quality and Environmental management in mechanical, plastic and chemical industries. He is ISO 9001:2008 and ISO 14001:2004 Lead Auditor and has also experience in the implementation of Environmental Management Systems. Marco is qualified as Lead Verifier GHG – Green House Gases.
Marcelo Antoniazzi Porto	Bureau Veritas Certification, Brazil	<u>Internal Technical Reviewer</u> Graduated in Electrical Engineering, with a graduate specialization in Quality Engineering and a Master's degree in Industrial Engineering. Quality management expert and auditor, he worked in the electro-electronic, mechanical, medical devices, leather and shoes industries. ISO 9001 and SA8000 auditor, he is also trained as ISO 14001 and OHSAS 18001 lead auditor. Marcelo is qualified as Lead Verifier GHG – Green House Gases.