



CDM Project Monitoring Report (Ver.1.0)

48 MW Duduluo River Hydroelectric Power Plant

UNFCCC ref. 2199

Monitoring period: 12/05/ 2009 - 14/12/2009

Provided by:

Author:	Mr. Yao Song Project Manager Carbon Asset Development First Climate (Beijing) Ltd. E-Mail: yao.song@firstclimate.com	Date: 2010-01-04
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First Climate (Beijing) Ltd.

Room 807, Building A, Shimao Mansion,
92 Jianguo Avenue, Chaoyang District | 100022 Beijing | P.R. China |
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Executive Summary

During the first monitoring period, from 12/05/2009 to 14/12/2009, the registered project, UNFCCC ref. 2199, has displaced 87,954 MWh of electricity which are equivalent to 74,180 tCO₂e.

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Section A. General Description of the Project Activity

A.1 Title of the project activity:

48 MW Duduluo River Hydroelectric Power Plant

A.2. Project Category

The project activity falls under Scope 1-Energy Industries (renewable/non-renewable sources).

A.3. Geographic Location

The proposed project is located in Chenggan town, Lushui County, Nujiang Lisu Ethnic Autonomous Prefecture of Yunnan Province, in the South West of China. The geographical coordinates of the project location is 98°40'10"-98°54'36" East and 26°13'36"-26°21'36" North.

A.4. Short description of the project activity:

48 MW Duduluo River Hydroelectric Power Plant, a run-of-river hydropower project, is located on the Duduluo River in the Chenggan Town, Lushui County, Nujiang Lisu Ethnic Autonomous Prefecture of Yunnan Province. According to the investigation done by Water & Electric Investigation & Design Institute of Kunming University of Science & Technology, the actual surface area at full reservoir level is approximately 8,820 m².

The clean net electricity generated by this project would be about 197,288 MWh per year and will be sold to China Southern Power Grid (CSPG). By replacing the equivalent electricity otherwise generated by fossil fuel fired power plants; this project is expected to reduce approximately 166,393 tCO₂e GHG emissions per year. All main equipments installed are in accordance with the description in registered PDD and listed in table 1.

Table 1. Equipment employed in the project

Name	Number	Model Number	Technical Parameter	
Generator	3	SF16-10/2800	Rated capacity (MW)	16
			Rated voltage (KV)	10.5
			Rated speed (r/min)	600
Hydro turbine	3	CJA237-L-165/4×10	Rated head (m)	177
			Rated power (MW)	16.58
			Rated flow (m ³ /s)	3.176
			Rated speed (r/min)	600

When the project was registered on 12/05/2009, the project had been put into operation. Therefore, the registration date of the CDM project is identified as the start date of the first crediting period. The monitoring period is from 12/05/2009 to 14/12/2009. During the monitoring period the project has operated smoothly except necessary maintenance break.

A.5. Methodology applied to the project activity for the current period

The methodology applied:

As the proposed project has been registered under ACM0002 (Version 06) --Consolidated methodology for grid-connected electricity generation from renewable sources, the monitoring plan described in registered PDD meets the requests of ACM0002.

A.6. The current crediting period

The current period is the first period of the 10-years fixed crediting period.

Section B. Monitoring Plan.

B.1. Description of the Monitoring Plan

The monitoring plan is in compliance with the description in the registered PDD and no Forward Action Request (FAR) was requested by the validation report (<http://cdm.unfccc.int/UserManagement/FileStorage/5TIGHM97PWBSE8J6NDYCVQF1AKRL3O>).

