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EcoSecurities Group plc

Initial and First Periodic Verification of the registered CDM project

Transalloys Manganese Alloy Smelter Energy Efficiency Project UNFCCC Reference No.1027

Report No. 1113899

October 6, 2008

TÜV SÜD Industrie Service GmbH
Carbon Management Service
Westendstr. 199 - 80686 Munich - GERMANY

Initial and First Periodic Verification of the CDM Project:

Transalloys Manganese Alloy Smelter Energy Efficiency Project, UNFCCC Reference No.1027

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Summary:

The certification body "Climate and Energy" of TÜV SÜD Industrie Service GmbH has been ordered by EcoSecurities Group plc to carry out the initial and the first periodic verification of the registered CDM project *Transalloys Manganese Alloy Smelter Energy Efficiency Project*, UNFCCC Reference No.1027, performed by *Highveld Steel and Vanadium Corporation Limited, South Africa.*

The verifier confirms that the project is implemented as planned and described in validated project design documents. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the project does generate GHG emission reductions.

The verifier can confirm that the GHG emission reduction for the whole monitoring period is calculated without material misstatements. Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and related to the valid and registered project baseline and monitoring, and its associated documents. Based on the information we have seen and evaluated we confirm the following statement:

Verified emission in the reporting period: October 1, 2004 to March 31, 2008

	Total
Baseline emissions	2.451.765 t CO_2
Project emissions	2.222.930 t CO_2
Leakage emission	0 t CO_2
Emission Reductions (before adjustment)	228.835 t CO_2
Emission Reductions (after adjustment)[1]	**223.073 t CO_2**

The verification team also determined some few areas of risks for the project in the context of the management / operation system and of quality assurance. Issues indicated as "Forward Action Request" should be submitted as indispensable information to the verification team of the next periodic verification.

Work carried out by:	Internal Quality Control by:
Thomas Kleiser (project manager) Robert Mitterwallner (GHG auditor) Cyprian Fusi (Trainee)	Javier Castro

[1] According to fixed value of Monitoring Plan for uncertainty of onsite emissions.

Abbreviations

Abbreviations that have been used in the report here:

CAR	Corrective Action Request
CDM	Clean Development Mechanism
DNA	Designated National Authority
ERU	Emission Reduction Unit
FAR	Forward Action Request
GHG	Greenhouse Gas
IETA	International Emission Trading Association
IVC	Initial Verification Checklist
JI	Joint Implementation
KP	Kyoto Protocol
MP	Monitoring Plan
MVP	Monitoring and Verification Protocol
PDD	Project Design Document
PVC	Periodical Verification Checklist
TÜV SÜD	TÜV SÜD Industrie Service GmbH
UNFCCC	UN Framework Convention on Climate Change
VVM	Validation and Verification Manual

Table of Contents

INTRODUCTION

Ecosecurities Group plc has commissioned an independent verification by TÜV Industrie Service GmbH (TÜV SÜD) of its registered CDM project *Transalloys Manganese Alloy Smelter Energy Efficiency Project*, UNFCCC Reference No.1027. The order includes the initial and first periodic verification of the project.

Verification is the periodic independent review and ex post determination by the Designated Operational Entity / Independent Entity of the monitored reductions in GHG emissions during the defined verification period.

This report summarizes the findings of the initial and first periodic verification. It is based on the Initial Verification Report Template Version 3.0, December 2003 and on the Periodic Verification Report Template Version 3.0, December 2003, both parts of the Validation and Verification Manual (VVM) published by International Emission Trading Association (IETA).

Initial and first periodic verification has been performed as one integrated activity. It consisted of a desk review of the project documents including PDD, monitoring plan, validation report, Monitoring Manual, draft monitoring report (October 2004 – March 2008) and further documentations.

The results of the validation were documented by DNV in the validation report: *Transalloys Manganese Alloy Smelter Energy Efficiency Project, South Africa*", report no. 2007-0068, rev. 2, dated 2007-08-29. This final validation report indicates no remaining issues.

The verification team consists of the following personnel:

Thomas Kleiser	TÜV SÜD, Munich	Project Manager
Robert Mitterwallner	TÜV SÜD, Munich	GHG Auditor
Cyprian Fusi	TÜV SÜD, Munich	Trainee

1.1 Objective

The objective of verification can be divided in Initial Verification and Periodic Verification:

- Initial Verification:

The objective of an initial verification is to verify that the project is implemented as planned, to confirm that the monitoring system is in place and fully functional, and to assure that the project will generate verifiable emission reductions. A separate initial verification prior to the project entering into regular operations is not a mandatory requirement.

- Periodic Verification:

The objective of the periodic verification is to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan; further more the periodic verification evaluates the GHG emission reduction data and express a conclusion with a high, but not absolute, level of assurance about whether the reported GHG emission reduction data is free of material misstatements; and verifies that the reported GHG emission data is sufficiently supported by evidence, i.e. monitoring records. If no prior initial verification has been carried out, the objective of the first periodic verification also includes the objectives of the initial verification.

The verification shall consider both quantitative and qualitative information on emission reductions. Quantitative data comprises the monitoring reports submitted to the verifier by the project entity. Qualitative data comprises information on internal management controls, calculation procedures, and procedures for transfer, frequency of emissions reports, review and internal audit of calculations/data transfers.

The verification is based on criteria set by UNFCCC, the Kyoto Protocol and the CDM modalities and procedures.

1.2 Scope

Verification scope is defined as an independent and objective review and ex post determination by the Designated Operational Entity of the monitored reductions in GHG emissions. The verification is based on the submitted monitoring report and the validated project design documents including its monitoring plan. The monitoring report and associated documents are 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 verification, focusing on the identification of significant risks of the project implementation and the generation of CERs.

The verification 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 monitoring activities.

The audit team has been provided with a Monitoring Report and underlying data records in May, 2008, covering the period October 2004 to March 2008 inclusive. This document serves as the basis for the assessment presented herewith. The first crediting period started October 1, 2004.

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

- Knowledge of Kyoto Protocol and the Marrakech Accords
- Environmental and Social Impact Assessment
- Quality assurance
- Technical aspects of energy generation
- Monitoring technologies and concepts
- Political, economical and technical 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”:

Thomas Kleiser is a lead auditor for CDM and JI projects at TÜV SÜD Industrie Service GmbH and head of CDM/JI division within TÜV SÜD. In this position he is responsible for the implementation of validation and certification processes for GHG mitigation projects. He has participated in more than 90 CDM and JI project assessments.

Robert Mitterwallner is a GHG-Auditor with a background as auditor for environmental management systems (according to ISO 14001), as expert in environmental permit procedures for industrial plants and as expert for environmental impact studies assessment. He is located at TUV SÜD Industrie Service in Munich since 1990. He has received training in the JI determination as well as CDM validation process and applied successfully as GHG Auditor for the

scopes energy industries, manufacturing industries, chemical industries, transport, mining/mineral production, metal production, solvent use and waste handling / disposal.

Cyprian Fusi, a Cameroonian by nationality, is a GHG Trainee in climate change projects at the "Carbon Management Service" in the head office of TÜV SÜD Industrie Service GmbH, Germany. He holds a Dipl.-Ing (M.Sc) degree in electrical engineering with a speciality in Radio Frequency / Microwave Engineering (RF/MW engineering). He has received training in the CDM validation and verification processes and has participated in several CDM project audits and workshops.

Responsibility for the internal quality control of the project was with the certification body "climate and energy".

1.3 GHG Project Description

The *Transalloys Manganese Alloy Smelter Energy Efficiency Project*, developed by Highveld Steel and Vanadium Corporation, is an industrial energy efficiency project that will reduce the electricity consumption in the production of silicomanganese (SiMn) alloy (a key component in steel making) at its Witbank facility in South Africa. The project involves a retrofit of current furnaces with new design of electric arc furnaces, electrode assemblies and new control and peripheral systems. The target is to reduce the specific electricity consumption of the alloy production by approximately 10-20% to between 4.5-4 MWh per tonne of alloy produced.

This will result in a reduction of the specific electricity consumption of approximately 0.4 MWh/ton. The project will thus displace electricity from the South African grid, which is mostly generated from coal combustion. The amounts of coal and coke used as reductants and paste (mostly made of carbon) used as electrodes in the submerged electric arc furnaces in the alloy production are not expected to be affected by the project. The project technology is now implemented in the furnaces No. 3, No. 5 and No. 7.

The project has been implemented completely as projected in the registered PDD. The registered PDD applies the methodology AM0038 version 01.

METHODOLOGY

Starting the initial verification the verifier's first task has been to familiarize with the project. Based on the received documents (see Annex 1) a verification checklist (VC) has been prepared, consisting of the Initial Verification Checklist (IVC) and the Periodic Verification Checklist (PVC) according to the VVM.

These combined checklists serve the following purposes:

- it organizes details of the audit procedure and clarifies the requirements the project is expected to meet; and
- it documents how a particular requirement has been validated and the result of the verification.

