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<b>Project Title</b>	Transalloys Manganese Alloy Smelter Energy Efficiency Project
<b>CDM Project Reference Number</b>	1027
<b>Monitoring Period (dates)</b>	3rd monitoring period: 01 July 2009 – 28 February 2010
<b>Client Name</b>	EcoSecurities International Ltd.
<b>Client Address</b>	Office 40, Dawson Street, Dublin, Ireland

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## Final Verification and Certification Report

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<b>Version Control</b>	<b>Date</b>
<b>Version 01 (Draft Verification Report)</b>	14 May 2010
<b>Version 02 (Final Verification Report)</b>	15 December 2010

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<b>Project Title</b>	Transalloys Manganese Alloy Smelter Energy Efficiency Project
<b>CDM Project reference</b>	1027
<b>ERM CVS Reference Number</b>	1795 V1
<b>Project Location</b>	Transalloys, Clewer Road, Witbank, 1035, Mpumalanga
<b>Country</b>	South Africa
<b>Host Party</b>	South Africa
<b>Annex I Party(s)</b>	United Kingdom of Great Britain and Northern Ireland, Switzerland
<b>Project Participants</b>	Transalloys Pty Ltd (South Africa) [formerly Highveld Steel and Vanadium Corporation Limited]; EcoSecurities Group Plc. (UK and Switzerland)
<b>Methodologies used and version number</b>	AM0038: <u>Methodology for improved electrical energy efficiency of an existing submerged electric arc furnace used for the production of SiMn</u> , Version 1 ACM0002: <u>Consolidated methodology for grid-connected electricity generation from renewable sources</u> , Version 6

<b>Date of publication of first monitoring report version</b>	06 April 2010
<b>Final Monitoring Report date and version number</b>	Version 3 – 08 December 2010
<b>Monitoring Period</b>	3 <sup>rd</sup> Monitoring Period: 01 July 2009 – 28 February 2010
<b>Number of CERs</b>	82,934 t CO <sub>2</sub> equivalents
<b>Date(s) of Site Visit</b>	21 & 22 April 2010

<b>Date/version of Registered PDD</b>	PDD Version Number 6 02 March 2007
<b>Date of Registration</b>	19 October 07
<b>Crediting Period</b>	01 October 2004 – 30 September 2014 (fixed)

### Summary

ERM CVS was commissioned by EcoSecurities International Limited to verify and certify the emissions reductions reported for the 3<sup>rd</sup> monitoring period, 01 July 2009 to 28 February 2010 as set out in the monitoring report of the CDM project Transalloys Manganese Alloy Smelter Energy Efficiency Project, Registration Reference 1027, version 3 dated 08 December 2010.

Based on the work performed, ERM CVS has concluded that the project is implemented as set out in the registered project design document and the emission reductions set out in the monitoring report dated 08 December 2010, version 3, are fairly stated and in accordance with the revised monitoring plan approved on 25 October 2009. The emissions reductions were found to be appropriately calculated in accordance with the approved consolidated baseline and monitoring methodologies AM0038 V1 and ACM0002 V6, and the monitoring plan set out in the Revised Monitoring Plan approved by the CDM Executive Board on 25/10/09.


Based on the information we have seen and verified, ERM CVS can confirm the following performance for the corresponding monitoring period:

Monitoring period:

01 July 2009 to 28 February 2010

Verified emission in the above reporting period:

- Baseline emissions: 533,725 t CO<sub>2</sub> equivalents
- Project emissions 449,435 t CO<sub>2</sub> equivalents
- Leakage emissions: 0 t CO<sub>2</sub> equivalents
- Emission reductions: 84,291 t CO<sub>2</sub> equivalents
- Onsite Emission reductions (for uncertainty as per PDD) ERO<sub>onsite,y</sub>: 15,071 t CO<sub>2</sub> equivalents
- Emissions to be deducted for uncertainty if ERO<sub>onsite,y</sub>>0: 1,356 t CO<sub>2</sub> equivalents

<ul style="list-style-type: none"><li><b>Emission reductions (adjusted for uncertainty): 82,934 t CO<sub>2</sub> equivalents</b></li></ul> <p>This value exceeds the estimated emissions in the PDD by 87% due to a combination of reasons that have been satisfactorily explained by the Project Participant and the verification of this aspect is set out in section 4.</p>		
<b>Client</b>	EcoSecurities International Ltd.	
<b>Client Representative</b>	Aude Duquesne	
<b>Report approved by: ERM-CVS</b>		<b>Signature</b> 
<b>Name</b> Melanie Eddis		
<b>Date</b> 15 December 2010		

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## 1. Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CER	Certified Emission Reduction(s)
CH <sub>4</sub>	Methane
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
CL	Clarification Request
DNA	Designated National Authority
DOE	Designated Operational Entity
ER	Emission Reduction
ERM CVS	Environmental Resource Management Certification and Verification Services
FAR	Forward Action Request
GHG	Greenhouse Gas
GWP	Global Warming Potential
HMI	Human Man Interface
IPCC	Intergovernmental Panel on Climate Change
LFG	Landfill gas
MP	Monitoring Plan
MR	Monitoring Report
PDD	Project Design Document
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change

## 2. Introduction

This report sets out the methodology and conclusions of the verification process and the ERM CVS Certification Statement. ERM CVS assessed and verified whether the implementation of the project activity and the steps taken to report emission reductions comply with the CDM criteria and relevant guidance provided by the CMP and the CDM Executive Board.

### 2.1. Verification Objectives

As set out in the CDM modalities and procedures, verification is the periodic independent review and ex post determination by the Designated Operational Entity (DOE) of the monitored reductions in anthropogenic emissions by sources of greenhouse gases that have occurred as a result of a registered CDM project activity during the verification period. Certification is the written assurance by the DOE that, during a specified time period, a project activity achieved the reductions in anthropogenic emissions by sources of greenhouse gases as verified.

The objective of the verification is to establish whether sufficient evidence exists to confirm, to reasonable assurance:

- Whether the project activity has been implemented and is being operated as per the registered PDD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project activity are in place.
- Whether the monitoring plan is in compliance with the approved CDM methodology that has been applied
- Whether the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the monitoring plan and applicable CDM requirements.
- Whether the emission reductions, as set out in the monitoring report have been measured, calculated and reported in accordance with the monitoring plan set out in the registered PDD (or subsequent approved monitoring plan revision if applicable).
- Whether the reported data meet the key principles of data quality and are complete, reliable, consistent, accurate, valid, transparent and conservative.

### 2.2. Scope and basis of verification work

The verification is an independent and objective review and *ex-post* determination of the monitored reductions in GHG emissions by the DOE.

Based on the key project information as set on page 2 of this report, the verification addresses the implementation and operation of the project activity as set out in the registered PDD, and the information and reported emissions reductions set out in the monitoring report prepared by the project participant for this monitoring period.