B.2. Parameters monitored

The monitored parameters are listed in the tables below:

EG_y: Net electricity supplied to the grid;
Surface Area: Surface area at full reservoir level;

Data / Parameter:	
Data unit:	EG _y MWh
Description:	Net electricity supplied to the grid
Source of data to be used:	Reading of the meter at the connection point between the proposed project and the Grid
Value of data applied for the purpose of calculating expected emission reductions in section B.5	87,954 MWh
Description of measurement methods and procedures to be applied:	The electricity supplied to the grid is hourly measured and monthly recorded. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup.
QA/QC procedures to be applied:	Invoices of electricity sold to the grid operator will be used for double check (see Section 7.2 for details).
Any comment:	

Data / Parameter:	Surface Area
Data unit:	m ²
Description:	Surface area at full reservoir level
Source of data to be used:	Measured by Design and Investigation Institute of Water Conservancy and Hydropower of Kunming University of Science and Technology
Value of data applied for the purpose of calculating expected emission reductions in section B.5	8,820 m ²
Description of measurement methods and procedures to be applied:	The surface area was monitored on 20/08/2008 based on topographical data and the height of the dam. Although the surface area deviates with the description in the registered PDD, the power density of this project is still greater than 10 W/m ² . Consequently, the project emission remains zero.
QA/QC procedures to be applied:	
Any comment:	The data measured by professional design institute is reliable and creditable.

B.3. Monitoring Organization and Training

The authority and responsibility for monitoring, reviewing, reporting and recording of data is in compliance with the description in registered PDD. The CDM and Monitoring training session corresponding to the monitoring plan in PDD was conducted on 20/08/2008.

Table 2. Responsible personnel for monitoring

Position	Responsibility	Name
CDM Manager	<ol style="list-style-type: none"> 1. CDM Monitoring team Management 2. CDM Monitoring plan implement 3. Audit the monitoring data report from technical principal and sign it. 4. Cooperate with buyer and CDM consultant for monitoring plan implement. 	Mr.Bingwei Lin Mr.Shimao Lai

Technical principal	<ol style="list-style-type: none"> 1. Manage equipments in plant. 2. Manage data collectors, 3. Confirm Monitor data. 	Mr.Rongming Hu Mr.Shunbo Zhang Mr.Zhili Yang
Financial principal	<ol style="list-style-type: none"> 1. Cost management for monitoring activity. 2. Financial work for CER trading. 	Mr.Zhaomin Wu
Data collector	<ol style="list-style-type: none"> 1. Record meters reading. <ol style="list-style-type: none"> 1) Record meters reading every hour. 2) Make 3 shifts for 24-hour data recording. 3) Report to technical principal when malfunction occurs to meters. 2. Equipments maintenance. <ol style="list-style-type: none"> 1) Examine the equipments 20 minute before shift turning to check problems. 3. Manage Digital Control System (DCS) <ol style="list-style-type: none"> 1) Monitor electronic data on DCS. 2) Record electronic data every hour. 3) Import monitoring data (.xls) of the previous day every day. 4) Report to technical principal when malfunction occurs to DCS. 	Team leaders: Mrs.Xinmei Li Mr.Mingrong Ou Mr.Fan Li Team members: Mr.Liceng Cai Mr.Jingyun Yang Mr.Xingcheng Zhe Mr.Yuzhen Qiao Mr.Rong Li Mr.Wensan San Mr.Guocai Li Mr.Yinglu Xiong Mr.Guizhen Ma Mr.Xuexing Fang Mr.Wenzhong Zhu
Data manager	<ol style="list-style-type: none"> 1. Data management. <ol style="list-style-type: none"> 1) Manage daily data of DCS. 2) Manage daily data of meters. 2. Store daily data in hard and soft copies. 3. Store monthly data and monthly report in hard and soft copies 4. Keep the data stored in the whole crediting period and 2 years after. 5 Submit the data to DOE in verification. 	Mr.Rongming Hu Mr.Shunbo Zhang Mr.Zhili Yang

B.4. Monitoring activities

All meters installed on site are compliance with the description in the registered PDD, including accuracy, type and installation criteria and process. For conservative purpose, the reading of Master Meter is used for calculating the emission reductions. The actual electric system on site and the location where the master meter is installed are presented in the Annex 1.

B.5. Quality Assurance and Quality Control

The Master Meter which is used for emission reduction calculation and the Backup Meter were calibrated and sealed on 11/03/2009

and 12/03/2009 respectively. The value metered by Backup Meter at the output side of the transformer of project plants will be used as a plausibility check of the value metered by the grid company. The Master Meter and Backup Meter will be calibrated at least once a year by an officially accredited entity in accordance with relevant national standards and sectoral regulations. And all the calibration records are documented and archived by the project owner for DOE's verification.