During the verification a special focus was given to:

- the correct implementation of the project (installations, monitoring equipment and procedures, quality assurance procedures)
- the correctness of assumptions with impacts on the monitoring and verification process (e.g. baseline assumptions)
- sustainable development and environmental performance parameters
- training programs
- allocation of responsibilities
- the day-to-day operation of the system
- After the document review the audit team conducted
- an on-site inspection
- interviews with the members of the owner, the operator and the CDM advisor in the office

The findings are the essential part of this verification report, which is based on the verification protocols of the VVM. Those protocols consist of four tables – one from the IVC, three from the PVC. The completed protocol is enclosed in Annex 1 and Annex 2 to this report. The structure of the tables is shown in the following:

Initial Verification Checklist – table 1			
OBJECTIVE	Ref.	COMMENTS	Concl. (incl FARs/CARs)
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	Description of circumstances and further conclusions.	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 Verification report. Forward Action Requests (FARs) indicate essential risks for further periodic verifications

Periodic Verification Checklist Table 1: Data Management System/Controls		
Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
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.	Description of circumstances and further commendation to the conclusion. 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 Verification report. The Initial Verification has additional Forward Action Requests (FAR). FAR indicates essential risks for further periodic verifications

Periodic Verification Checklist Table 2: GHG calculation procedures and management control testing		
Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
Identification of potential reporting risks based on an assessment of the emission estimation procedures. Identification of key source data. Focus on those risks that impact the accuracy, completeness and consistency of the reported data.	Identification of the key controls for each area with potential reporting risks. Assessment of adequacy of the key controls and eventually test that the key controls are actually in operation. Internal controls include, Understanding of responsibilities and roles, Reporting, reviewing and formal management approval of data; Procedures for ensuring data completeness, conformance with reporting guidelines, maintenance of data trails etc.	Identification of areas of residual risks, i.e. areas of potential reporting risks where there are no adequate management controls to mitigate potential reporting risks Areas where data accuracy, completeness and consistency could be improved are highlighted.

Periodic Verification Checklist Table 3: Detailed audit testing of residual risk areas and random testing		
Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including FARs)
List of residual areas of risks of Periodic Verification Checklist Table 2 where detailed audit testing is necessary. In addition, other material areas may be selected for detailed audit testing.	The additional verification testing performed is described. Testing may include: Sample cross checking of manual transfers of data Recalculation Spreadsheet 'walk through' to check links and equations Inspection of calibration and maintenance records for key equipment Check sampling analysis results Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.	Having investigated the residual risks, the conclusions are noted here. Errors and uncertainties are highlighted.

CARs were encountered during the verification process. Addressed CARs had been solved during verification process.

However, the verification team has defined FARs, whenever the current status requires a special focus on this item for the next consecutive verification.

All FARs have to be reported to the verification team of the next Periodic Verification, which has to take into account all such findings.

Monitoring Period: From October 1, 2004 to March 31, 2008

1.4 Review of Documentation and on the spot visit

The verification was performed as a desk review and an on the spot visit.

The document review included the assessment of

- Project documents including PDD,
- Validation report (results of the validation were documented by DNV in the validation report: *Transalloys Manganese Alloy Smelter Energy Efficiency Project, South Africa*, report no. 2007-0068, rev. 2, dated 2007-08-29. This final validation report indicates no remaining issues
- Applied methodology,
- Monitoring plan,
- Monitoring Manual,
- Monitoring report and further documentations.

The verification team conducted an on the spot visit in Mai 5 and 6, 2008 at the plant of Highveld Steel and Vanadium Corporation Limited in Witbank, South Africa.

1.5 Resolution of Corrective and Forward Action Requests

The objective of this phase of the verification was to resolve the requests for corrective actions and any other outstanding issues which needed to be clarified for TÜV SÜD`s positive conclusion on the GHG emission reduction calculation. Quality and accuracy of the data and documents presented during the on the spot visit were high. Corrections and clarification were requested since initial statements and sources were not clear or not correctly used. Finally all requested corrections and clarification could be resolved.

INITIAL VERIFICATION FINDINGS

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

The findings from the desk review of the final monitoring report and the findings from interviews during the follow-up visit are summarized. A more detailed record of these findings can be found in the Verification Protocol in annex 1.

Where TÜV SÜD had identified issues that needed clarification or that represented a risk to the fulfilment of the project objectives, a Corrective or Forward Action Request, respectively, have been issued. The Corrective and Forward Action Requests are stated, where applicable, in the following sections and are further documented in the Verification Protocol in annex 1.

In the context of Forward Action Requests, risks have been identified, which may endanger the delivery of high quality CERs in the future, i.e. by deviations from standard procedures as defined by the MP. As a consequence, such aspects should receive a special focus during the next consecutive verifications. A FAR may originate from lack of data sustaining claimed emission reductions. Forward Action Requests are understood as recommendation for future project monitoring; they are stated, where applicable, in the following sections and are further documented in the Verification Protocol in annex 1.

The final conclusions for verification subject are presented. The verification findings relate to the project implementation as documented and described in the final monitoring report.

One task of verification is to check the remaining issues from the previous validation or issues which are clearly defined for assessment in the PDD. The validation report, prepared by DNV, Norway, notes no open issues.

1.1 Project Implementation

1.1.1 Discussion

The scrutiny of a proper implementation of a project is a key issue of an Initial Verification, in order to have a climate change project ready for successful operation. The project is implemented at the production plant of Silicomanganese (SiMn) alloy undertaking the CDM project activity as described in the following:

Retrofitting has been done by Bateman (furnace 3) and Pyromet (furnace 5 and 7) as contracted by Transalloys as following:

- retrofitted Furnace 7 – Optimization of Pitch-Center-Diameter before October 2004
- retrofitted Furnace 5 – Optimization of Pitch-Center-Diameter before December 2005
- retrofitted Furnace 3 – Optimization of Pitch-Center-Diameter (Transalloys) and converting from rotating to stationary furnace and change of pneumatic slipping system (Bateman) before November 2005

A slightly shorter distance between the electrodes (Pitch-Center-Diameter) does cause higher energy efficiency.

Project has been implemented as defined in the PDD and there is no change in the major equipments. As verified during on the spot visit, furnace 3 is a stationary furnace after refurbishment. A certificate for the rebuild of furnace 3 by Bateman is available (IRL No. 11). It was

not possible to physically verify the optimization of the Pitch-Center-Diameter of furnaces 3, 5 and 7, since all of them were in operation during the on-site visit. Evidence about the completion of the measures to optimize the Pitch-Center-Diameter were provided to the DOE in the form of schemes and data about the critical dimensions of the furnaces before and after refurbishment (IRL No. 12 and 13).

The plants have the metering and measurement devices such as power meter and balances available at all the three project furnaces, to monitor various parameters related to project. All equipments indicated in the metering scheme are of reputed made and are periodically calibrated.

The procedures for carrying out batch weigh scale tests and calibrating scales of various equipments have been documented in the integrated management system SHEQ (Safety Health Environment Quality). The procedures include the responsibilities, testing procedure and calculation.

At all three project furnaces the power measurements are online and the balance measurements are batch wise. Results of chemical analysis of furnace input components (monthly analysis) and product (daily analysis) done by the laboratory of the group Highveld (since the ownership has been transferred to Renova (it is now an external laboratory) are sent to Transalloys.

1.1.2 Findings

OBJECTIVE	COMMENTS
Documentation (IVC 3.3)	**Forward Action Request No. 1:** The available procedures need to be amended in order to cover the roles and responsibilities according to the responsibility matrix in the PDD, for access, revision, modification and authority for data collection, storage, archiving and back up. **Forward Action Request No. 2:** A new procedure to define the calibration of the power meters has to be created and enforced covering all elements requested in FAR 1. **Forward Action Request No. 3:** There is a need to create, communicate and enforce a calibration plan for each monitoring equipment. The calibration plan should be part of the integrated management system SHEQ. **Forward Action Request No. 4:** The responsibilities and authorities have to be described in the integrated management system SHEQ as per the responsibility matrix indicated in the PDD.

1.1.3 Conclusion

The Forward Action Requests will be addressed by the PP in time for the next periodic verification.

1.2 Internal and External data

1.2.1 Discussion

The following internal parameters are obtained according to the monitoring plan:

1. Tonnes of SiMn/year: Output streams measured by calibrated balance and calculated

2. Tonnes of reductant coal/year: Input streams measured by calibrated balance and calculated

3. Tonnes of reductant coke/year: Input streams weighed by calibrated balance and calculated

4. Tonnes of paste/year: Input streams measured by weighed by calibrated balance and calculated

5. Quality of coal: analyzed by Highveld lab (monthly results available) and calculated

6. Quality of cokep: analyzed monthly by Highveld lab and calculated.

7. Quality of SiMnp: analyzed daily by Highveld lab and calculated by Ecosecurities.

8. Quality of ore: analyzed monthly by Highveld lab and calculated by Ecosecurities.

9. Quality of fluxes: analyzed monthly by Highveld lab and calculated by Ecosecurities

10. Power Consumption in MWh/year: measured through calibrated power meters, invoices issued by the utility company.

11. Emission factor of coke: based on carbon content analysis by Highveld lab and calculated by Ecosecurities

The responsibility for data collection for each plant lies with the Service Manager of Transalloys and person in charge at Ecosecurities. The service Manager has further trained staff for collection of all data related to this CDM Project. In addition plant has deployed trained staff with good experience in operation and maintenance of the plant and sufficiently qualified to carry out their tasks.