The verification tests the data and assertions set out in the monitoring report prepared for this monitoring period by the project participants and is based on:

- the approved monitoring methodologies applied in the registered project design document (PDD) /1/ /2/
- the registered project design document (PDD) /3/
- revised monitoring plan /4/
- previous verification reports /8/ /9/
- UNFCCC criteria referred to in the Kyoto Protocol criteria and the CDM modalities and procedures as agreed in the Bonn Agreement and the Marrakech Accords
- Relevant decisions, guidance and clarifications of the CMP and CDM Executive Board and any other information and references relevant to the project activity's reported emission reductions
- the Validation and Verification Manual as approved by the CDM Executive Board (EB 55) /22/
- Specific guidance and clarification of the Executive Board applicable to this project:

The Verification assesses the emissions reductions for the period 01/07/2009 - 28/02/2010 as reported in the Monitoring Report, for the Transalloys Manganese Alloy Smelter Energy Efficiency Project.

The monitoring report is assessed, using a rules based approach, against the principles of accuracy, relevance, credibility, reliability, completeness, consistency, and transparency. Conservativeness is applied throughout the process to ensure that emission reductions are not overstated.

The verification considers both quantitative and qualitative information on emission reductions. Quantitative information comprises the data and numbers reported in the Monitoring Report submitted for verification to the DOE. Qualitative information 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 does not provide any consulting advice to the client. However, stated requests for clarifications and/or corrective actions could potentially lead to the improvements to the monitoring activities.

The reference documents used for this verification are listed in Annex 1: Reference Documents. The site visit for the 3<sup>rd</sup> periodic Verification was conducted on 21 & 22 April 2010.

### 2.3. Description of Project Activity and Period Covered

This engagement covers emissions and emission reduction from anthropogenic sources of GHG included within the project boundary of the registered PDD of the following project and period.

<b>Name of Project</b>	Transalloys Manganese Alloy Smelter Energy Efficiency Project
<b>UNFCCC Registration Number</b>	1027
<b>Monitoring Period Covered in this Report</b>	01/07/2009 - 28/02/2010
<b>Project Participants</b>	Transalloys Pty Ltd (South Africa) [formerly Highveld Steel and Vanadium Corporation Limited]; EcoSecurities Group Plc. (UK and Switzerland)
<b>Location of the Project Activity</b>	Transalloys, Clewer Road, Witbank, 1035, Mpumalanga, South Africa

The Transalloys Manganese Alloy Smelter Energy Efficiency Project, developed by Transalloys, formally a division of Highveld Steel and Vanadium Corporation Ltd and now an independent company, is primarily an industrial energy efficiency project that reduces the electricity consumption in the production of silicomanganese (SiMn) alloy (a key component in steel making) at its Witbank facility in South Africa. It primarily generates certified emission reductions (CERs) due to the retrofitting of current submerged electric arc furnaces with a new design of electric arc furnaces, electrode assemblies, and control and peripheral systems which reduces the specific electricity consumption of alloy production. The project displaces electricity from the South African grid, which is mostly produced from coal (these are known as the "offsite" emissions). Amounts of coal, coke (used as reductants) & paste used is also monitored as their use results in carbon emissions (these are known in the PDD as "onsite" emissions).

Five furnaces are covered by the project. Furnace 7 was retrofitted in late 2004, furnace 5 and furnace 3 in 2005 and furnace 1 and furnace 6 are expected to be retrofitted, although plans have been delayed due to poor market conditions that directly affected the viability of the retrofits.

The approach of the project, for all furnaces, has been to retrofit new technology into the existing furnace infrastructure, which was designed for a different technology.

The central elements that have been changed in the project are the following:

- Furnaces 7 and 5: the PCD (pitch centre diameter), which measures the distance between the three electrodes, is optimized in order to reduce electricity consumption.
- The same principles are applied for furnace 3. The units are smaller and so the design is a bit different and the elements that needed to be changed for the project are not all the same. For instance, furnace 3 is converted from a rotating (around its vertical axle) to a stationary furnace and the old pneumatic slipping system (to let the electrode paste down the electrode) is changed. Bateman provide the technology for these furnaces.

### 3. Verification activities

#### 3.1. Contract Review

Prior to contracting with the client, a full review of the project and the verification requirements was made. This addressed both commercial risk and project risks associated with conducting the verification activities and confirmed the availability of an appropriately qualified team to conduct the verification.

#### 3.2. ERM CVS Approach

The Verification comprised the following activities:

- Document review based on the Monitoring Report and other project documentation, the project activities and the processes undertaken by the project participants;
- A site visit, conducted on 21 & 22 April 2010, to review evidence and interview key personnel for the registered project activity;
- Preparation of reports; and
- Technical review.

#### 3.3. Appointment of Team Members and Technical Reviewers

Based on ERM CVS's review of the project the Verification Team required the following competencies:

- Knowledge of Kyoto Protocol and the Marrakech Accords;
- Knowledge of the industry (SiMn production processes), technology, and associated energy requirements;
- Monitoring concepts;
- Quality assurance;
- Skills in environmental auditing (ISO 14000, EMAS); and
- Political, economical, legal and technical framework conditions in South Africa.

ERM CVS has therefore composed a project team consisting of the following:

Verification Team	Role	Coverage of technical scope	Coverage of sectoral expertise	Host country experience	Participated in site visit?
Jon Duncan	Lead Verifier	√	√	√	Yes
Graham Paul	Verifier	√	√	√	Yes
Brian Hayes	Technical Expert	√	√	√	Yes

Technical Review	Role	Coverage of technical scope	Coverage of sectoral expertise	Host country experience	Participated in site visit?
Braulio Pikman	Technical Reviewer	√	√		No

**Jon Duncan** has 14 year of experience in applied environmental sciences. Jon has an engineering undergraduate followed by a masters degree in environmental science. Jon has over 5 years of experience in greenhouse gas data verification and has worked across several sectors, including metals smelting, mining, logistics, manufacturing and construction. Jon has undergone formal ERM CVS DOE training for both validation and verification and has led verification projects using AM0038.

**Graham Paul** has an MSc in Global Environmental Change. Graham has project experience in climate strategy, carbon footprinting, climate risk assessment, the Clean Development Mechanism (CDM), carbon due diligence, and greenhouse gas data verification. Graham has had formal verification training and has worked on projects covering approved methodologies ACM0002 and AM0038 previously with a focus on the mining sector.

**Brian Hayes** joined the team as a sectoral expert and has worked for 5 years in Engineering and Production as a Process Engineer and Production Manager and 9 years in the field of SHEQ Management. He has particular expertise in the mining and minerals processing sectors and has acted as technical process specialist to environmental compliance audits of SiMn processes. He also worked as Process Engineer to the Iron and Steel Corporation of SA (ISCOR), working at the petrochemical division. Further 9 years in capacity of technical specialist to environmental legal compliance audits.

**Braulio Pikman** has experience in Thermal Measurements, Combustion, Energy efficiency, Climate Change, CDM Methodologies. Mr Pikman has Coordinated the Thermal Measurements Laboratory of the Technological Research Institute of Sao Paulo for 10 years, working with Combustion & Gasification Experimental Diagnostics, Air Emissions Monitoring & Control, development of instrumentation for measurements in flames and Energy Conservation Projects to the Oil & Gas Sector, Petrochemical and also mining and metals sector (aluminum, steel and magnesium industry). Mr Pikman was responsible for the energy conservation program of the National Petroleum Agency of Brazil from 2000 to 2002 regarding the industrial and



Transportation Sectors. Since May, 2005, Mr Pikman is a Member of The Methodological Panel of the United Nations Framework Convention on Climate Change and has assessed more than 10 methodologies related to the metals smelting sector.

