# VERIFICATION AND CERTIFICATION REPORT

## CHENGDE HONGSONG WIND FARM PROJECT

### VOLUNTARY CARBON UNIT VERIFICATION

MONITORING AND REPORTING PERIOD:
SEPTEMBER 1, 2006 - DECEMBER 31, 2006

REPORT NO. 2007-0272
REVISION NO. 01

DET NORSKE VERITAS

DET NORSKE VERITAS

# VERIFICATION AND CERTIFICATION REPORT

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Summary:

Det Norske Veritas Certification Ltd. (DNV) has been contracted by Carbon Resource Management Ltd. to carry out verification of emission reductions generated by the "Chengde Hongsong Wind Farm Project" in Chengde City, Hebei Province, China for the period September 1, 2006 - December 31, 2006.

In our opinion, the project's reported GHG emission reductions for the period from September 1, 2006 - December 31, 2006, as reported in the operational records from the project assessed during interview and subsequent operational records submitted in the period after the interview, are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology (ACM0002, version 06) , the monitoring plan and the Project Design Document. As a consequence, Det Norske Veritas Certification Ltd. is able to verify that the emission reductions from the project during the period September 1, 2006 - December 31, 2006 amount to 37 873 tonnes of $CO_2$ equivalent.

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|---|---|---|
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| Report title:<br>Chengde Hongsong Wind Farm Project<br>VCU certification | | |
| Work carried out by:<br>Mindy (Ming) Yue | | |
| Work verified by:<br>Einar Telnes | | |
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**Indexing terms**

| | |
|---|---|
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Appendix A Verification Checklist

## *Abbreviations*

| | |
|---|---|
| CAR | Corrective Action Request |
| CDM | Clean Development Mechanism |
| CEF | Carbon Emission Factor |
| CER | Certified Emission Reduction(s) |
| $CO_2$ | Carbon dioxide |
| $CO_2e$ | Carbon dioxide equivalent |
| DNV | Det Norske Veritas |
| DNA | Designated National Authority |
| DOE | Designated Operational Entity |
| FAR | Forward Action Request |
| GHG | Greenhouse gas(es) |
| IPCC | Intergovernmental Panel on Climate Change |
| MP | Monitoring Plan |
| NCPG | North China power grid |
| NGO | Non-governmental Organisation |
| ODA | Official Development Assistance |
| PDD | Project Design Document |
| UNFCCC | United Nations Framework Convention for Climate Change |
| VCUs | Voluntary Carbon Units |
| GWP | Global Warming Potential |

# 1 INTRODUCTION

Det Norske Veritas Certification Ltd. has been engaged by Carbon Resource Management Ltd. to verify the greenhouse gas (GHG) emission reductions reported as Voluntary Carbon Units (VCUs) for the Chengde Hongsong Wind Farm Project, for the period from September 1, 2006 to December 31, 2006, reported as 37 873 tonnes of $CO_2$ equivalent.

The project has applied the approved CDM baseline and monitoring methodologies ACM0002, version 06, and emissions reductions are reported in the monitoring and operational records from the reporting period. The verification is based on the requirements in ACM0002 version 06. This report contains the findings from this verification assignment and a certification statement for the VCUs.

The verification team consisted of the following personnel:

| | | |
|---|---|---|
| Mindy (Ming) Yue | DNV Beijing | CDM Verifier |
| Einar Telnes | DNV Oslo | Technical Reviewer |

## 1.1 Objective

Det Norske Veritas Certification Ltd. has been engaged by Carbon Resource Management Ltd. to verify the greenhouse gas (GHG) emission reductions reported from the "Chengde Hongsong Wind Farm Project". The draft Voluntary Carbon Standard (VCS) version 2 of October 2006 /6/ was used as criteria for this verification.

The verification is the periodic independent review and *ex post* determination by a Certification Entity / Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the project activity complying with defined criteria during a defined verification period.