The effective implementation of the quality management system ensures that the data is monitored on hourly/daily basis and then compiled into the log book. The documented procedures

are evidenced as a part of the integrated management system SHEQ documentation for quality assurance.
As the records are maintained on daily basis and the production of SiMn is a batch process with more than one batch a day, the chances of misstatement are hereby low.

The external data used by Ecosecurities to calculate the CERs are following:

- Emission factor of fuels – IPCC 2006 values are used.
- Emission Factor of coal = 3.1 tCO2/tCoal (see PDD[2])
- Grid emission factor = 1.221 (see PDD)

1.2.2 Findings

None

1.2.3 Conclusion

The project complies with the requirements.

1.3 Environmental and Social Indicators

1.3.1 Discussion

Environmental and social indicators are not defined in the monitoring plan. Hence the question is not applicable.

But the client takes action on a voluntary basis regarding environmental and social issues:

- DNA Audit of 2008 on the plant including questions on sustainability
- Annual Report 2007 of Highveld covers environmental and social issues (see Highveld AR2007 page 48).

1.3.2 Findings

None

1.3.3 Conclusion

The project complies with the requirements.

1.4 Management and Operational System

1.4.1 Discussion

All procedures relevant to the CDM project are documented electronically as part of the integrated management system SHEQ. (see FAR 1 to 4)

[2] The selected IPCC default value for the emission factor of coal is more conservative than the resulting project specific one.

The overall authority of the project is personally supervised by Mr. Lou Jacobs (Service Manager of Transalloys) and Mrs. Jennifer Orr (Ecosecurities). Mr. Lou Jacobs has further delegated responsibility to Mrs. Elisabeth Botha for collection and compilation and Mr. Steve Niekerk for calibration of all meters related to this CDM Project.

All persons in charge of the monitoring of the CDM project are trained frequently by Ecosecurities (last training was in March 2008, IRL No. 57) as well as by Transalloys. It has been demonstrated that the interviewed persons in charge of the monitoring have good experience in operation and maintenance of the plant and are sufficiently qualified to carry out their tasks.

Responsibilities are allocated as indicated in the Responsibility Matrix in the PDD (see FAR 4).

Back-up meters are not installed. In case of meter or balance failures spare meters or balances can be assembled within less than one day. Spare power meters are already calibrated and spare balances need to be calibrated by authorized persons of the project engineer department before the operation of the furnace restarts.

The log books and paper tickets (see 3.8) are stored in a cabinet since the beginning of the project.

All other recorded data is stored on the server at Highveld and on the server at Ecosecurities.

Calculation methodology is laid down in the monitoring report. In addition the client has submitted the emission reduction in the excel sheets duly supported with the parameters records for the verification.

Internal Audits of Transalloys are carried out on a bi-annual basis as well as every 3 month.

The management review is part of the integrated management system SHEQ.

1.4.2 Findings

None

1.4.3 Conclusion

Apart from the resolution of FAR 1 to FAR 4 (see chapter 3.1.2) the project complies with the requirements.

Finally, the verification team confirms that the monitoring report and the Management and Operational Systems are eligible for reliable project monitoring.

Periodic Verification Findings

1.1 Defined organizational structure, responsibilities and competencies

1.1.1 Discussion

The overall authority of the project is personally supervised by Mr. Lou Jacobs (Service Manager of Transalloys) and Mrs. Jennifer Orr (Ecosecurities). Mr. Lou Jacobs has further delegated responsibility to Mrs. Elisabeth Botha for collection and compilation and Mr. Steve Niekerk for calibration of all data related to this CDM Project.

The responsibilities are consistent with those defined in the responsibility matrix indicated in the PDD. The awareness of the person in charge of the calibration regarding his tasks has been confirmed as spot check.

The responsibility matrix is not yet implemented in the integrated management system SHEQ (FAR 4).

1.1.2 Findings

None

1.1.3 Conclusion

As indicated in previous section the Management and Operational Systems are eligible for reliable project monitoring (see FAR 1 to FAR 4).

1.2 Completeness of Monitoring

1.2.1 Discussion

Apart from the following findings the monitoring plan is as per the registered PDD and the reporting procedures reflect the monitoring plan completely. Results of laboratory analysis are indicated now in the MR.

All parameters were determined as prescribed. The complete data is stored electronically. The necessary procedures have been defined in internal procedures and additional internal documents relevant for the determination of all the parameters listed in the monitoring plan (see FAR 1 to FAR 4).

1.2.2 Findings

OBJECTIVE	COMMENTS
Documentation (IVC 2.1)	**Corrective Action Request No. 1** According to the MP of the PDD (page 40) a discount rate of 9% has to be considered in the case that onsite emissions are lower in the project compared to the baseline. As for the result in the MR this is the case for the years 2006 and 2008, but, without making the corrections. Hence, the calculation in the MR has to be amended correspondingly.

OBJECTIVE	COMMENTS
Documentation (IVC 2.2)	**Clarification Request 1:** Measured data for tones of SiMn has not been cross-checked by product sales records as indicated in the PDD. Please justify the reasons and, if applicable, explain alternatively cross-checking measures. **Clarification Request 2:** Measured data for power consumption of each furnace has not been systematically cross-checked by electricity bills as indicated in the PDD. Please justify the reasons and, if applicable, explain alternatively cross-checking measures. **Clarification Request 3:** As output of a spot check of the fields „Amended During QA/QC" for Furnace 5 in January 2008, for January 26 and January 8 the power figure of the Furnace Report has been enhanced by Ecosecurities which is conservative approach, meanwhile, for January 30 the power figure of the furnace report of 496 MWh has been significantly reduced to 8 MWh, which is not conservative approach. Please clarify why in this case the amendment was not conservative and explain generally the amendment procedure (justify the rule and amount of amended figure).

1.2.3 Conclusion

Finally, the discount rate of 9% required as for the MP has been applied to the emission reductions and the revised figures included in the monitoring report (CAR 1). This has been cross-checked by TÜV-SÜD auditors and found to have been correctly applied.

The realized cross-checking method of measured product SiMn, deviating from the MP, is deemed to be more accurate than the cross-checking by sales records as for the MP in the validated PDD (CR 1). These checks have been integrated in the file CDM DATA MANAGEMENT (IRL-No. 22) to assure their consistent application.

Finally it has been demonstrated that bill cross-check method is suitable and conservative (CR 2). The applied cross-check method has been integrated in the file CDM DATA MANAGEMENT (IRL-No. 22) to assure its consistent application.

Electricity figures included in the 'Furnace Report' represent total electricity consumed at the respective furnace per day. This figure is cross-checked with the manual daily record ('Daily log sheet') to see whether the amounts have been calculated correctly i.e. whether the difference between the totalized figure at the end of the day minus the totalized figure at the beginning of the day is equal to the total amount stated in Furnace Report. If that is not the case,

the figure is corrected. Calculation files for workbooks furnaces 3, 5 and 7 have been amended correspondingly (CR 3).

The project complies with the requirements.

1.3 Accuracy of Emission Reduction Calculations

1.3.1 Discussion

Due to the approved methodology there is no need to make corrections for data uncertainty apart from the corrections explained in chapter 1.2.3 above. The audit team confirms that emission reduction calculations have been performed according to the Monitoring Plan and to the calculation methodology reported in the Monitoring Report.

The carbon emission factor & grid emission factor for South African grid (Combined Margin) provided by ESKOM are used as a predetermined default value which has been defined in the PDD and confirmed during validation of the project. The slightly non consistency for BE onsite of 3,06 (MR) from 3,05 (PDD) can be explained by rounding error.

CDM specific internal audits are initiated periodically diligently. Quality assurance procedures are in place and all data information is reviewed for accuracy and correctness by a staff member before submission. Staff is made aware of the quality assurance procedures.

For the crediting years 2005, 2006 and 2007 the emission reductions were higher than that estimated in the PDD. The reasons cannot be justified exactly by the PP since the influence of the optimization of the Pitch-Center-Diameter on the corresponding furnace is depending on a bundle of parameters like (see IRL No. 12 and 13):

- Inter-electrode spacing,
- Pitch-Circle-Diameter,
- Inside Diameter,
- Electrode Diameter,
- Furnace Depth among others.