### 3.4. Verification Activities

#### a) Document Review

A comprehensive review was conducted of the registered PDD, including the monitoring plan, the corresponding validation report, previous verification reports, the initial verification report, the applied monitoring methodology, and relevant decisions, clarifications and guidance in the CDM Modalities and Procedures and the CDM Executive Board. A completed list of all Reference Documents reviewed is contained in Annex 1.

#### b) Site Visit

<b>Location</b>	Transalloys, Clewer Road, Witbank, 1035, Mpumalanga	
<b>Site visit date</b>	21 & 22 April 2010	
<b>Coverage</b>	<b>Information Source</b>	
<ul style="list-style-type: none"> <li>Assessment of the project implementation as per the registered PDD;</li> <li>Review of information flows for generating, aggregating and reporting the monitoring parameters;</li> <li>Interviews with relevant personnel were conducted to confirm that the operational and data collection procedures are implemented in accordance with the revised monitoring plan;</li> <li>Cross-checked information provided in the Monitoring Report with data from other sources such as monitoring manual, CER calculation workbook, daily and monthly logsheet data, and equipment printouts;</li> <li>Checked monitoring equipment including calibration performance and observations of the monitoring practices against the requirements of the revised monitoring plan and the selected methodology;</li> <li>Review calculations and assumptions made in determining the GHG data and emission reductions; and</li> <li>Identification of quality control and quality control procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.</li> </ul>	<b>Documentation:</b> (see Annex 1 for the complete list) <ul style="list-style-type: none"> <li>PDD /3/</li> <li>Revised Monitoring Plan, /4/</li> <li>AM0038 v1 and ACM0002 v6; /1/ /2/</li> <li>Validation Report, /28/</li> <li>Validation of Revised Monitoring Plan ; /29/</li> <li>Monitoring Report and Final Verification Report for the 1<sup>st</sup> monitoring period; /8/</li> <li>Monitoring Report and Final Verification Report for the 2<sup>nd</sup> monitoring period; /9/</li> <li>Monitoring Report for the 3<sup>rd</sup> monitoring period; /5/</li> <li>Monitoring Manual (for on site instruction);/6/</li> <li>Equipment printouts (source data - Platform scales and Batchweigh scales) /7/;</li> <li>Daily and monthly furnace logsheet data; /12/</li> <li>CER Calculation Workbook for the monitoring period; /14/</li> <li>Equipment Maintenance Schedules &amp; Calibration records. /7/</li> </ul>	
	<b>Interviews conducted with:</b> <ul style="list-style-type: none"> <li>Sean Buchanan – EcoSecurities Project Manager;</li> <li>Lou Jacobs – Transalloys CDM Programme Manager</li> <li>Blessing Buthelezi – Transalloys Laboratory</li> <li>Steve van Niekerk – Instruments Engineer</li> <li>Amos Masemoka, Cassie Steenkamp, Tumelo Nkadineng - Transalloys Furnace Operators</li> <li>Production Engineers</li> </ul>	

#### c) Reporting Findings

As a result of the verification process, the Verification Team may raise the following findings:

- Clarification Request (CL): where information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.
- Corrective Action Request (CAR): This is issued where:
  - Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient
  - Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impair the estimate of emission reductions
  - Issues identified in a Forward Action Request (FAR) during validation (or previous verification) to be verified have not been resolved by the project participants

The verification process may be stopped until this information has been made available to the verifiers' satisfaction. Failure to address a CL may result in the CAR. Information or clarification provides as a result of a CL may also lead to a CAR. Forward Action Requests (FAR) may also be raised for actions if the monitoring and reporting require attention and/or adjustment for the next verification period. These have no impact upon the completion of the current verification activity.

A 'Minor Issue' may be recorded for typographical errors or similar minor errors that do not have an impact on the compliance of the project to the CDM rules but nevertheless should be corrected to improve clarity.

After satisfactory close out of CARs and CLs, the final report presents the verification activities undertaken, the issues raised, and explains how these issues have been closed out to enable the final verification conclusions to be made.

### **3.5. Independent technical review**

The verification activities and content of the report are subject to a review by an independent technical reviewer. The role of the Technical Reviewer is to provide oversight that all procedures have been followed by the verification team and all conclusions justified and supported by evidence. The Technical Reviewer will either accept or reject the recommendations made by the verification team.

#### 4. Verification Findings

##### 4.1. Status of open issues from previous verifications (if applicable)

The 2<sup>nd</sup> verification was conducted by ERM CVS and the following FARs were raised:

**FAR1** - *There is a need to archive all equipment printouts for both equipment calibration and for monitoring project parameters for the entire project crediting period.*

During the 3<sup>rd</sup> verification conducted by ERM CVS, archiving processes were reviewed and confirmed to be adequate. Hence FAR 1 has been closed out.

**FAR2** - *There is a need to make all monthly Excel logsheets password protected at the end of the month when they are saved on the server in order to prevent any 'editing' of these logsheets taking place.*

During the 3<sup>rd</sup> verification conducted by ERM CVS, the Excel logsheets were reviewed and found to be password protected. Hence FAR 2 has been closed out.

**FAR3** - *There is a need to protect all 'calculation cells' in the daily Excel logsheets in order to prevent the entering of raw data into these cells.*

During the 3<sup>rd</sup> verification conducted by ERM CVS, it was observed that the calculation cells in the daily furnace logsheets are locked once the daily QA/QC review process has been completed. ERM CVS did verify that logsheets are reviewed daily by the CDM QA/QC manager, and once he is confident that all daily data is correct, locks all calculation cells. ERM CVS is of the opinion that the above described process prevents manipulation of logsheets, and hence FAR3 is closed out.

**FAR4** - *There is a need for a procedure for the QA/QC of logsheet data to be developed and for this procedure to include processes for the changing of data in logsheets.*

During the 3<sup>rd</sup> verification conducted by ERM CVS, it was noted that a QA/QC process has been developed however the consistent application of this QA/QC process was questioned. Hence CAR7 was raised for a formal procedure to be developed. This was done and the monitoring report was revised accordingly. CAR7 was closed, and this closes FAR 4.

**FAR5** - *There is a need to update the current load cell (weigh hopper) calibration procedure to include the process in place to calibrate the mass pieces used for the calibration of the weighhoppers' load cells.*

During the verification it was confirmed that Transalloys has implemented two separate procedures for these two processes, since calibration of the test weights is an annual activity and calibration of the load cells in the batchweigh system using these test weights is a weekly activity. Hence FAR 5 has been closed out.

**FAR6** - *There is a need to file the documentation (letters and emails) relating to the manufacturers requirements for the maintenance and calibration of scale platforms (QPy, monitored), electricity meters (ECy), and load cells in weigh hoppers (Qpcoal,y and Qpcoke,y) on site with the monitoring plan.*

ERM CVS verified the filing of relevant documentation and found that appropriate filing was in place. Hence FAR6 has been closed out.