## 1.2 Scope

The verification scope is:

- to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan,
- to evaluate the GHG emission reduction data and express a conclusion with a high level of assurance about whether the reported GHG emission reduction data is free from material misstatement,
- to verify that the reported GHG emission data is sufficiently supported by evidence, i.e. monitoring records.

The verification shall ensure that reported emission reductions are complete and accurate in order to be verified.

The verification team has, based on the recommendations in the Validation and Verification Manual /12/, employed a risk-based approach, focusing on the identification of significant reporting risks.

## 1.3 Description of the Project Activity

| | |
|---|---|
| Title of project activity: | *Chengde Hongsong Wind Farm project* |
| Project Participants: | *Hebei Hong-Song Wind Power Share Holding Ltd.* |
| | *Carbon Resource Management Ltd.* |
| Location of the project activity: | *The project is located in Chengde City, Hebei Province, China* |

The project consists of the construction and operation of a wind park located in Chengde City, Hebei Province, China. The project comprises of 78 wind turbines with a nominal capacity of 600 KW and 6 wind turbines with a nominal capacity of 750 KW, providing a total capacity of 51.3 MW. The estimated annual net generation is around 110 000 MWh.

The power generated by using wind power resources is connected to the North China power grid (NCPG) on the basis of a power purchase agreement. The project thereby displaces the equivalent amount of electricity generated by the current energy mix in NCPG.

The project boundary is defined as the site of the project activity and the NCPG. The baseline is defined as the electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources.

The electricity supplied to the grid is measured through the electricity meters both at the Chengde Hongsong wind farm and at the Shanwanzi substation.

The first wind turbine of the wind farm was commissioned in September 2004, the last wind turbine started operation on 12 May 2006, when all the wind turbines were put into operation for power generation. The Chengde Hongsong Wind Farm Project has not applied for registration as a CDM project. The VCU verification of the project acknowledges a single crediting period of 10 years, commencing from January 1, 2005. This verification report relates to the second monitoring period from September 1, 2006 to December 31, 2006. The total net electricity supplied to the grid amounts 39 783 MWh in the period of September 1, 2006 – December 31, 2006. The grid emission factor is calculated *ex-ante to be 0.952 $tCO_2e/MWh$.* The emission reductions reported from the project for the period from September 1, 2006 to December 31, 2006 equate to 37 873 tonnes of $CO_2$ equivalent.

# 2 METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. The DNV team has for this assignment decided to check all factors and issues with the same emphasis, but has also during its preparations identified the key reporting risks and used the assessment to determine to which extent the project operator's control systems were adequate for mitigation of these key reporting risks. In addition, other areas that can have an impact on reported emission reductions have also undergone detailed audit testing. All electricity generation records have been examined and verified for the reporting period.

The verification process was guided by a verification checklist, which aims to ensure a transparent verification process. This documents in detail how the factors contributing to emission reductions have been verified and how the verification findings have been reached.

**Duration of verification**

| | |
|---|---|
| Preparations: | *February 12, 2007* |
| Interview: | *February 12, 2007* |
| Verification of subsequent records: | *February 12-13, 2007* |
| Reporting*:* | *February 18, 2007* |

## 2.1 Review of Documentation

The basis for the verification has been the monitoring report from the project developer for the period September 1, 2006 to December 31, 2006, dated 12 February 2007 /1/, monitoring records for the period September 1, 2006 to December 31, 2006 /2/, invoices of electricity sales and purchases for the period September 1, 2006 to December 31, 2006 /3/, the latest version of the project design document (PDD version 1.2 dated 21 December 2006 /4/, and the approved baseline and monitoring methodology for the project ACM0002, version 06 /7/. The verification team have also assessed the operational records, calibration records of the electricity meters, the working requirements for the operation staff and training records of the operation staff.

## 2.2 Site Visit

A site audit was performed at Hebei Hong-Song Wind Power Share Holding Ltd. on December 7- 8, 2006, when it was the first verification for the emission reductions during the period of January 1, 2005 to August 31, 2006. For the second verification, the project owner provided all necessary documents for the verification, therefore only an interview was performed.