For Furnace 3 the efficiency of the different optimization measures (see 1.3) is not measurable. For example the emission reductions of furnace 5 indicated in the MR are negative for the years 2005 and 2007 and those for furnace 7 are positive in all crediting years, though the installed power demand is the same as that for furnace 5. But, the critical furnace parameters as mentioned above are different for both furnaces, e.g. furnace depth 5 is 3.753 m and furnace depth 7 is only 3.450 m. Reasonable explanations of negative emission reductions of furnace 5 are now indicated in the MR.

1.3.2 Findings

OBJECTIVE	COMMENTS
Documentation (IVC 5.2)	**Corrective Action Request No. 2** The results of the current Monitoring Report MR do not have the same base as the emission reductions estimated in the PDD. There is a need to calculate the sum of the emission reductions for all project furnaces in the MR enabling a comparison of the yearly emission reductions estimated by the PDD.

1.3.3 Conclusion

A 'CER Summary' sheet has been inserted in the workbook of each furnace to show the sum of the emission reductions for all project furnaces. This sheet has also been included in the monitoring report in order to enable a comparison of the yearly emission reductions with those estimated in the PDD.

The project complies with the requirements.

1.4 Quality of Evidence to Determine Emission Reductions

1.4.1 Discussion

Concerning verification the calculation of emission reductions is based on internal data and external data. The origin of those data was explicitly checked. Further on, entering and processing of those data in the monitoring workbook Excel sheet was checked where predefined algorithms compute the annual values of the emission reductions. All equations and algorithms used in the different workbook sheets were checked. Inspection of calibration and maintenance records for key equipment was performed for all relevant meters.

Necessary procedures have been defined in internal procedures and additional internal documents relevant for the determination of the various parameters on daily basis.

1.4.2 Findings

None

1.4.3 Conclusion

The project complies with the requirements.

PROJECT SCORECARD

The conclusions on this scorecard are based on the revised CDM monitoring report.

Risk Areas		**Conclusions**			**Summary of findings and comments**
		Baseline Emissions	*Project Emissions*	*Emission Reductions*	
Completeness	Source coverage/ boundary definition	✓	✓	✓	All relevant sources are covered by the monitoring plan and the boundaries of the project are defined correctly and transparently.
Accuracy	Physical Measurement and Analysis	✓	✓	✓	State-of-the-art technology is applied in an appropriate manner. Appropriate back-up solutions are provided.
	Data calculations	✓	✓	✓	Emission reductions are calculated correctly.
	Data management & reporting	✓	✓	✓	Data management and reporting were found to be satisfying.
Consistency	Changes in the project	✓	✓	✓	Results are consistent to underlying raw data.

Industrie Service

VERIFICATION STATEMENT

The certification body "Climate and Energy" of TÜV SÜD Industrie Service GmbH has been ordered by Ecosecurities Group plc to carry out the initial and the first periodic verification of the registered CDM project *Transalloys Manganese Alloy Smelter Energy Efficiency Project*, UNFCCC Reference No.1027, performed by *Highveld Steel and Vanadium Corporation Limited, South Africa.* The verification is based on requirements of the UN Framework Convention on Climate Change (UNFCCC). In this context, the relevant documents are the "Marrakech Accords". The verifier confirms that the project is implemented as planned and described in the validated project design document. Installed equipment being essential for generating emission reduction and for metering the data defined in the monitoring plan runs reliably and is calibrated appropriately. The monitoring system is in place and the project generates GHG emission reductions according to the approved methodology. The verifier can confirm that the GHG emission reduction is calculated without material misstatements for the whole monitoring period. Our opinion relates to the project's GHG emissions reductions reported and related to the valid project baseline and monitoring, and its associated documents. The verifier also confirms that the monitoring plan of the project activity is in accordance to the applied methodology.

Based on the information we have seen and evaluated, we confirm the following statement:

Reporting period: October 1, 2004 to March 31, 2008.

Verified emission in the above reporting period:

	Total
Baseline emissions	2.451.765 t CO2
Project emissions	2.222.930 t CO2
Leakage emission	0 t CO2
Emission Reductions:	228.835 t CO2
Emission Reductions[3]:	**223.073** t CO2

The verification team also determined some areas of risks for the project in the context of the management system. Those issues indicated as "Forward Action Request" and should be submitted as indispensable information to the verification team of the next periodic verification.

Munich, 2008-10-06

Javier Castro
Head of Certification body
„Climate and Energy"

Munich, 2008-10-06

Thomas Kleiser
Assessment Team Leader

[3] According to fixed value of Monitoring Plan for uncertainty of onsite emissions.

Annex 1: Initial and Periodic Verification Checklist

1 INITIAL VERIFICATION CHECKLIST

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
1. Opening Session			
1.1. Introduction to audits	1, 2, 3	The intention and the target of the audit were illustrated to the participants of the audit (for participants see Annex 2).	☑
1.2. Clarification of access to data archives, records, plans, drawings etc.	1	The verification team got open access to all required plans, data, records, drawings and to all relevant facilities.	☑
1.3. Contractors for equipment and installation works	1, 2, 11, 12, 13	The principle production process as well as the project relevant facilities has been presented by the PP Transalloys. The project has been implemented as defined in the PDD and the implementation of the project is in process and review periodically through progress reports. For furnaces 6 (22 MVA) and 1 (21 MVA) refurbishment is not planned yet. There is no change in the following project relevant equipments. The engineering companies involved in the refurbishment of the furnaces are Pyromet and Bateman. • Demag Furnace 7 (48 MVA) • Elkem Furnace 5 (48 MVA) • Elkem Furnace 3 (21 MVA)	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
1.4. Actual status of installation works	1, 2, 11, 12, 13	Retrofitting has been done by Transalloys respectively Bateman as following, : • retrofitted Furnace 7 – Optimization of Pitch Center Diameter before October 2004 • retrofitted Furnace 5 – Optimization of Pitch Center Diameter before December 2005 • retrofitted Furnace 3 – Optimization of Pitch Center Diameter (Transalloys) and converting from rotating to stationary furnace and change of pneumatic slipping system (Bateman) before November 2005 A slightly shorter distance between the electrodes (Pitch Center Diameter) does cause higher energy efficiency.	☑
2. Open issues indicated in validation report			
2.1. Missing steps to final approval	2, 3	Based on the validation report the verification team identified no missing steps for the project that has been registered under the CDM under the reference number 1027.	☑
3. Implementation of the project			
3.1. Physical components	1, 11, 12, 13	Project has been implemented as defined in the PDD and there is no change in the major equipments. As verified during on the spot visit, furnace 3 is a stationary furnace after refurbishment. A certificate for the rebuild of furnace 3 by Bateman is available (IRL No. 11). It was not possi-	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
		ble to verify the optimization of the Pitch Center Diameter of furnaces 3, 5 and 7, since all of them were in operation. Evidence about the completion of the measures to optimize the Pitch Center Diameter are not available, these measures have been carried out by Transalloys. Only schemes and data about the critical dimensions of the furnaces before and after refur-bishment are available for DOE (IRL No. 12 and 13).	
3.2. Project boundaries	1, 2	The project boundaries are as defined in the PDD.	☑
3.3. Monitoring and metering systems	1, 2, 16, 17, 21, 59, 60, 61	The plants have the metering and measurement devices such as power meter and balances available at all the three project furnaces, to monitor various parameters related to project. All equipments indicated in the me-tering scheme are of reputed make and are periodically calibrated. The procedures for carrying out batch weigh scale tests and calibrating scales of various equipments have been documented in the integrated management system SHEQ (Safety Health Environment Quality). The procedures include the responsibilities, testing procedure and calculation. At all three project furnaces the power measurements are online and the balance measurements are batch wise. Results of chemical analysis of furnace input components (monthly analysis) and product (daily analysis) done by the laboratory of the group Highveld (since the ownership has been transferred to Renova (it is now an external laboratory) are sent to Transalloys.	