B.6. Data storage and Archiving

All the data monitored is stored and archived in accordance with the description in the registered PDD. The monitored data will be presented to the verification agency or DOE.

B.7. Monitoring report

After the project registered, the project participant should submit monitoring report to DOE for verification annually. The contents of the monitoring report include net power output, the report of the emission reduction and the record of meters calibration and maintaining.

Section C Monitoring Activity

C.1. Monitoring instruments and installation requirements

All the meters installed on site were installed according to the China national standard "electricity meter installation technical management code" (DL/T448-2000). The Master Meter which is used for emission reduction calculation and the Backup Meter are calibrated by YNIMMT, one of the qualified institutes in China. The detail of the meter and the calibration certificate are listed in Annex 2 and the table below respectively:

Table 3 Detail of master meter installed.

Meter Description	Meter type	Serial Number	Date of calibration	calibration frequency	Manufacturer
Master Meter	DTSD341 (0.5S)	20070780110150	11/03/2009	1 year	CHANGSHA WEISHENG ELECTRONIC S CO.,LTD
Backup Meter	DTSD341 (0.2S)	20071025020024	12/03/2009	1 year	CHANGSHA WEISHENG ELECTRONIC S CO.,LTD

C.2. Data Collection

All data are collected from master meter and recorded in accordance with the description in registered PDD.

EG_y was automatically computed in an Excel spreadsheet by Technical Principal.

C.3. Calibration

The calibrations of the meters were made as indicated in the table above.

C.4. Data management

The monitoring data are monitored continuously and stored in both electric copy and hard copy. Based on daily monitoring data, the monthly monitoring reports were compiled carefully. The CDM manager made signatures on the paper version of the monthly monitoring data report. These monitoring data are reserved and will be kept throughout the 10 years crediting period and the following two years.

C.5. Monitoring result

The parameters, electricity generated and self consumed electricity are measured by the master meter and listed in the table below.

Table 5 Monitoring result.

Date	Electricity Generated (Mwh)	Self-Consumed Electricity (Mwh)	Electricity Supplied (Mwh) (Measured)	Emission Factor (tCO ₂ /Mwh)	Baseline Emission (tCO ₂)
	a	b	c=a-b	d	e=d*c
May 2009	6,552	0	6,552	0.8434 (The emission factor of the grid was calculated ex-ante in PDD and the values was proved by the value published by National Development and Reform Committee on 09/08/2007 ¹)	74,180
Jun 2009	13,072	0	13,072		
Jul 2009	14,334	0.88	14,333		
Aug 2009	15,308	0	15,308		
Sep 2009	14,306	0	14,306		
Oct 2009	12,756	1.76	12,756		
Nov 2009	8,733	0	8,733		
Dec 2009	2,895	0	2,893		
Total	87,957	2.64	87,954		

¹ <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1364.pdf>

C.6. Emission reduction calculation

The emission reduction, ER_y by the project activity during a given year y is the difference between the baseline emission (BE_y) and project emission (PE_y), as follows:

Baseline Emission

$$BE_y = EG_y \times EF_{CO_2,y} = 87,954 \times 0.8434 = 74,180 \text{ tCO}_2\text{e/a}$$

Project Emission

Because there is no auxiliary fuel consumed in project activity and the power density is greater than 10W/m^2 , and according to methodology ACM0002, there is no project emission of this project.