The following personnel were interviewed or assisted the verification team:

| Name | Organization |
|---|---|
| Mr. Shi Xiangfeng<br>Project Manager | Carbon Resource Management |
| Mr. He Zhiyuan<br>Project manager of planning division | Hebei Hong-Song Wind Power Share Holding Ltd. |

# 3 VERIFICATION FINDINGS

Findings established during the verification may be that:

i) the verification is not able to obtain sufficient evidence for the reported emission reductions or part of the reported emission reductions. In this case these emission reductions shall not be verified;

ii) the verification has identified material misstatements in the reported emission reductions. Emission reductions with material misstatements shall be discounted based on the verifier's ex-post determination of the achieved emission reductions.

A forward action requests (FAR) may be issued, where:

- the actual project monitoring and reporting practices requires attention and /or adjustment for the next consecutive verification period, or
- an adjustment of the monitoring plan is recommended.

In the context of FARs, risks may be identified, which may endanger the delivery of emission reductions in the future, i.e. by deviations from good reporting or management procedures. As a consequence, such aspects should receive a special focus during the next verification.

## 3.1 Assessment

The data presented in the monitoring report and monitoring and operational records for the entire verification period were assessed in detail by review of detailed project documentation and production records, interviews with personnel at Hebei Hong-Song Wind Power Share Holding Ltd., collection of measurements, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. This has enabled the verification team to assess the accuracy and completeness of reported monitoring results and verify the correct application of the approved monitoring methodology. Data from other sources, such as the grid emission factor, have also been assessed.

Following the interview and submission of additional information, monitoring and operational records for the entire verification period were assessed in the period September 1, 2006 to December 31, 2006. Reconsolidation of all reported data was performed, based on a final assessment of monitoring and operational records from the period subsequent to the audit.

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### 3.1.1 Factors used for project emission reduction calculations

All reported factors required by the monitoring methodology ACM0002 version 06, the parameters required for monitoring in the PDD as well as necessary management system issues were also assessed during the interview. This included the following:

### 3.1.2 Grid emission factor

Grid emission factor is calculated correctly on the basis of the approved monitoring methodology ACM0002 version 06, which is determined *ex-ante* to be 0.952 $tCO_2e/MWh$.

### 3.1.3 Monitored data for project emissions within the project boundary

For the wind power project, project emissions are zero.

### 3.1.4 Monitored data for baseline emissions

**1. Net electricity supplied to the grid:**

The net electricity supplied to the grid, which is used for emission reductions calculation, is assessed through monitoring and operational data for the days applicable in the monitoring/reporting period. These data are recorded from the measurement of electricity meters both at the Hongsong wind farm and at the Shanwanzi substation. And the data have been crosschecked with invoices of electricity sales. The data reported are found to be correct.

### 3.1.5 Monitored data for leakage

Project participants do not need to consider these emission sources as leakage in applying ACM0002.

## 3.2 Project Implementation

The project is implemented and has been in operation since September 2004, when the first wind turbine started to operate. The last wind turbine started operation on 12 May 2006, when all the wind turbines were put into operation for electricity generation.

## 3.3 Completeness of Monitoring

The monitoring of the project is complete and in accordance with the approved monitoring methodology. The monitoring methodologies and sustaining records were sufficient to enable verification of emission reductions.

## 3.4 Accuracy of Emission Reduction Calculations

For all factors where uncertainty occurs, the project operator has reported conservative values.

The accuracy of reported emission reductions fulfils the methodology criteria.

## 3.5 Quality of Evidence to Determine Emission Reductions

All necessary documentation is collected, referenced and aggregated and is easily accessible in hard-copy or electronic format. Measurements are performed by calibrated equipment, and the key data can also be cross-checked via other sources, such as sales and inventory data. No assumptions are used that have any material influence on reported emission reductions.

## 3.6 Management System and Quality Assurance

The Hebei Hong-Song Wind Power Share Holding Ltd. has applied its management system to the wind source for power generation process.