There are no remaining open FARs.

##### 4.2. Project Implementation in accordance with the registered PDD

The Transalloys Manganese Alloy Smelter Energy Efficiency Project, Registration Reference 1027, was registered on 19/10/2007 with the crediting period of 01/10/04 - 30/09/2014 (fixed). This is the 3<sup>rd</sup> project verification and the monitoring period covered in this verification activity is 01/07/2009 - 28/02/2010, which falls within the crediting period.

Based on review of documentation and the site visit, ERM CVS can confirm that the project has been implemented and operated as set out in the PDD. Furnaces 3, 5 and 7 have been retrofitted as described in the PDD. Whilst the PDD makes provision for the furnaces 1 and 6 to be retrofitted this has not been done due to economic conditions. Due to the fact that the furnaces were in operation at the time of the site visit, it was not physically possible to verify the PCD optimization but evidence was provided in the form of schematic diagrams.

The project started operating on 01/10/2004 with the PCD optimization to furnace 7 taking place by end September 2004, to furnace 5 by start December 2005, and to furnace 3 by end October 2005, along with the conversion of furnace 3 from a rotating

furnace to a stationary furnace. According to the PDD, furnace 6 was to be retrofitted in 2008 and furnace 1 in 2009. According to the project manager the plan is still to retrofit furnaces 1 and 6 but will only do so when economic conditions improve. As it stands, during the monitoring period of 8 months, furnace 3 operated for 6 months in 2009 and 2 months in 2010, furnace 5 for approximately 5¼ months in 2009, and 2 months in 2010, and furnace 7 for approximately 3¼ months in 2009 and 2 months in 2010. Transalloys have all the metering and monitoring equipment in place at the 3 retrofitted furnaces in order to monitor the project parameters. Further, the data storage processes and systems have been confirmed to be in accordance with the monitoring plan.

The description of the project activity in the monitoring report /5/ is found to be an accurate reflection of the actual implementation and operation, and aligned with the project description in the registered PDD /3/. The Verification team can confirm that there have been no changes to the project or to any attributes of the project between the 2<sup>nd</sup> and 3<sup>rd</sup> verification periods.

#### 4.3. Compliance of the monitoring plan with the monitoring methodology

The project participants sought revision to the Monitoring Plan in the 2<sup>nd</sup> verification period. The Revised Monitoring Plan was validated by DNV and was approved by the CDM Executive Board on 25/10/09 /4/. The validation report confirmed conformance with the monitoring methodology, and this was also checked by ERM CVS.

In conclusion, the monitoring plan is in accordance with the approved methodologies, AM0038 v1 and ACM0002 v6, applied by the CDM project activity

#### 4.4. Compliance of monitoring with the monitoring plan

Based on ERM CVS's review of project documentation, interviews with relevant personnel and observations during the site visit, ERM CVS can confirm that the project monitoring system has been implemented as set out in revised monitoring plan in accordance with AM0038 V1. All parameters stated in the monitoring plan have been applied and the monitoring equipment has been installed and operated as required.

The applicable methodologies AM0038 v1 and ACM0002 v6 require that the following data be collected:

1. Tonnes of SiMn, QP,y
2. MWh of electricity use, EC,y
3. Tonnes of coal, QPcoal,y
4. Tonnes of coke, QPcoke,y
5. Tonnes of paste, QPpaste,y
6. tCO<sub>2</sub>/tcoal, EFpcoal,y
7. tCO<sub>2</sub>/tcoke, EFpcoke,y
8. tCO<sub>2</sub>/tcarbon paste, EFppaste,y
9. Quality of coal (mass fraction %)
10. Quality of coke (mass fraction %)
11. Quality of electrode paste (mass fraction %)
12. tCO<sub>2</sub>/MWh, EF,y, offsite
13. Quality of SiMn (mass fraction %)
14. Quality of ore (mass fraction %)
15. Quality of fluxes (mass fraction %)

The monitoring of project parameters as per the Revised Monitoring Plan and the implementation of management quality assurance and quality control procedures (including the revision and implementation of FARs from the 2<sup>nd</sup> verification) have been properly implemented in accordance with the Revised Monitoring Plan and the Monitoring Report (as detailed in section 4 of this document). Exceptions identified during the verification are noted as CLs or CARs below, and these were all closed out. This has been confirmed through site inspection and data and supporting record review.

The data set provided for the monitoring period includes times in which the furnaces were not running (furnace 3 did not operate for three quarters of the month of July 2009 (23 Days), furnace 7 did not operate for July, August and three quarters of the month of September 2010 (22 days). Samples of data were traced from their origin (references in IPCC documents / origination in the Transalloys lab / supplier documentation / equipment printouts), to their use in daily logsheets (electronic), their transfer into the calculation workbook as well as a review of all calculations used to produce the final emissions reductions. The traceability of records was confirmed.

##### Archived equipment printout data:

The process of archiving all equipment printouts, for both equipment calibration and for monitoring project parameters for the monitoring period was found to be followed. These equipment printouts are used to verify and cross check the daily logsheet data. However, despite the fact that paper print outs showing batchweigh data for raw material use in Furnace 7 were available for the monitoring period, it was unclear how this particular archived information is used in the QA/QC process of daily shift totals for raw material use. Hence CL2 was raised.

**CL2:** Please clarify the application of the QA/QC process for daily batchweigh data for furnace 7.

Further documentation was provided by the project participant and CL2 was closed.

Logsheet data versus archived equipment printout data:

As stated, equipment printouts are used to verify the daily logsheet data. Data points were reviewed for the monitoring period (note that F7 did not operate for July, August and half of September of 2009). The following data points were assessed on each log sheet:

- Tap data (SiMn production);
- Batchweigh data (Coal use and coke use).

Electricity use (MWh) and paste use were compared with utility invoices and supplier invoices respectively.

A series of minor differences between daily logsheet data and the archived data and CAR 1 was raised.

**CAR1:** Please provide annotation in the logsheets for the above identified dates describing the inconsistencies found between the archived equipment printouts (where available) and the daily logsheets and make corrections where appropriate.

The project participant provided the explanation and corrections to the data. CAR 1 was therefore closed.

Electricity use (ECy):

During the review of electricity use (ECy) during the monitoring period, a difference in Furnace 3 consumption was found when comparing the logsheets, Calculation Workbook and monitoring report. The total consumption as per the logsheets is 65720 MWh (start meter reading of 48140 MWh and closing meter reading of 113860MWh), but according to the Calculation Workbook and Monitoring Report, total electricity consumption is 65711 MWh. The reason is due to a meter reading being incorrectly recorded in August and September of the monitoring period. Hence CAR2 has been raised.

**CAR2:** Please correct the meter reading recording in the daily logsheets, calculation workbook and monitoring report.

The necessary corrections were made and CAR 2 was closed.