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
		Forward Action Request No. 1: The available procedures need to be amended in order to cover the roles and responsibilities according to the responsibility matrix in the PDD, for access, revision, modification and authority for data collection, storage, archiving and back up. **Forward Action Request No. 2:** A new procedure to define the calibration of the power meters has to be created and enforced covering all elements requested in FAR 1.	**FAR 1** **FAR 2**
3.4. Data uncertainty	1, 5, 6, 7, 22	Data is monitored on hourly respectively daily basis and then at the end of each of three daily shifts compiled into the log book. Data from the daily log books is imported by qualified and experienced staff of Transalloys in to excel spreadsheet every day. There are adequate cross check and back up arrangements (CD writer and streamer) made to ensure effective transfer of data to the main Transalloys server in Witbank. Generated Excel spreadsheets "Data Base" and "Monthly Furnace Reports" are monthly sent by e-mail to Ecosecurities subsidiary in Johannesburg. Here final Excel spreadsheets, so-called workbooks are generated using the available data of Transalloys. There are additional cross check and back up arrangements made by Ecosecurities to ensure effective transfer of data to	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
		the main Ecosecurities server in Oxford.	
3.5. Calibration and quality assurance	1, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45	Each monitoring equipment has to be calibrated according to manufacturer requirements and procedures of integrated management system SHEQ (see FAR 1 and FAR 2). On the date of verification, Calibration records of the measuring and monitoring equipment has been verified at site. All the meters and balances for each of the three project furnaces have been found to be calibrated as per specified frequency. **Forward Action Request No. 3:** There is a need to create, communicate and enforce a calibration plan for each monitoring equipment. The calibration plan should be part of the integrated management system SHEQ.	**FAR 3**
3.6. Data acquisition and data processing systems	1, 22	At all three project furnaces the power measurements are online and the balance measurements are batch wise. Results of chemical analysis of furnace input components and product done by the laboratory of Highveld) are sent monthly to Transalloys.	☑
3.7. Reporting procedures	1, 22	Data is monitored on hourly respectively daily basis and then at the end of each of three daily shifts compiled into the log book. Data from the daily log books is imported by qualified and experienced staff of Transalloys in to excel spreadsheet every day. There are adequate cross check and	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
		back up arrangements made to ensure effective transfer of data to the main Transalloys server in Witbank. Generated Excel spreadsheets "Data Base" and "Furnace Reports" are monthly sent by e-mail to Ecosecurities subsidiary in Johannesburg. Here final Excel spreadsheets, so-called workbooks are generated using the available data of Transalloys. There are additional cross check and back up arrangements made by Ecose-curities to ensure effective transfer of data to the main Ecosecurities serv-er in Oxford. Persons responsible for import and compilation of data for all three project furnaces are as defined in the responsibility matrix in the PDD.	
3.8. Documented instructions	1, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55	During verification, it was observed that the following log books and records are maintained manually respectively electronically , to monitor the operation controls: • Receiving and usage of raw materials on daily basis (log book in paper form) • Meter readings for weighed components or product (ticket in paper form) • Lab analysis reports for raw materials and product (electronically). The records were verified for the monitoring period by spot checks.	☑
3.9. Qualification and training	1, 57	The overall authority of the project is personally supervised by Mr. Lou Jacobs (Service Manager of Transalloys) and Mrs. Jennifer Orr (Ecose-curities). Mr. Lou Jacobs has further delegated responsibility to Mrs. Eli-sabeth Botha for collection and compilation and Mr. Steve Niekerk for ca-libration of all data related to this CDM Project. If applicable, Mrs. Elisa-beth Botha can be replaced by Conny Masiela or Bulelwa Mgwenya and	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
		Mr. Steve Niekerk can be replaced by John Foster who is as well located in the engineering department. All persons in charge for the monitoring of the CDM project are trained frequently by Ecosecurities (last training was in March 2008, IRL No. 57) as well as by Transalloys. It has been demonstrated that the interviewed persons in charge for the monitoring have good experience in operation and maintenance of the plant and are sufficiently qualified to carry out their tasks.	
3.10. Responsibilities	1, 2	The responsibilities are consistent with those defined in the responsibility matrix indicated in the PDD. The awareness of the person in charge of the calibration regarding his tasks has been confirmed as spot check. **Forward Action Request No. 4:** The responsibilities and authorities have to be described in the integrated management system SHEQ as per the responsibility matrix indicated in the PDD.	**FAR 4**
3.11. Troubleshooting procedures	1, 22	The documented procedure for recording of each parameter is included in the description of CDM data management. These procedures include the cross-checks.	☑
4. Internal Data			

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
4.1. Type and sources of internal data	1, 2, 3, 7, 59, 60, 61	The following internal parameters are obtained according to the monitoring plan: **1. Tonnes of SiMn/year:** Output streams measured by calibrated balance and calculated **2. Tonnes of reductant coal/year**: Input streams measured by calibrated balance and calculated **3. Tonnes of reductant coke/year**: Input streams weighed by calibrated balance and calculated **4. Tonnes of paste/year:** Input streams measured by weighed by calibrated balance and calculated **5. Quality of coal:** analyzed by Highveld lab (monthly results available) and calculated **6. Quality of cokep:** analyzed monthly by Highveld lab and calculated. **7. Quality of SiMnp:** analyzed daily by Highveld lab and calculated by Ecosecurities. **8. Quality of ore:** analyzed monthly by Highveld lab and calculated by	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
		Ecosecurities. **9. Quality of fluxes:** analyzed monthly by Highveld lab and calculated by Ecosecurities **10. Power Consumption in MWh/year:** measured through calibrated power meters, invoices issued by the utility company. **11. Emission factor of coke:** based on carbon content analysis by High-veld lab and calculated by Ecosecurities	
4.2. Data collection	1, 22	The responsibility for data collection for each plant lies with the Service Manager of Transalloys and person in charge at Ecosecurities. The ser-vice Manager has further trained staff for collection of all data related to this CDM Project. In addition plant has deployed trained staff with good experience in operation and maintenance of the plant and sufficiently qualified to carry out their tasks.	☑
4.3. Quality assurance	1, 22	The effective implementation of the quality management system ensures that the data is monitored on hourly/daily basis and then compiled into the log book. The documented procedures are evidenced as a part of the in-tegrated management system SHEQ documentation for quality assur-ance.	

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
4.4. Significance and reporting risks	1, 22	As the records are maintained on daily basis and the production of SiMn is a batch process with more than one batch a day, the chances of miss-tatement are hereby low.	☑
5. External Data			
5.1. Type and sources of external data	1, 2, 3	The external data used by Ecosecurities to calculate the CERs are as fol-lowing: • Emission factor of fuels – IPCC 2006 values are used. • Emission Factor of coal = 3.1 tCO2/tCoal (see PDD) • Grid emission factor = 1.221 (see PDD)	☑
5.2. Access to external data	1, 2, 3	See 5.1	☑
5.3. Quality assurance	1, 2, 3	See 5.1	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
5.4. Data uncertainty	1, 2, 3	See 5.1	☑
5.5. Emergency procedures	1, 2, 3	See 5.1	☑
6. Environmental and Social Indicators			
6.1. Implementation of measures	1, 58	Environmental and social indicators are not defined in the monitoring plan. Hence the question is not applicable. But the client takes action on a voluntary basis regarding environmental and social issues: • DNA Audit of 2008 on the plant including questions on sustainability • Annual Report 2007 of Highveld covers environmental and social issues (see Highveld AR2007 page 48).	☑
6.2. Monitoring equipment	1, 58	See 6.1	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
6.3. Quality assurance proce-dures	1, 58	See 6.1	☑
6.4. External data	1, 58	See 6.1	☑
7. Management and Operational System			
7.1. Documentation	1, 14, 15, 16, 17	All procedures relevant to the CDM project are documented electronically as part of the integrated management system SHEQ. (see FAR 1 to 4)	see FAR 1 to 4
7.2. Qualification and training	1, 14, 15, 16, 17, 57	The overall authority of the project is personally supervised by Mr. Lou Jacobs (Service Manager of Transalloys) and Mrs. Jennifer Orr (Ecose-curities). Mr. Lou Jacobs has further delegated responsibility to Mrs. Eli-sabeth Botha for collection and compilation and Mr. Steve Niekerk for ca-libration of all data related to this CDM Project.	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
		All persons in charge for the monitoring of the CDM project are trained frequently by Ecosecurities (last training was in March 2008, IRL No. 57) as well as by Transalloys. It has been demonstrated that the interviewed persons in charge for the monitoring have good experience in operation and maintenance of the plant and are sufficiently qualified to carry out their tasks.	
7.3. Allocation of responsibilities	1, 14, 15, 16, 17	Responsibilities are allocated as indicated in the Responsibility Matrix in the PDD (see FAR 4).	See FAR 4
7.4. Emergency procedures	1, 22	Back-up meters are not installed. In case of meter or balance failures spare meters or balances can be assembled within less than one day. Spare power meters are already calibrated and spare balances need to be calibrated by authorized persons of the project engineer department before the operation of the furnace restarts.	☑
7.5. Data archiving	1, 22	The log books and paper tickets (see 3.8) are stored in a cabinet since the beginning of the project. All other recorded data is stored on the server of Highveld respectively on the server of Ecosecurities.	☑
7.6. Monitoring report	1, 4	Calculation methodology is laid down in the monitoring report. Additional	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion.(incl FARs/CARs)
		the client has submitted the emission reduction in the excel sheets duly supported with the parameters records for the verification.	
7.7. Internal audits and manage-ment review	1, 14, 15	Internal Audits of Transalloys are carried out on a bi-annual basis as well as every 3 month. The management review is part of the integrated management system SHEQ.	☑

2 PERIODIC VERIFICATION CHECKLIST

Table 1: Data Management System/Controls

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
1. Defined organizational structure, responsibilities and competencies		
1.1. Position and roles	Full	The overall authority of the project is personally supervised by Mr. Lou Jacobs (Service Manager of Transalloys) and Mrs. Jennifer Orr (Ecosecurities). Mr. Lou Jacobs has further delegated responsibility to Mrs. Elisabeth Botha for collection and compilation and Mr. Steve Niekerk for calibration of all data related to this CDM Project.
1.2. Responsibilities	Limited	The responsibilities are consistent with those defined in the responsibility matrix indicated in the PDD. The awareness of the person in charge of the calibration regarding his tasks has been confirmed as spot check. The responsibility matrix is not yet implemented in the integrated management system SHEQ (FAR 4).