## 3.7 Additionality

The additionality of the project has been established using the "*Tool for the demonstration and assessment of additionality*" approved by the CDM-EB during the first verification of the project.

# 4 CERTIFICATION STATEMENT

**Introduction**

DNV Certification Ltd. has been engaged by Carbon Resource Management Ltd. to verify the greenhouse gas (GHG) emission reductions reported as Voluntary Carbon Units (VCUs) for the "Chengde Hongsong Wind Farm Project" for the period from September 1, 2006 to December 31, 2006, claimed as 37 873 tonnes of $CO_2$ equivalent.

The project has applied the approved CDM baseline and monitoring methodology ACM0002, version 06, and emissions reductions are reported in the monitoring and operational records from the reporting period. The verification is based on the requirements in ACM0002 version 06.

**Responsibilities of Carbon Resource Management Ltd. and DNV Certification Ltd.**

The management of the project is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions on the basis set out within the CDM project design document presented for registration. The development and maintenance of records and reporting procedures in accordance with the approved monitoring methodology ACM0002 version 06, including the calculation and determination of GHG emission reductions from the project, is the responsibility of the management of the Chengde Hongsong Wind Farm Project.

It is DNV's responsibility to express an independent verification statement on the reported GHG emission reductions from the project for the period from September 1, 2006 to December 31, 2006 based on the verified emissions reductions for the same period and the project's compliance with the approved baseline and monitoring methodology ACM0002 version 06 as well as the Voluntary Carbon Standard.

**Basis of GHG verification opinion**

Our verification approach was based on the requirements as defined under the Kyoto Protocol, the CDM modalities and procedures, as well as those defined by the CDM Executive Board and by the baseline and monitoring methodology ACM0002 version 06, as well as complementary criteria embedded in the VCS draft version, October 2006.

Our verification approach draws on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. Our examination includes assessment of evidence relevant to the amounts and disclosures in relation to the project's GHG emission reductions for the period from September 1, 2006 to December 31, 2006.

We planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that the amount of GHG emission reductions for the period from September 1, 2006 to December 31, 2006 are fairly stated and are additional to what would otherwise have occurred.

We conducted our verification on the basis of the monitoring methodology ACM0002 version 06, and the monitoring plan included in the PDD of the project. The verification included:

- collection of evidence supporting the reported data,
- checking whether the provisions of the monitoring methodology ACM0002 version 06, and the monitoring plan in the PDD were consistently and appropriately applied.

We have verified whether the information included in the monitoring and operational records for the project in the stated period is correct and that the emissions reductions achieved have been determined correctly.

***Certification Statement***

*In our opinion, the GHG emission reductions reported from the "Chengde Hongsong Wind Farm Project Wind Farm Project" for the period from September 1, 2006 to December 31, 2006 are fairly stated and additional to what would otherwise have occurred.*

*The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology (ACM0002 version 06) and the monitoring plan contained in the PDD.*

*Hence, Det Norske Veritas Certification Ltd. is able to certify that the reported emission reductions from the project during the period September 1, 2006 to December 31, 2006 amount to 37 873 (thirty seven thousand eight hundred and seventy three) tonnes of $CO_2$ equivalent.*

| | |
|---|---|
| Beijing, 18-02-2007 | Oslo, 18-02-2007 |
| Mindy Yue | Einar Telnes |
| CDM validator | Director |

# 5 REFERENCES

*Documents provided by the project participants that relate directly to the project:*

/1/ Monitoring Report, Volume 2: Chengde Hongsong Wind Farm Project, for the period September 1, 2006 to December 31, 2006, dated 12 February 2007.

/2/ Monitoring Records: Chengde Hongsong Wind Farm Project, September 1, 2006 to December 31, 2006.

/3/ Invoices of electricity sales and purchases, September 1, 2006 to December 31, 2006.

/4/ CDM Project Design Document: Chengde Hongsong Wind Farm Project, version 1.2 of 21 December 2006.

/5/ Additional data: CDM Project Spreadsheet.