The first version of the monitoring report, under the QA/QC procedure for electricity use (ECy) the following is stated: "Values reported are cross-checked with electricity metered monthly by the grid company Eskom. The two values correlate satisfactorily during this Monitoring Period". The verification process identified that there has been an issue with the meters belonging to Eskom during the period November 2009 to February 2010 when the electricity use data provided by Eskom was not the same MWh usage as the meters belonging to Transalloys (which are used to monitor the CDM project). The PP indicated that the QA/QC procedure has been implemented as per the requirements of the monitoring plan and that it was through this process that the following electricity differences were noted:

*Table 1: Differences noted between Eskom invoices and Transalloys meters*

	Nov-09	Dec-09	Jan-10	Feb-10
<b>Transalloys Total (kWh)</b>	66,994,850	66,725,970	63,917,510	62,265,931
<b>ESKOM Total (kWh)</b>	70,418,600	71,005,625	65,707,725	62,823,900
<b>Difference (kWh)</b>	3,423,750	4,279,655	1,790,215	557,969
<b>% Difference</b>	4.9	6.0	2.7	0.9

The verification team reviewed communication between the two companies in aid of addressing the issue. Eskom conceded that their meters were faulty for the period in question and as a result will invoice Transalloys for the months in question using the readings from the Transalloys meters as apposed to their own meters. This was considered appropriate since the tons of product produced relative to energy consumed is in line with historical performance for the furnaces set out below.

*Table 2: Comparison of energy consumption relative to production*

	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	TOTAL
Transalloys Total (kWh)	20,268,150	37,315,250	41,936,100	66,471,050	66,994,850	66,725,970	63,917,510	62,265,931	<b>425,894,811</b>
Eskom Total (kWh)	20,268,150	37,315,250	41,936,100	66,471,050	70,418,600	71,005,625	65,707,725	62,823,900	<b>435,946,400</b>
Difference (kWh)	0	0	0	0	3,423,750	4,279,655	1,790,215	557,969	<b>10,051,589</b>
Difference (%)	0.0	0.0	0.0	0.0	4.9	6.0	2.7	0.9	<b>2.3</b>

**Furnace #3**

# 3 furnace (kWh)	8,835,000	8,671,000	8,076,000	8,384,000	8,139,000	7,919,000	7,890,000	7,812,000	<b>65,726,000.00</b>
# 3 furnace (MWh)	8,835	8,671	8,076	8,384	8,139	7,919	7,890	7,812	<b>65,726.00</b>

	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	TOTAL
# 3 furnace (SiMn)	2,058.79	2,170.90	1,922.60	2,047.80	1,909.40	2,027.55	1,779.55	1,753.55	15,670.14
Energy intensity (tonnes SiMn/kWh)	0.000233	0.000250	0.000238	0.000244	0.000235	0.000256	0.000226	0.000224	0.000238
Energy intensity (tonnes SiMn/MWh)	0.23	0.25	0.24	0.24	0.23	0.26	0.23	0.22	0.24
Secp (MWh/tonnes SiMn)	4.29	3.99	4.20	4.09	4.26	3.91	4.43	4.45	4.19

**Furnace #5**

# 5 furnace (kWh)	555,000	14,755,000	16,441,000	18,266,000	16,473,000	18,404,000	17,295,000	15,604,000	117,793,000.00
# 5 furnace (MWh)	555	14,755	16,441	18,266	16,473	18,404	17,295	15,604	117,793.00
# 5 furnace (SiMn)	33.60	3,209.55	3,719.00	4,021.45	3,560.45	4,058.80	3,583.30	3,458.65	25,644.80
Energy intensity (tonnes SiMn/kWh)	0.000061	0.000218	0.000226	0.000220	0.000216	0.000221	0.000207	0.000222	0.000218
Energy intensity (tonnes SiMn/MWh)	0.06	0.22	0.23	0.22	0.22	0.22	0.21	0.22	0.22
Secp (MWh/tonnes SiMn)	16.52	4.60	4.42	4.54	4.63	4.53	4.83	4.51	4.59

**Furnace #7**

# 7 furnace (kWh)	0	0	515,000	15,008,000	17,818,000	17,043,000	16,191,000	16,596,000	83,171,000.00
# 7 furnace (MWh)	0	0	515	15,008	17,818	17,043	16,191	16,596	83,171.00
# 7 furnace (SiMn)	-	-	-	3,350.85	4,423.75	4,116.75	3,650.65	4,447.25	19,989.25
Energy intensity (tonnes SiMn/kWh)	0.000000	0.000000	0.000000	0.000223	0.000248	0.000242	0.000225	0.000268	0.000240
Energy intensity (tonnes SiMn/MWh)	0.00	0.00	0.00	0.22	0.25	0.24	0.23	0.27	0.24
Secp (MWh/tonnes SiMn)	-	-	-	4.48	4.03	4.14	4.44	3.73	4.16

Since the QA/QC process had been implemented, but not properly reported in the monitoring report, CAR3 was raised.

**CAR3:** Please update the QA/QC procedure (ECy) in the monitoring report to reflect the QA/QC procedures that have taken place, and the results thereof.

The project participants revised the monitoring report and CAR 3 was closed.

Data annotation:

During data verification process, some minor inconsistencies between equipment printouts and logsheet data were found. These inconsistencies were often due to a change in operating conditions and with the help of production engineers the inconsistencies were explained and if necessary, corrected. Annotation currently only occurs if incorrect data are corrected.

**FAR 1** was raised to request that in future monitoring periods, any change from "normal conditions" is fully annotated. For example, a change in the batchweigh recipe and the associated changes in equipment printouts vs logsheet data.

Coal (Qpcoal) and Coke (Qpcoke) use – QA/QC procedure:

In the first version of the monitoring report, under the QA/QC procedure for both coal use (Qpcoal), and coke use (Qpcoke), the following is stated: "The weigh hoppers are maintained regularly and tested weekly for accuracy according to internal procedure

TAOP230". This provides information on the QA/QC procedure for maintaining equipment but does not provide information on the QA/QC procedure for ensuring the coal use and coke use data is accurate. Hence CAR4 has been raised.

**CAR4:** Please update the QA/QC procedure (Qpcoal and Qpcoke) in the monitoring report to reflect the procedure that ensures the accuracy of the data.

The monitoring report was updated by the PP and CAR 4 was closed.

SiMn production (QPy) – QA/QC procedure:

In the first version of the monitoring report, under the QA/QC procedure for SiMn production (QPy) the following is stated: "The measured data correlates satisfactorily with the product sales record during this Monitoring Period." However, it is not strictly true that the data is compared with the product sales record but rather the "saleable production" (which includes recovered material). Hence CAR5 has been raised.

**CAR5:** Please update the QA/QC procedure (QPy) in the monitoring report to reflect the actual QA/QC procedures that have taken place, and the results thereof.

The monitoring report was updated by the PP and CAR 5 was closed.