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
1.3. Competencies needed	Full	See 1.1 and 1.2 above.
2. Conformance with monitoring plan		
2.1. Reporting procedures	Full (after closing CAR 1)	Apart from the following item the monitoring plan is as per the registered PDD **Corrective Action Request No. 1** According to the MP of the PDD (page 40) a discount rate of 9% has to be considered in the case that onsite emissions are lower in the project compared to the baseline. As for the result of the MR this is the case for the years 2006 and 2008, but, without making the corrections. Hence, the calculation in the MR has to be amended correspondingly.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
2.2. Necessary Changes	Full (after closing CRs)	**Clarification Request 1:** Measured data for tones of SiMn has not been cross-checked by product sales records as indicated in the PDD. Please justify the reasons and, if applicable, explain alternatively cross-checking measures. **Clarification Request 2:** Measured data for power consumption of each furnace has not been systematically cross-checked by electricity bills as indicated in the PDD. Please justify the reasons and, if applicable, explain alternatively cross-checking measures. **Clarification Request 3:** As output of a spot check of the fields „Amended During QA/QC" for Furnace 5 in January 2008, for January 26 and January 8 the power figure of the Furnace Report has been enhanced by Ecosecurities which is conservative approach, meanwhile, for January 30 the power figure of the furnace report of 496 MWh has been significantly reduced to 8 MWh, which is not conservative approach. Please clarify why in this case the amendment was not conservative and explain generally the amendment procedure (justify the rule and amount of amended figure).

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
3. Application of GHG determination methods		
3.1. Methods used	Limited	Apart from CAR 1 the reporting procedures reflect the monitoring plan content. The calculation of the emission reduction is correct.
3.2. Information/process flow	Full	The necessary procedures have been defined in internal procedures and additional internal documents relevant for the determination of the various parameters on daily basis.
3.3. Data transfer	Full	The complete data is stored electronically on servers and in case of log books and tickets hardcopies are stored.
3.4. Data trails	Full	The necessary procedures have been defined in internal procedures and additional internal documents relevant for the determination of all parameters listed in the monitoring plan.
4. Identification and maintenance of key process parameters		
4.1. Identification of key parameters	Full	The critical parameters for the determination of GHG emissions are the parameters listed in section D of the approved PDD
4.2. Calibration/maintenance	Full	The company maintains calibration for each of the equipment & the audit team verified the status for all the equipment and found to be complying with the requirements of manufacturers. For the missing calibration plan see FAR 3.
5. GHG Calculations		

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
5.1. Use of estimates and default data	Full	The carbon emission factor & grid emission factor for South African grid (Combined Margin) provided by ESKOM are used as a predetermined default value which has been defined in the PDD and confirmed during validation of the project. The slightly non consistency for BE onsite of 3,06 (MR) from 3,05 (PDD) can be explained by rounding error.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
5.2. Guidance on checks and reviews	Full	CDM specific internal audits are initiated periodically diligently. Quality assurance procedures are in place and all data information is reviewed for accuracy and correctness by a staff member before submission. Staff is made aware of the quality assurance procedures. For the crediting years 2005, 2006 and 2007 the emission reductions were higher than that estimated in the PDD. The reasons cannot be justified exactly by the PP since the influence of the optimization of the Pitch Center Diameter on the corresponding furnace is depending on a bundle of parameters (see IRL No. 12 and 13) like Inter electrode spacing, Pitch Circle Diameter, Inside Diameter, Electrode Diameter, Furnace Depth among others. For Furnace 3 the efficiency of the different optimization measures (see 1.3) is not measurable. For example the emission reductions of furnace 5 indicated in the MR are negative for the years 2005 and 2007 and those for furnace 7 are positive in all crediting years, though the installed power demand is the same than that for furnace 5. But, the critical furnace parameters as mentioned above are different for both furnaces, e.g. furnace depth 5 is 3.753 m and furnace depth 7 is only 3.450 m. **Corrective Action Request No. 2** The results of the current Monitoring Report MR do not have the same base as the emission reductions estimated in the PDD. There is a need to calculate the sum of the emission reductions for all project furnaces in the MR enabling a comparison of the yearly emission reductions estimated by the PDD.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
5.3. Internal validation and verification	Full	Monitoring procedure for CDM Project includes the responsibility and frequency for carrying out internal audits. Quality assurance procedures are in place.
5.4. Data protection measures	Full	The necessary procedures relating to Information technology are in place to provide necessary data security, and also prevent the unauthorized use of the same.
5.5. IT systems	Full	The IT system is server based and located in head quarters of Transalloys and Ecosecurities.

Table 2: GHG calculation procedures and management control testing

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
Potential reporting risks based on an assessment of the emission estimation procedures can be expected to occur in the following fields of action: 1. raw data collection 2. calculation methods, Key source data applicable to the project assessed are hereby: • Records of Raw material receipts • Production records of SiMn • Metering records for electricity import from the grid • Laboratory/analytical data Appropriate calibration and maintenance of equipment resulting in a high accuracy of data supplied should be in place. It is hereby needed to focus on those risks that impact the accuracy, completeness and consistency of the reported data. Risks are weakness in the GHG calculation systems and may include: ➢ manual transfer of data/manual calculations, ➢ position of metering equipment ➢ unclear origins of data,	Regarding the potential reporting risks identified in the left column the following mitigation measures have been observed during the document review and the on the spot mission: 1. Raw data collection: As the project make use of coal, coke, paste, or and fluxes, their records of production, procurement, along with the production records of SiMn and the amount of electricity imported from the grid remains to be the main parameter to be obtained for the GHG calculation. Key source data for this parameter are: • Weigh bridges and meter reading. • Invoices and records for electrical power and product sales records. The metering equipments are installed appropriately and same are of reputed make. 2. Calculation methods: The reporting procedures reflect the monitoring plan content & the calculation of the emission reduction is correct & also additionally deducting the project emissions caused by input material and power consumption.	The issues remaining are: a) the way the data obtained is used to fill the excel tool and b) the way the excel tool data is used to calculate the emission reduction in a conservative manner according to the approach prescribed in the PDD.

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
➢ accuracy due to technological limitations, ➢ Compilation of the averages		

Table 3: Detailed audit testing of residual risk areas and random testing

Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)
The issues remaining are the way the data obtained is used to fill the excel tools and the way the excel tools data is used to calculate the emission reduction in a conservative manner according to the approach prescribed in the PDD.	There have been several spot checks of data transferred from readings and use data for raw material to the calculation tools. Furthermore, spot checks have been done by the Audit team to check the system of generating emission reduction data in the monitoring report using rough data in the calculation tools. Finally, there was no error in such transfer.	Having investigated the residual risks, the audit team comes to the following conclusion: Immediate action was needed with respect to the current emission reduction calculation. Those corrections have been considered during the verification process, so only small residual risk is open regarding the improvement of the Quality Management System (FAR 1 to FAR 4).

Table 4: Compilation of open issues

Draft report corrective and forward action requests by audit team	Summary of project owner response (first and second loop)	Audit team conclusion
Forward Action Request No. 1: The available procedures need to be amended in order to cover the roles and responsibilities according to the responsibility matrix in the PDD, for access, revision, modification and authority for data collection, storage, archiving and back up.	This will be addressed in time for consecutive verifications.	Issue considered closed ☑
Forward Action Request No. 2: A new procedure to define the calibration of the power meters has to be created and enforced covering all elements requested in FAR 1.	This will be addressed in time for consecutive verifications.	Issue considered closed ☑
Forward Action Request No. 3: There is a need to create, communicate and enforce a calibration plan for each monitoring equipment. The calibration plan should be part of the integrated management system SHEQ.	This will be addressed in time for consecutive verifications.	Issue considered closed ☑

Draft report corrective and forward action requests by audit team	Summary of project owner response (first and second loop)	Audit team conclusion
Forward Action Request No. 4: The responsibilities and authorities have to be described in the integrated management system SHEQ as per the responsibility matrix indicated in the PDD.	This will be addressed in time for consecutive verifications.	Issue considered closed ☑
Corrective Action Request No. 1 According to the MP of the PDD (page 40) a discount rate of 9% has to be considered in the case that onsite emissions are lower in the project compared to the baseline. As for the result of the MR this is the case for the years 2006 and 2008, but, without making the corrections. Hence, the calculation in the MR has to be amended correspondingly.	Looking at all furnaces over all relevant years, onsite project emissions were lower than onsite baseline emissions in the years 2005, 2006 and 2007 at Furnace #3, in the years 2006 and 2008 at Furnace #5 as well as in the years 2004, 2005, 2006, 2007 and 2008 in the case of Furnace #7. A discount rate of 9% has been applied to the emission reductions and the revised figures included in the monitoring report.	This has been cross-checked by TÜV-SÜD auditors and found to have been correctly applied. This caused a reduction in tCO2 eq. ☑