$$PE_y = 0$$

Leakage

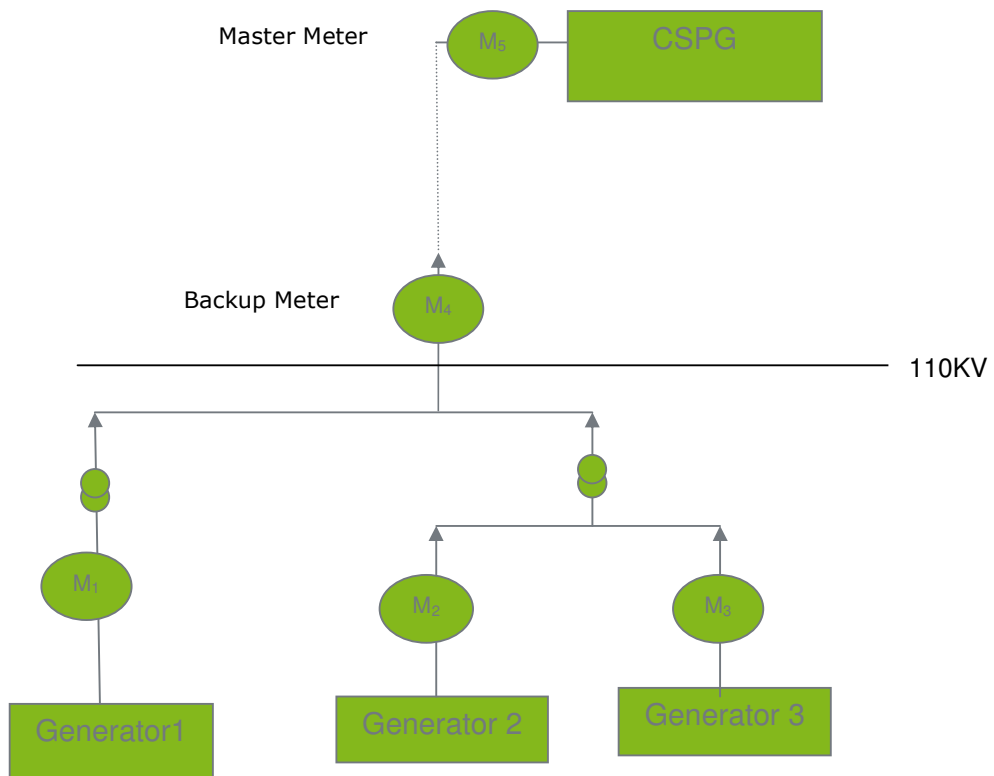
According to methodology ACM0002, leakage for this project is not considered.

$$L_y = 0$$

Emission reduction

$$ER_y = BE_y - PE_y - L_y = BE_y - 0 - 0 = 74,180 \text{ tCO}_2\text{e/a}$$

Annex 1: Diagram of the monitoring system



Annex 2: Meter Calibration Certificate

		云南省计量测试技术研究院	
检 定 证 书			
证书编号:		2009ZXDqt-00157 号	
送 检 单 位	泸水县泉德水电开发有限公司怒江电网称杆开关站		
计 量 器 具 名 称	三相多功能电子电能表		
型 号 / 规 格	DTSD341 (有功0.5S级, 无功2.0级)		
出 厂 编 号	20070780110150		
制 造 单 位	长沙威胜电子有限公司		
检 定 依 据	JJG 596-1999《电子式电能表检定规程》		
检 定 结 论	合格		
(检定专用章)		批 准 人	朱自科
		核 验 员	廖生
		检 定 员	何洪伟
			
检定日期		2009 年	3 月 11 日
有效期至		2010 年	3 月 10 日
计量检定机构授权证书号: (国) 法计 (2007) 01035号			
地址: 中国云南 昆明市滇池路566号			
传真: 0871-4601600			
电话: 0871-4601566			
邮编: 650228			
EMAIL: ynjlbgs@126.com			
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云南省计量测试技术研究院

证书编号: 2009ZXDqt-00157

检定所使用的计量(基)标准

名称	出厂编号	测量范围	不确定度或准确度		证书编号	有效期至
			等级或最大	允许误差		
三相电能表装置校验仪	2003165	3×(0~1000)V; 3×(0~100)A	0.02级		2009ZXDsn-000 03	2010-01-07

溯源性: 本次检定使用的计量标准均可溯源到国家计量基准;
本院所出具的数据均可溯源到国家计量基准和国家法定计量单位。

检定环境条件:

地点: 怒江电网称杆开关站

环境温度: 20.6℃

相对湿度: 46%

其他:

- 注: 1. 本证书封面未加盖“云南省计量测试技术研究院检定专用章”无效;
2. 未经本院书面批准, 不得复制(全文复制除外)本证书;
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检定结果 RESULTS OF VERIFICATION

证书编号: 2009ZXDqt-00157

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Certification No.