#### 4.5. Assessment of data and calculation of GHG emission reductions

The emission reduction calculations are contained in the Transalloys Calculation Workbook /14/. The Calculation Workbook contains the following information:

- F3 – Historic and Baseline data and calculations
- F3 – Project emissions and emission reductions calculations
- F3 – Daily furnace data
- F3 – SiMn Composition data
- F5 – Historic and Baseline data and calculations
- F5 – Project emissions and emission reductions calculations
- F5 – Daily furnace data
- F5 – SiMn Composition data
- F7 – Historic and Baseline data and calculations
- F7 – Project emissions and emission reductions calculations
- F7 – Daily furnace data
- F7 – SiMn Composition data
- Paste emission factor data
- Paste delivery data
- Coke emission factor data
- Ore quality data
- Coal quality data
- Flux quality data

The verification team evaluated the calculations in the Monitoring Report to determine the emission reductions during the monitoring period resulting from implementation of the project activity. In conducting this evaluation, the verification team considered:

- Conformance with the formulae and methods described in the monitoring plan and applied methodology;
- Completeness of data during the monitoring period;
- Supporting evidence and audit trails, such as plant log books, inventories and purchase records;
- Assumptions used in the calculations and their basis;
- Application of emission factors, IPCC default values and other reference values.

The following equations, in line with the requirements of the methodology, were used to calculate the emission reductions in the Transalloys Calculation Workbook /14/:

1.	$BEy = BEy_{\text{offsite}} + BEy_{\text{onsite}}$ for each furnace
2.	$BEy_{\text{offsite}} = QPy_{\text{max}} \times secb \times EFy_{\text{offsite}}$
3.	$BEy_{\text{onsite}} = QPy_{\text{max}} \times EFb_{\text{onsite}}$
4.	$EFb_{\text{onsite}} = (Qb_{\text{coal}} \times EFb_{\text{coal}} + Qb_{\text{coke}} \times EFb_{\text{coke}} + Qb_{\text{paste}} \times EFb_{\text{paste}}) / QP$

5. $Q_{Py,max} = \text{minimum}(Q_{Py,monitored}, Q_{Phistoric})$
6. $PE_y = PE_{y,offsite} + PE_{y,onsite}$ for each furnace
7. $PE_{y,offsite} = Q_{Py,max} \times \text{secp} \times EF_{y,offsite}$
8. $PE_{y,onsite} = Q_{Py,max} \times EF_{p,y,onsite}$
9. $EF_{p,y,onsite} = (Q_{p,coal} \times EF_{p,coal} + Q_{p,coke} \times EF_{p,coke} + Q_{p,paste} \times EF_{p,paste}) / Q_P$
10. $Q_{Py,max} = \text{minimum}(Q_{Py,monitored}, Q_{Phistoric})$
11. $L_y = 0$
12. $ER_y = BE_y - PE_y - L_y$ for each furnace
13. $ER_{y,onsite} = BE_{y,onsite} - PE_{y,onsite}$
14. $BE_y = BE_{y,F3} + BE_{y,F5} + BE_{y,F7}$
15. $PE_y = PE_{y,F3} + PE_{y,F5} + PE_{y,F7}$
16. $\text{Leakage} = L_{F3} + L_{F5} + L_{F7} = 0$
17. $ER_{y,\text{not adjusted}} = BE_y - PE_y - L_y$
18. $ER_{onsite,y} = ER_{onsite,y,F3} + ER_{onsite,y,F5} + ER_{onsite,y,F7}$
19. Uncertainty adjustment component = $0.91 \times ER_{onsite,y}$ if $ER_{onsite,y} > 0$
20. Uncertainty adjustment component = 0 if $ER_{onsite,y} \leq 0$
21. $ER_y = ER_{y,\text{not adjusted}} - \text{Uncertainty adjustment component}$

The formulae above were checked and found to be consistent with the requirements of the methodology and were all correctly entered into the Transalloys Calculation Workbook /14/. that was used to calculate the emission reductions. Since the emission reduction on site are greater than zero, the uncertainty factor of 0.91 was applied as per the requirements of the methodology. The final amount of CER claimed after adjustment for uncertainty is 82,934 t CO<sub>2</sub> equivalents.

The data set supplied for CER calculation purposes was found to be complete and the emission reduction calculations transparent. The appropriate formulae and methods of calculations of the baseline emissions and project emissions have been implemented (methodology requires no leakage calculation) as per the Revised Monitoring Plan. The use of emission factors and of default values have been appropriately justified and correctly applied.

The following default data have been appropriately applied in the emission reduction calculations:

- Coal emission factor - 3.1 tCO<sub>2</sub>/tcoal - IPCC (2006) - Vol3, Ch4, section 4.3.3.2, table 4.6 page 4.37
- Carbon content of volatiles in coke - 80% - equation 4.19, p4.33 of IPCC (2006)
- Carbon content of volatiles in paste - 80% - same value as for the coke of 80% is used as per equation 4.19, p4.33 of IPCC (2006)
- 3.67 tCO<sub>2</sub>/tpaste - conservative value used for paste if monthly analysis from supplier unavailable, as per PDD (i.e. 100% carbon)
- Electricity grid emission factor (EF<sub>y</sub>, offsite) - 1.221 tCO<sub>2</sub>/MWh - established *ex ante* according to ACM0002 Version 6

The emission reduction calculations have been reviewed and samples of data have been traced from their origin (references in IPCC documents / origination in the Transalloys lab / supplier documentation / equipment printouts), to their use in logsheets (electronic), their transfer into calculation workbooks as well as a review of all calculations used to produce the final emissions reductions.

#### Data verification – logsheet data versus Transalloys Calculation Workbook:

The logsheet data are transcribed into the Transalloys Calculation Workbook in order to calculate emissions reductions during the monitoring period. A review of the daily logsheet data against the Transalloys Calculation Workbook data was undertaken. Out of a sample of 270 data points, 5 minor differences representing transcription errors from logsheets into the CER Calculation Workbook were found. The largest error identified was 0.1%. These are set out in the table below.



Table 3: Transcription errors from logsheets into the CER Calculation Workbook

Date	Issue:	ERM Finding
16-Dec-09	Logsheets data vs workbook data - coal	Difference in coal amount between logsheet and workbook
17-Dec-09	Logsheets data vs workbook data - coal	Difference in coal amount between logsheet and workbook
22-Dec-09	Logsheets data vs workbook data - coal	Difference in coal amount between logsheet and workbook
23-Dec-09	Logsheets data vs workbook data - coal	Difference in coal amount between logsheet and workbook
31-Dec-09	Logsheets data vs workbook data - paste	Difference in paste amount between logsheet and workbook

Hence CAR6 has been raised.

**CAR6:** Please check the logsheets and correct the transcription errors found between the logsheets and the CER Calculation Workbook.

The PP confirmed that transcription errors had been identified and corrected. CAR 6 is closed.

#### Data verification – efficiency in emissions reductions:

The efficiency improvement in emissions reductions (calculated as emissions reductions divided by baseline emissions) for the monitoring period under review for each furnace is noted as:

- F3: 14.1% (2009), 8.9% (2010), 12.8% (Total),
- F5: 14.9% (2009), 12.1% (2010), 14.2% (Total),
- F7: 17.5% (2009), 23.8% (2010), 19.7% (Total).

Hence the implementation of the project has resulted in similar improvements in emission reductions (versus baseline emissions) at F3 and F5, but a somewhat higher efficiency improvement at F7 compared with the previous monitoring period. Hence CL1 was raised to clarify the reason for the greater efficiency achieved at Furnace 7 versus Furnaces 3 and 5 for the same monitoring period.