Draft report corrective and forward action requests by audit team	Summary of project owner response (first and second loop)	Audit team conclusion
Clarification Request 1: Measured data for tones of SiMn has not been cross-checked by product sales records as indicated in the PDD. Please justify the reasons and, if applicable, explain alternatively cross-checking measures.	Comment of the PP (first loop): *When cross-checking measured data of tones of SiMn produced with product sales record, tones sold will seldom render matching figures due to the fact that not all SiMn in a particular month produced will necessarily be sold in that month. In general the yield (= the difference between saleable material and taphole production) is somewhere in the region of 85 to 90%.* *Hence, the site carries out additional checks to confirm that declared production is true. This is done via* *a) weighing the material as it comes off the crushing/screening plant;* *b) survey figures; and* *c) stock balancing by calculation* *That way it can be confirmed whether or not weighed production figures are in line with furnace production figures and stockpiles. The existing monitoring system will be reviewed with respect to cross-checks in time for consecutive verifications.* Answer raised by DOE (second loop): The direct monitoring of this parameter, verified on the project plant, is consistent with the applied methodology. The described alternative cross-check method is deemed to be appropriate. Anyway, please clarify that this cross-checking method is more accurate than the cross-checking by sales records. How is it ensured to review the existing monitoring system as stated in the comment, are proves available?	See on the left: answer raised by DOE (second loop):

Draft report corrective and forward action requests by audit team	Summary of project owner response (first and second loop)	Audit team conclusion
	Comment of PP (second loop): *The SiMn production is not directlycross-checked against the sales records because not all the SiMn out of the furnace tap is sold:* *- A part of the production, called the slag, is sent to the jigging plant for the production of FeMn;* *- After the SiMn has solidified, it is crushed to obtain lumps of SiMn of different sizes, according to the sales contracts. The lumps that are smaller than 3mm are called the fines (non saleable) and are used in the process of smelting FeMn. The bigger lumps are weighed and either sold or kept in stock;* *- A part of the production is sold – this is measured on the weighbridge when exiting the facility;* *- The rest is kept in stock, in different stacks according to the size of the lumps. The stocks volumes are surveyed, according to the size of the stack.* *Hence the checks performed are:* *- That the SiMn after crushing (hence without slag and fines as previously described) is about 85% - 90% of the SiMn out of the furnace tap;* *- That the SiMn after crushing equals the sum of the stock (surveyed by the size of the stacks) and sales records.* *In effect, these checks are more conservative than a simple check against the sales records because they provide a far more accurate picture i.e. the SiMn weighed out of the furnace tap is comparable to the SiMn weighed after the crushing station. It is not directly comparable to the sales of SiMn.* *Moreover, these checks have been integrated in CDM DATA*	

Draft report corrective and forward action requests by audit team	Summary of project owner response (first and second loop)	Audit team conclusion
	MANAGEMENT to assure their consistent application.	Comment of DOE: Closed, the realized cross-checking method is deemed to be more accurate than the cross-checking by sales records as for the MP in the validated PDD. ☑
Clarification Request 2: Measured `data for power consumption of each furnace has not been systematically cross-checked by electricity bills as indicated in the PDD. Please justify the reasons and, if applicable, explain alternatively cross-checking measures.	Comment of the PP (first loop): *Electricity bills stating total on-site consumption are cross-checked at irregular intervals with the sum of the consumption at each furnace, especially if amounts seem atypical. In addition, SiMn output is compared to electricity consumption on a daily basis to assure that the recorded figures are reasonable.* *It was demonstrated during the on-site visit that total electricity consumption at the site was inline with the sum of the consumption at each furnace plus auxiliary consumption (e.g. for lighting).* *The existing monitoring system will be reviewed with respect to cross-checks in time for consecutive verifications.* Answer raised by DOE (second loop): Please clarify in more detail that the bill cross-check method in this	See left: answer raised by DOE

Draft report corrective and forward action requests by audit team	Summary of project owner response (first and second loop)	Audit team conclusion
	special case is suitable and conservative. Give evidence that the power share of non project power consumption is stable for each year. How is it ensured to review the existing monitoring system as stated in the comment, are proves available? <u>Answer of the PP (second loop):</u> *The plant receives an invoice from the electricity provider covering its total electricity consumption. As the consumption of each furnace is metered, the invoiced amount is compared to the sum of the furnaces' consumption as it is by far the largest source of electricity consumption on site. Spot checks during verification have shown that the two figures match reasonably i.e. a constant range of elecricity is being used for machinery, lighting, etc. Hence, this check is sufficient to identify any faults with respect to electricity consumption. The applied cross-check method has been integrated in CDM DATA MANAGEMENT to assure its consistent application.*	(second loop) <u>Comment of DOE:</u> Closed, finally it has been demonstrated that bill cross-check method is suitable and conservative.

Draft report corrective and forward action requests by audit team	Summary of project owner response (first and second loop)	Audit team conclusion
		☑
Clarification Request 3: As output of a spot check of the fields „Amended During QA/QC" for Furnace 5 in January 2008, for January 26 and January 8 the power figure of the Furnace Report has been enhanced by Ecosecurities which is conservative approach, meanwhile, for January 30 the power figure of the furnace report of 496 MWh has been significantly reduced to 8 MWh, which is not conservative approach. Please clarify why in this case the amendment was not conservative and explain generally the amendment procedure (justify the rule and amount of amended figure).	Electricity figures included in the 'Furnace Report' represent total electricity consumed at the respective furnace per day. This figure is cross-checked with the manual daily record ('Daily log sheet') to see whether the amounts have been calculated correctly i.e. whether the difference between the totalized figure at the end of the day minus the totalized figure at the beginning of the day is equal to the total amount stated in Furnace Report. If that is not the case, the figure is corrected. That is, if the calculated figure is different to the figure stated in Furnace Report, the calculated figure is used. [Please note that 'Database' also includes the start and end figure from the electricity meter per day and hence can be used as an additional control.] In the case of January 26 and January 8 it was noted that the calculated figure was higher than the one stated in Furnace Report and hence it was corrected accordingly. In the case of January 30, it was noted that the consumption that was recorded in Furnace Report was the previous day's. Actual consumption on the day in question was the difference between 109935MWh and 109927MWh which amounted to 8MWh. Hence the figure was corrected accordingly. Considering that SiMn production was coming to a halt, this is reasonable.	Issue considered to be closed ☑

Draft report corrective and forward action requests by audit team	Summary of project owner response (first and second loop)	Audit team conclusion
Corrective Action Request No. 2 The results of the current Monitoring Report MR do not have the same base as the emission reductions estimated in the PDD. There is a need to calculate the sum of the emission reductions for all project furnaces in the MR enabling a comparison of the yearly emission reductions estimated by the PDD.	A 'CER Summary' sheet has been inserted in the workbook of each furnace to show the sum of the emission reductions for all project furnaces. This sheet has also been included in the monitoring report in order to enable a comparison of the yearly emission reductions with those estimated in the PDD.	Issue considered closed ☑
Additional Clarification Request 1 (third loop) The methodology requires that the quality of the different fuels and raw materials are monitored monthly or daily. This information is not available in the report or excel file, please clarify.	The regular analysis of coal and coke on a monthly basis has been included in the workbook as well as the monitoring report. Attached you will also find the outstanding lab reports for the coal (all other analyses are contained within the file called '2004 to 2008 Transalloys Analytical Reports (coke)' which you already have). Paste is manufactured to predetermined specifications which are contractually fixed hence there are no further analyses. This has also been explained in the monitoring report and I am attaching the latest version of the contract with the supplier for your reference (this contract is the same as the one previously used but needed to be changed due to the change in management) as well as the email that accompanied the contract. Furthermore, we have used	The monitoring frequencies for fuel and raw material are according to the methodology. Evidence is available (see IRL-No. 59, 60, 61). The workbook has been revised accordingly and explanations have been added to

Draft report corrective and forward action requests by audit team	Summary of project owner response (first and second loop)	Audit team conclusion
	the conservative emission factor from the meth for paste in the project scenario instead of one based on the manufacturer's specifications. We have included the results form the daily analysis in the workbook as well as the monitoring report. For your reference, we have scanned excerpts of the paper records for some months and are also attaching the associated electronic files named 'analysis-buffer'. Furthermore, the data flow and procedures have been revised to accommodate these changes (see also attached) and as discussed will be included in the management system for the next verification.	the MR. ☑
Additional Clarification Request 2 (third loop) The IPCC value used for the emission factor of coal has to be compared with the project specific value in order to clearly show the conservativeness of the approach.	The site does receive regular lab analysis of coal from the lab. However, the project uses the IPCC default value in order to be consistent with the emission factor used in the baseline. Furthermore, project-specific values are expected to be lower than IPCC values and hence project-specific values would not be conservative. We have calculated the emission factor of coal based on the results from the laboratory analysis and this has been included in the workbook (in the sheet 'Project Emissions &ER'). It can be seen that the project specific factor is consistently less conservative than the IPCC default.	The calculations in the workbook combined with the available analytical results for coal (IRL-No. 60) now indicate clearly that the selected IPCC default value for the emission factor of coal is more conservative than the analyzed project specific one, which is not based on re-