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

/6/ Voluntary Carbon Standard, Draft version 2, October 2006.

/7/ Approved Monitoring methodology ACM0002, version 06, May 19, 2005.

/8/ Production Reports (daily), September 1, 2006 to December 31, 2006.

/9/ Calibration Certificates for electricity meters.

/10/ Working requirements for the operation staff.

/11/ Training records of the operation staff.

/12/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. http://www.vvmanual.info.

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# APPENDIX

## VERIFICATION CHECKLIST

## Table 1: Data Management System/Controls

The project operator's data management system/controls are assessed to identify reporting risks and to assess the data management system's/control's ability to mitigate reporting risks.

The GHG data management system/controls are assessed against the expectations detailed in the table. A score is assigned as follows:

- Full - all best-practice expectations are implemented.
- Partial - a proportion of the best practice expectations is implemented
- Limited - this should be given if little or none of the system component is in place.

| Expectations for GHG data management system/controls | Score | Verifiers Comments (including *Forward Action Requests*) |
|---|---|---|
| ***A. Defined organisational structure, responsibilities and competencies*** | | |
| **A.1. Position and roles**<br>*Position and role of each person in the GHG data management process is clearly defined and implemented, from raw data generation to submission of the final data. Accountability of senior management must also be demonstrated.* | Full | It was defined in the management system documentation and well understood by the personnel. |
| **A.2. Responsibilities**<br>*Specific monitoring and reporting tasks and responsibilities are included in job descriptions or special instructions for employees.* | Full | Specific monitoring and reporting tasks are described in the relevant documented procedures. |
| **A.3. *Competencies needed***<br>*Competencies needed for each aspect of the GHG determination process are analysed. Personnel competencies are assessed and training programme implemented as required.* | Full | Competencies of the personnel in charge of monitoring and calculation process deem sufficient. |

| Expectations for GHG data management system/controls | Score | Verifiers Comments (including *Forward Action Requests*) |
|---|---|---|
| ***B. Conformance with monitoring plan*** | | |
| **B.1. Reporting procedures**<br>*Reporting procedures should reflect the monitoring plan content. Where deviations from the monitoring plan occur, the impact of this on the data is estimated and the reasons justified.* | Full | No deviation from the monitoring plan has been found. |
| **B.2. Necessary Changes**<br>*Necessary changes to the monitoring plan are identified and changes are integrated in local procedures as necessary.* | Full | No changes were identified to the monitoring plan. |
| ***C. Application of GHG determination methods*** | | |
| **C.1. Methods used**<br>*There are documented description of the methods used to determine GHG emissions and justification for the chosen methods. If applicable, procedures for capturing emissions from non-routine or exceptional events are in place and implemented.* | Full | Integral part of the methods used to determine GHG emissions are documented properly.<br>Electricity supplied to the grid was properly monitored and calculated in line with the procedure. |
| **C.2. Information/process flow**<br>*An information/process flow diagram, describing the entire process from raw data to reported totals is developed.* | Full | An information/process flow are defined and understood by the concerned personnel. |
| **C.3. Data transfer**<br>*Where data is transferred between or within systems/spreadsheets, the method of transfer (automatic/manual) is highlighted - automatic links/updates are implemented where possible. All assumptions and the references to original data sources are documented.* | Full | No mistake of data manual transfer has occurred. |
| **C.4. Data trails**<br>*Requirements for documented data trails are defined and implemented and all documentation are physically available.* | Full | All necessary raw/intermediate data is maintained properly.<br>Non-routine event has been recorded and maintained properly. |