**CL1:** Please clarify the reasons for the greater emissions reductions at furnace 7 versus those at Furnace 3 and 5.

The PP provided further explanation and this CL was closed.

Compliance question	Verification activities undertaken	Findings	Conclusion (OK/CAR/CL)
<i>Were data available throughout the monitoring period in accordance with the monitoring plan and methodology?</i>	The daily and monthly records dated from 1 July 2009 to 28 Feb 2010 were available and deemed to be in order /12 to 24/	All data were available throughout the monitoring period in accordance with the monitoring plan and methodology. Some minor transcription errors were found and hence CAR 6 was raised. These were corrected and CAR 6 was closed.	CAR 6
<i>Has the project participant used appropriate methods and formulae for calculating baseline, project and leakage emissions?</i>	The calculation workbook used by the client has been checked and the formulae were found to be consistent with the requirements of the methodology	The project participant has used appropriate methods and formulae for calculating baseline, project and leakage emissions	OK
<i>Has the project participant justified all assumptions, emission factors and default values that have been applied?</i>	The grid emission factor and assumption was found to be consistent with the requirements of the methodology. /12 to 24/	The emission factors and default values that have been applied are appropriate and justified.	OK

#### Conclusion

Emission reductions have been calculated in accordance with the monitoring plan and the applied methodology, and it was determined that the data processing and emission reductions calculations resulted in real and measurable emission reductions. Where there was any unavailability of data, the conservative assumptions have been made. All assumptions, emission factors and default values have been justified and the information has been cross checked with other sources.

#### 4.6. Management Systems and Quality Assurance

Transalloys maintains an ISO9000 quality management system /23/. The project activity has a monitoring manual /6/, which provides guidance on how the monitoring plan in the PDD is implemented by the project developer. The project activity has an onsite CDM Management Team and operates within the Transalloys standard operating procedures.

The Revised Monitoring Plan provides a list of the parameters which must be monitored during the project activity. It also provides for each parameter, a description of the measurement methods as well as the QA/QC procedures applied.

The monitoring of project parameters as per the Revised Monitoring Plan and the implementation of management quality assurance and quality control procedures (including the revision and implementation corrections to close out FARs from the **2<sup>nd</sup> verification**) were confirmed to be properly implemented in accordance with the Revised Monitoring Plan and the Monitoring Report (as detailed in section 4 of this document). A further minor exception was noted with respect to inconsistent recording of the outcomes of calibration and testing of the platform scales in the furnace logsheets which did not impact on the accuracy of emission reductions during this monitoring period. However improvements have been requested in FAR 1 to improve recording in future monitoring periods.

#### 4.7. Deviations

No requests were submitted to the CDM Executive Board for revision or deviation from the approved monitoring plan.

#### 4.8. Comparison of emission reductions with those predicted in the PDD

The forecasted emission reductions in the PDD for the period 2009-2010 are 66,553 t CO<sub>2</sub>e/year. When this is reduced to the length of monitoring period of 8 months the forecast for this period is 44,368 t CO<sub>2</sub>e, which is correctly set out in the monitoring report. However the monitoring report, in Section E.5, presents the predicted emissions reductions on an annual basis, which is not comparable with the emissions reductions during this monitoring period. Therefore CL3 was raised for comparative data to be presented.

The amount of emissions reductions reported during the **3<sup>rd</sup> monitoring period** (82,934 tCO<sub>2</sub>e) exceeds the estimated emissions in the PDD by 87% due to a combination of factors that have both positively and negatively influenced the estimated emission reductions. An excess was also reported, and issued, during the 1<sup>st</sup> monitoring period (01/10/2004 – 31/03/2008), as well as during the 2<sup>nd</sup> monitoring period (1/04/2008 to 30/06/2009).

The PP has set out the reasons for the increase in emission reductions and ERM CVS reviewed this and found the reasons to be in line with the methodology and revised monitoring plan.

Factors that have increased the emission reductions above those estimated in the PDD are:

1. **On-site emission reductions** On-site emission reductions (due to consumption of coal, coke and paste) are higher than forecast due to the calculated on-site specific emission factor of 2.65 tCO<sub>2</sub>/tSiMn being lower than the baseline emission factor of 2.93 tCO<sub>2</sub>/tSiMn. The methodology requires including on-site emissions in the project boundary although it was assumed in the PDD that they would not be affected. The primary reason for the reduction in the onsite emission factor during the monitoring period is due to a reduction in the amount of coke required in the smelting process, which is as a result of the project activity. This was verified through discussion with the on site metallurgist and is inline with the requirements of the methodology.
2. **Electricity savings were higher during the monitoring period than the 0.4 MWh/tSiMn originally forecasted in the PDD estimates.**
  - a. **Methodology effect on baseline electricity consumption.** The PDD estimates a reduction in specific electricity consumption per tonne of manufactured product of 0.4 MWh/tSiMn. When the electricity saving of 0.4 MWh/tSiMn was estimated by the project developer at the time of decision making (2003) the specific consumption was 4.91 MWh/tSiMn. The methodology established a baseline consumption of 5.4 MWh/tSiMn (based on data from 1997-2003). When validation started in November 2006 it was deemed appropriate to keep the 0.4 MWh/tSiMn savings compared to the 7 years baseline level of 5.4 MWh/tSiMn in view of the monitoring data available at the time. Essentially the savings would be 0.4 MWh/tSiMn (on the 2003 baseline of 4.91 MWh/tSiMn) + 0.49 MWh/tSiMn (the 7 year baseline of 5.4 MWh/tSiMn minus 4.91 MWh/tSiMn) = 0.89 MWh/tSiMn. This has been verified through review of the PDD and is inline with the requirements of the methodology
  - b. **Higher electricity savings.** The project achieved a higher than anticipated electricity saving during the monitoring period. Compared to PDD estimates of 0.4MWh/t electricity savings (2003 baseline), the project has achieved 0.59MWh/t (compared to the 2003 baseline). A review of the energy consumption data and PDD

confirmed that greater than anticipated energy efficiency has been achieved through the project activity. This is in line with the requirements of the methodology.

3. **Delay of Furnace 1 & 6 retrofit.** In the PDD Transalloys expected furnace 6 to be retrofitted early 2008 & Furnace 1 in 2009. Due to poor market conditions, the retrofitting works have not started yet. Hence the PDD estimates are adjusted in order to only cover the emission reduction generated by furnaces 3, 5 and 7 (the ones retrofitted to date). The site visit confirmed that the retrofits to Furnaces 1 and 6 have not yet begun. The delay in retrofits means that the project activity is not yet able to generate emission reductions from Furnace 1 or 6.
4. **Lower SiMn production during the monitoring period.** The PDD estimates are based on an annual SiMn production of 96,488 t which corresponds to 64,326tSiMn over a period equal to the length of this monitoring period. However, only 61,304 tSiMn have been produced during this monitoring period. A review of production data and the PDD confirmed that lower SiMn production occurred for the monitoring period. The methodology does not have any specific requirements with respect to the production values.

#### 4.9. Other observations

No further observations were noted.