Draft report corrective and forward action requests by audit team	Summary of project owner response (first and second loop)	Audit team conclusion
		liable data base. ☑
Additional Clarification Request 3 (third loop) It has to been justified in the MR that the applied emission factor of coke and paste are conservative, e.g. IPCC value versus project specific value.	The conservative factor of 3.67 tCO2/t of carbon paste proposed in the methodology will be applied. ERs will be recalculated and the workbook as well as monitoring report amended accordingly. We have used the conservative factor in the workbooks and based ER calculations on this which has led to a reduction of 3,353CERs. The MR has been revised for both emission factors.	Manufacturer/supplier paste data on a monthly base, as required as per methodology, is not reliable available. Hence, the alternative choice of IPCC default value for paste has been applied. As for the emission factor of coke, a project specific factor has been applied according to the methodology and the choice has been justified in the MR. ☑

Draft report corrective and forward action requests by audit team	Summary of project owner response (first and second loop)	Audit team conclusion
Additional Clarification Request 4 (third loop) The negative emission reductions for some years for furnace 5 have to be justified in the MR.	An explanation has been included in the MR	☑
Additional Clarification Request 5 (third loop) In the workbooks excel files several figures are only indicated in the cells as value and not with calculation formula, therefore a full crosscheck of the calculation is not possible, please clarify.	As explained above, the emission factor of coal has been calculated. The paste composition does indeed remain the same as the supplier is contractually obliged to produce to the same specifications (in order to assure that the production process is not negatively impacted). The latest contract with the supplier has been included for reference. For ER calculations, the conservative emission factor for paste from the meth is now used.	☑

Annex 2: Reference List

Reference No.	Document or Type of Information
1	On-site interviews and inspections of the project plant were conducted from Mai 05 to 06, 2008 by the auditing team of TÜV SÜD. <u>Verification team:</u> Mr. Robert Mitterwallner — Lead Auditor, TÜV SÜD Industrie Service GmbH, Munich Mr. Cyprian Fusi — Trainee, TÜV SÜD Industrie Service GmbH, Munich <u>Interviewed persons:</u> Mr. Lou Jacobs — Service Manager of Transalloys Mrs. E. Botha — Sales Assistant of Transalloys Mr. Solomon — Quality Control of Transalloys Mr. Steve Niekerk — Project Engineer of Transalloys Mrs. Nina Zetsche — Ecosecurities Mrs. Jennifer Orr — Ecosecurities Mr. Steve Anzarouth — Ecosecurities
2	Final Project Design Document for the CDM project “Transalloys Manganese Alloy Smelter Energy Efficiency Project“, South Africa, version 6, dated March 2, 2007
3	DNV Validation Report for the CDM project “Transalloys Manganese Alloy Smelter Energy Efficiency Project“, South Africa, report number 2007-0068, dated August 29, 2007

Reference No.	Document or Type of Information
4	Monitoring Report for the CDM project “Transalloys Manganese Alloy Smelter Energy Efficiency Project“, South Africa, dated September 5, 2008; version 5
5	Link free calculation files for workbooks furnaces 3, 5 and 7, dated October 2, 2008
6	Excel calculation files for Data base, 2004 to 2008
7	Excel calculation files for Monthly Furnace Reports, 2004 to 2008
8	Transalloys Analytical Reports for Coke, 2004 to 2008
9	Transalloys Analysis SiMn (product), 2004 to 2008
10	UNFCCC webpage
11	Bateman Area Hand-Over Certificate for Furnace 3 Rebuild, October 17, 2005
12	Scheme of critical dimensions of furnaces 1 to 7, before refurbishment, Mai 27, 2005
13	Scheme of critical dimensions of furnaces 1 to 7, after refurbishment, 2007
14	Transalloys Integrated Management System SHEQ internal Audit schedule (bi-annual), Mai 6, 2008
15	Transalloys Integrated Management System SHEQ self Audit programme (every 3 month), 2008
16	Transalloys Integrated Management System SHEQ, procedure TAOP 230 “Carrying out batch weigh scale tests”, November 2004
17	Transalloys Integrated Management System SHEQ, procedure TAI G01 “Calibrate Scales”, July 2006
18	Monthly Invoice of Eskom (power grid operator in SA) for November 2004, November 2005, November 2006 and November 2007
19	Monitoring Data Flow Diagram, Ecosecurities, September 8, 2008
20	Sample furnace record from Mai 5, 2008 for furnaces 3, 5, 7, among others
21	Metering Scheme for furnaces 3, 5 and 7, including serial numbers of monitoring equipments, Ecosecurities, without date
22	Description of CDM Data Management, Ecosecurities, September 8, 2008
23	Technical Data Sheet for Power Meter Enermax Plus, including brief description of meter, November 28, 2005

Reference No.	Document or Type of Information
24	Enermax Plus Power Meter Calibration Certification for Furnace 5, S/N: November 22, 2006
25	Enermax Plus Power Meter Calibration Certification for Furnace 7, S/N: September 28, 2006
26	Kemp Cape Mountain Test Certificate of DGZ Power Meter MTB 2442, S/N 6907014, before adjustment, April 16, 2008
27	Kemp Cape Mountain Test Certificate of DGZ Power Meter MTB 2442, S/N 6907014, after adjustment, April 16, 2008
28	Power Meter Technics LTD. Certification of Calibration for Power Meter MTB 2442, October 23, 2006
29	Strike Technology Calibration Attestation for Power Meters S/N 61498, 6460054, 332798, 6390018, April 4, 2008
30	ISO 9001:2000 Certificate of Dekra for Strike Technologies Design Manufacture and Distribution of Monitoring and Protection Equipment for Use in Power Systems, valid until August 31, 2009
31	Strike Enermax Calibration Certificate Power Meter S/N 332798, April 18, 2008
32	Strike Enermax Calibration Certificate Power Meter S/N 61498, April 25, 2008
33	Transalloys internal Calibration Attestation for Platform Scales, February 27, 2008
34	JCS-Scales Calibration Certification for road weigh bridge main entrance, January 25, 2008
35	JCS-Scales Calibration Certification for S/N 60102100, April 20, 2007
36	JCS-Scales Calibration Certification for S/N 60102100, January 28, 2006
37	JCS-Scales Calibration Certification for S/N 20000301, January 31, 2005
38	JCS-Scales Calibration Certification for S/N 20000301, January 27, 2004
39	High VI weight Verification Certification Hoppers H1 to H25, January 8, 2008
40	High VI weight Verification Certification Hoppers H1 to H25, January 9, 2007
41	High VI weight Verification Certification Hoppers H1 to H25, January 17, 2006
42	High VI weight Verification Certification Hoppers H1 to H25, January 7, 2005
43	High VI weight Verification Certification Hoppers H1 to H25, November 24, 2004

Reference No.	Document or Type of Information
44	Exact Calibration Services ECS for serial numbers H1 to H20
45	Exact Calibration Services ECS for serial numbers H1 to H25
46	Sample Record of Logg Book Furnace 3 for Mai 5, 2008
47	Sample Record of Logg Book Furnace 3 for March 6, 2008
48	Sample Record of Logg Book Furnace 3 for March 20, 2008
49	Sample Record of Logg Book Furnace 3 for March 26, 2008
50	Sample Record of Logg Book Furnace 5 for March 6, 2008
51	Sample Record of Logg Book Furnace 5 for March 20, 2008
52	Sample Record of Logg Book Furnace 5 for March 26, 2008
53	Sample Record of Logg Book Furnace 7 for March 6, 2008
54	Sample Record of Logg Book Furnace 7 for March 20, 2008
55	Sample Record of Logg Book Furnace 7 for March 26, 2008
56	ISO 9001:2000 Certificate of TÜV Rheinland for Highveld Steel and Vanadium Corporation LTD. for manufacturing of cast and rolled steel products and chemicals and vanadium slag, valid until January 31, 2009
57	Evidence for CDM and Monitoring Training by Ecosecurities for Transalloys CDM Project Team, March 3, 2008
58	Highveld Steel and Vanadium Corporation Limited, Annual Report 2007
59	Transalloys Paste Data from 2008, PDF file from September 8, 2008
60	Transalloys Coal Data from 2008, PDF file from September 8, 2008
61	Analysis Buffer for SiMn for the years 2006, 2007 and 2008; files from September 8, 2008