Record No.

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基本误差测量 1:有功 0.5S 级

平衡负载时三相电能检定误差

量 程	功率因数	负载电流	相对误差 (%)
三相四线 3×57.7/100V 3×1.5 (6) A	$\cos \phi = 1.0$	I_{\max}	-0.10
		I_s	-0.15
		0.5 I_s	-0.10
		0.1 I_s	-0.10
	$\cos \phi = 0.5L$	I_{\max}	-0.05
		I_s	-0.05
		0.5 I_s	+0.05
		0.1 I_s	-0.05
	$\cos \phi = 0.8C$	I_{\max}	-0.20
		I_s	-0.20
		0.5 I_s	-0.20
		0.1 I_s	-0.10

不平衡负载时三相电能检定误差

量 程	相别	功率因数	负载电流	相对误差 (%)
3×57.7/100V 3×1.5 (6) A	A	$\cos \phi = 1.0$	I_s	-0.20
			0.1 I_s	-0.15
		$\cos \phi = 0.5L$	I_s	0.00
			0.2 I_s	-0.15
	B	$\cos \phi = 1.0$	I_s	-0.15
			0.1 I_s	-0.15
		$\cos \phi = 0.5L$	I_s	-0.05
			0.2 I_s	-0.15
	C	$\cos \phi = 1.0$	I_s	-0.05
			0.1 I_s	-0.15
		$\cos \phi = 0.5L$	I_s	-0.15
			0.2 I_s	-0.10

标准偏差估计值:

相线	量程	负载电流	功率因数	S (%)
三相四线	3×57.7/100V	I_s	1.0	0.002
	3×1.5 (6) A		0.5 L	0.002

检定结果 RESULTS OF VERIFICATION

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基本误差测量 2: 无功 2.0 级

平衡负载时三相电能检定误差

量 程	功率因数	负载电流	相对误差 (%)
三相四线 3×57.7/100V 3×1.5 (6) A	sin φ=1.0	I_{max}	-0.2
		I_b	-0.2
		0.5 I_b	-0.2
		0.1 I_b	+0.2
	sin φ=0.5L	I_{max}	0.0
		I_b	-0.2
		0.5 I_b	-0.2
		0.1 I_b	0.0

不平衡负载时三相电能检定误差

量 程	相别	功率因数	负载电流	相对误差 (%)
3×57.7/100V 3×1.5 (6) A	A	sin φ=1.0	I_b	+0.2
			0.1 I_b	+0.2
		sin φ=0.5 L	I_b	+0.2
			0.2 I_b	0.0
	B	sin φ=1.0	I_b	0.0
			0.1 I_b	0.0
		sin φ=0.5 L	I_b	-0.2
			0.2 I_b	-0.2
	C	sin φ=1.0	I_b	+0.2
			0.1 I_b	+0.2
		sin φ=0.5 L	I_b	0.0
			0.2 I_b	0.0

标准偏差估计值:

相线	量程	负载电流	功率因数	S (%)
三相四线	3×57.7/100V	I_b	1.0	0.005
	3×1.5 (6) A		0.5 L	0.004

直观及通电检查: 合格

启动和潜动试验: 合格

常数校验试验: 合格

检定结论: 有功 0.5S 级合格, 无功 2.0 级合格。



云南省计量测试技术研究院

检定证书

证书编号: 2009ZXDqt-00282 号

送检单位 泸水县泉德水电开发有限公司堵堵洛二级水电站

计量器具名称 三相多功能电能表

型号/规格 DTS0341 (有功0.2S级, 无功1.0级)

出厂编号 20071025020024

制造单位 长沙威胜电子有限公司

检定依据 JJG 596-1999《电子式电能表检定规程》

检定结论 有功降为0.5S级合格

(检定专用章)