| Expectations for GHG data management system/controls | Score | Verifiers Comments (including *Forward Action Requests*) |
|---|---|---|
| ***D. Identification and maintenance of key process parameters*** | | |
| **D.1. Identification of key parameters**<br>*The key physical process parameters that are critical for the determination of GHG emissions (e.g. meters, sampling methods) are identified.* | Full | The key physical parameters are identified. |
| **D.2. Calibration/maintenance**<br>*Appropriate calibration/maintenance requirements are determined.* | Full | Necessary calibration and/or maintenance for the measurement equipment have been conducted according to the documented procedures. |
| ***E. GHG Calculations*** | | |
| **E.1. Use of estimates and default data**<br>*Where estimates or default data are used, these are validated and periodically evaluated to ensure their ongoing appropriateness and accuracy, particularly following changes to circumstances, equipment etc. The validation and periodic evaluation of this is documented.* | Full | The estimates and default data deem to be appropriate. |
| **E.2. Guidance on checks and reviews**<br>*Guidance is provided on when, where and how checks and reviews are to be carried out, and what evidence needs to be documented. This includes spot checks by a second person not performing the calculations over manual data transfers, changes in assumptions and the overall reliability of the calculation processes.* | Full | No calculation and reporting error has been encountered thus checking and reviewing system deem effective. |
| **E.3. Internal verification**<br>*Internal verifications include the GHG data management systems, to ensure consistent application of calculation methods.* | Full | The data necessary for calculating GHG emissions and the calculation results have been archived properly. It is fully understood among the relevant personnel. |

| Expectations for GHG data management system/controls | Score | Verifiers Comments (including *Forward Action Requests*) |
|---|---|---|
| **E.4. Internal validation**<br>*Data reported from internal departments should be validated visibly (by signature or electronically) by an employee who is able to assess the accuracy and completeness of the data. Supporting information on the data limitations, problems should also be included in the data trail.* | Full | Data used for calculation do not include any mistake and the validation is deemed sufficient. |
| **E.5. Data protection measures**<br>*Data protection measures for databases/spreadsheets should be in place (access restrictions and editor rights).* | Full | Data protection and back-up procedures are defined and maintained properly. |
| **E.6. IT systems**<br>*IT systems used for GHG monitoring and reporting should be tested and documented.* | Full | Data collection and reporting system is securitised properly. |

Table 2: Detailed audit testing of risk areas and random testing

| **Areas of residual risks** | **Additional verification testing performed** | **Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)** |
|---|---|---|
| *List the residual areas of risks (Table 2 where detailed audit testing is necessary.*<br>*In addition, other material areas may be selected for detailed audit testing.* | *The additional verification testing performed is described. Testing may include:*<br>➢ *Sample cross checking of manual transfers of data*<br>➢ *Recalculation*<br>➢ *Spreadsheet 'walk through' to check links and equations*<br>➢ *Inspection of calibration and maintenance records for key equipment*<br>➢ *Check sampling analysis results*<br>➢ *Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.* | *Having investigated the residual risks, the conclusions should be noted here. Errors and uncertainties should be highlighted.*<br>*Errors and uncertainty can be due to a number of reasons:*<br>➢ *Calculation errors. These may be due to inaccurate manual transposition, use of inappropriate emission factors or assumptions etc.*<br>➢ *Lack of clarity in the monitoring plan. This could lead to inconsistent approaches to calculations or scope of reported data.*<br>➢ *Technological limitations. There may be inherent uncertainties (error bands) associated with the methods used to measure emissions e.g. use of particular equipment such as meters.*<br>➢ *Lack of source data. Data for some sources may not be cost effective or practical to collect. This may result in the use of default data which has been derived based on certain assumptions/conditions and which will therefore have varying applicability in different situations.* |
| - ID No. 1 (net electricity supplied to the grid)<br>➢ Accuracy of raw data<br>➢ Qualification of the monitoring personnel<br>➢ Record of unusual events<br>➢ Manual data transfer | - ID No. 1 (electricity supplied to the grid)<br>➢ Calibration and maintenance records of electricity meters have been verified and are OK.<br>➢ Training plan and records have been verified and are OK.<br>➢ Records of actions taken have been maintained properly. | No errors, uncertainties or areas of improvement or were identified. |

| Areas of residual risks | Additional verification testing performed | Conclusions and Areas Requiring Improvement (including *Forward Action Requests*) |
|---|---|---|
| | ➢ Review process verified and found OK. | |

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