批准人 朱自科

核验员 廖志

检定员 何洪伟



检定日期 2009 年 3 月 12 日

有效期至 2010 年 3 月 11 日

计量检定机构授权证书号: (国)法计(2007)01035号
地址: 中国云南 昆明市滇池路566号
传真: 0871-4601600

电话: 0871-4601566
邮编: 650228
EMAIL: ynjibgs@126.com

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云南省计量测试技术研究院

证书编号: 2009ZXDqt-00282

检定所使用的计量(基)标准

名 称	出厂编号	测量范围	不确定度或准确度	证书编号	有效期至
			等级或最大 允许误差		
三相电能表装 置校验仪	2003165	3×(0~1000)V; 3×(0~100)A	0.02级	2009ZXDsn-000 03	2010-01-07

溯源性: 本次检定使用的计量标准均可溯源到国家计量基准;
本院所出具的数据均可溯源到国家计量基准和国家法定计量单位。

检定环境条件:

地点: 泸水县泉德水电开发有限公司堵堵洛二级水电

环境温度: 20.0℃

相对湿度: 48%

其他:

- 注: 1. 本证书封面未加盖“云南省计量测试技术研究院检定专用章”无效;
2. 未经本院书面批准, 不得复制(全文复制除外)本证书;
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检定结果

RESULTS OF VERIFICATION

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基本误差测量 1: 有功 0.5S 级

平衡负载时三相电能检定误差

量 程	功率因数	负载电流	相对误差 (%)
三相四线 3×57.7/100V 3×1.5 (6) A	cos φ=1.0	I_{max}	-0.10
		I_b	-0.10
		0.5 I_b	-0.25
		0.1 I_b	-0.10
	cos φ=0.5L	I_{max}	-0.15
		I_b	-0.15
		0.5 I_b	-0.30
		0.1 I_b	-0.25
	cos φ=0.8C	I_{max}	-0.05
		I_b	-0.10
		0.5 I_b	-0.25
		0.1 I_b	-0.05

不平衡负载时三相电能检定误差

量 程	相别	功率因数	负载电流	相对误差 (%)
3×57.7/100V 3×1.5 (6) A	A	cos φ=1.0	I_b	-0.10
			0.1 I_b	-0.25
		cos φ=0.5 L	I_b	-0.20
			0.2 I_b	-0.30
	B	cos φ=1.0	I_b	-0.10
			0.1 I_b	-0.25
		cos φ=0.5 L	I_b	-0.25
			0.2 I_b	-0.30
	C	cos φ=1.0	I_b	-0.05
			0.1 I_b	-0.25
		cos φ=0.5 L	I_b	-0.15
			0.2 I_b	-0.30

标准偏差估计值:

相线	量程	负载电流	功率因数	S (%)
三相四线	3×57.7/100V	I_b	1.0	0.003
	3×1.5(6)A		0.5 L	0.001

检定结果 RESULTS OF VERIFICATION

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基本误差测量 2: 无功 1.0 级

平衡负载时三相电能检定误差

量 程	功率因数	负载电流	相对误差 (%)
三相四线 3×57.7/100V 3×1.5 (6) A	sin φ=1.0	I_{max}	-0.1
		I_b	-0.1
		0.5I _b	-0.2
		0.1I _b	0.0
	sin φ=0.5L	I_{max}	0.0
		I_b	-0.1
		0.5I _b	-0.2
		0.1I _b	0.0

不平衡负载时三相电能检定误差

量 程	相别	功率因数	负载电流	相对误差 (%)
3×57.7/100V 3×1.5 (6) A	A	sin φ=1.0	I_b	0.0
			0.1I _b	-0.2
		sin φ=0.5 L	I_b	-0.1
			0.2I _b	-0.2
	B	sin φ=1.0	I_b	-0.1
			0.1I _b	-0.2
		sin φ=0.5 L	I_b	0.0
			0.2I _b	-0.2
	C	sin φ=1.0	I_b	-0.1
			0.1I _b	-0.2
		sin φ=0.5 L	I_b	0.0
			0.2I _b	-0.2

标准偏差估计值:

相线	量 程	负载电流	功率因数	S (%)
三相四线	3×57.7/100V	I_b	1.0	0.002
	3×1.5 (6) A		0.5 L	0.001

直观及通电检查: 合格 启动和潜动试验: 合格

常数校验试验: 合格

检定结论: 有功降为 0.5S 级合格, 无功 1.0 级合格。