## 5. Emission Reduction Calculations

## 5.1. List of Parameters available at Validation – Baseline emissions

ID	Parameters	Data Unit	Parameter Description	Source of data			
				Direct measure	Sampling	External Source	Other
1	QPi	Tonnes of SiMn/year	Annual SiMn production for 7 years preceding the project activity	7 Years of historical data. Data monitored at each tapping of the furnace			
2	ECi	MWh/year	Annual grid electricity consumption by the submerged electric arc furnace for 7 years preceding the project activity	7 Years of historical data. Metered continuously			
3	Qbcoal,i	Tonnes of coal/year	Annual consumption of coal used as reductant in the submerged electric arc furnace for 7 years preceding the project activity	7 Years of historical data. Amount of coal put in each batch is weighed in hoppers with load cells, and recorded daily			
4	Qbcoke,i	Tonnes of coke/year	Annual consumption of coke used as reductant in the submerged electric arc furnace for 7 years preceding the project activity	7 Years of historical data. Amount of coke put in each batch is weighed in hoppers with load cells, and recorded daily			
5	Qbpaste,i	Tonnes of paste/year	Annual consumption of electrode paste used as electrode in the submerged electric arc furnace for 7 years preceding the project activity	The average weight of each cylinder is calculated based on weighing paste trucks (arriving at the facility) on a weighbridge and dividing on a monthly basis the total weight by number of cylinders delivered to the facility.			
6	EFbcoal,i	tCO <sub>2</sub> /tcoal	Emission factor applied for the coal consumed as reductant based on carbon content			IPCC (2006) – Vol3, Ch4, section 4.3.3.2, table 4.6 page 4.37	
7	EFbcoke,i	tCO <sub>2</sub> /tcoke	Emission factor applied for the coke consumed as reductant based on carbon content				Calculated using equation 4.19, p4.33 of IPCC (2006)
8	EFbpaste,i	tCO <sub>2</sub> /t of carbon paste	Emission factor applied for the electrode paste consumed as electrode based on carbon content			Calculated using equation 4.19, p4.33 of IPCC (2006) using supplier information.	
9	Quality of coalb	Mass fraction of each component (%m/m)	Quality of coal based on elementary analysis and other relevant properties		Transalloys lab analyses		

ID	Parameters	Data Unit	Parameter Description	Source of data			
				Direct measure	Sampling	External Source	Other
10	Quality of cokeb	Mass fraction of each component (%m/m)	Quality of coke based on elementary analysis and other relevant properties		Transalloys lab analyses		
11	Quality of electrode pasteb	Mass fraction of each component (%m/m)	Quality of electrode paste based on elementary analyses and other relevant properties			Supplier information	
12	Quality of SiMnb	Text	Quality of SiMnb, based on elementary analysis and other relevant properties		Transalloys lab analyses		
13	Quality of ore	Text	Quality of ore, based on elementary analysis and other relevant properties		Transalloys lab analyses		
14	Quality of fluxes	Text	Quality of fluxes, based on elementary analysis and other relevant properties		Transalloys lab analyses		

## 5.2. List of Monitored Parameters – Project emissions

ID	Parameters	Data Unit	Parameter Description	Source of data			
				Direct measure	Sampling	External Source	Other
1	QPy	Tonnes of SiMn/year	Quantity of SiMn production in year y during the project activity	Data monitored at each tapping of the furnace			
2	ECy	MWh/year	Annual grid electricity consumption by the submerged electric arc furnace	Metered continuously			
3	Qpcoal,y	Tonnes of coal/year	Annual consumption of coal used as reductant in the submerged electric arc furnaces	Amount of coal put in each batch is weighed in hoppers with load cells, and recorded daily			
4	Qp coke,y	Tonnes of coke/year	Annual consumption of coke used as reductant in the submerged electric arc furnaces	Amount of coke put in each batch is weighed in hoppers with load cells, and recorded daily			
5	Qp paste,y	Tonnes of paste/year	Annual consumption of electrode paste used as electrode in the submerged electric arc furnaces	The average weight of each cylinder is calculated based on weighing paste trucks (arriving at the facility) on a weighbridge and dividing on a monthly basis the total weight by number of cylinders delivered to the facility.			
6	EFpcoal,y	tCO <sub>2</sub> /tcoal	Emission factor applied for the coal consumed as			IPCC (2006) – Vol3, Ch4,	

			reductant based on carbon content			section 4.3.3.2, table 4.6 page 4.37	
7	EF <sub>coke,y</sub>	tCO <sub>2</sub> /tcoke	Emission factor applied for the coke consumed as reductant based on carbon content		Calculated from laboratory analysis using equation 4.19, p4.33 of IPCC (2006)		
8	EF <sub>paste,y</sub>	tCO <sub>2</sub> /t of carbon paste	Emission factor applied for the electrode paste consumed as electrode based on carbon content		Calculated using equation 4.19, p4.33 of IPCC (2006) using supplier information.		
9	Quality of coalp	Mass fraction of each component (%m/m)	Quality of coal based on elementary analysis and other relevant properties		Transalloys lab analyses		
10	Quality of cokep	Mass fraction of each component (%m/m)	Quality of coke based on elementary analysis and other relevant properties		Transalloys lab analyses		
11	Quality of electrode pastep	Mass fraction of each component (%m/m)	Quality of electrode paste based on elementary analyses and other relevant properties			Supplier information	
12	EF <sub>y,offsite</sub>	tCO <sub>2</sub> /MWh	Grid emission factor			The Grid electricity emission factor (EF <sub>y,offsite</sub> in tCO <sub>2</sub> e/MWh) for South Africa is established ex ante according to ACM0002 V6	
13	Quality of SiMnp	Text	Quality of SiMnb, based on elementary analysis and other relevant properties		Transalloys lab analyses		
14	Quality of ore	Text	Quality of ore, based on elementary analysis and other relevant properties		Transalloys lab analyses		
15	Quality of fluxes	Text	Quality of fluxes, based on elementary analysis and other relevant properties		Transalloys lab analyses		

### 5.3. List of Monitored Parameters– Leakage emissions

ID	Parameters	Data Unit	Parameter Description	Source of data			
				Direct measure	Sampling	External Source	Other
	Leakage is zero according to AM0038 v1, and applied as such.						

## 5.4. Monitoring Parameters

<b>Data / Parameter:</b>	<b>QPy, monitored</b>													
<b>Data unit:</b>	Tonnes of SiMn													
<b>Description:</b>	Quantity of SiMn production in year y during the project activity													
<b>Measurement Devices:</b>	Weighing metal ladles on a weighing platform													
<b>Measurement Frequency:</b>	The ladles are filled at each tapping of the project furnace and are weighed on two weighing platforms before and after being filled with SiMn. The resulting amount of metal produced within the project boundaries is aggregated daily													
<b>QA/QC Procedures Applied:</b>	<ul style="list-style-type: none"> <li>The weighing platform will be maintained and calibrated regularly in line with the manufacturer's requirements</li> <li>Measured data will be cross-checked with product sales records</li> </ul>													
<b>Verification Activities / Evidence Reviewed:</b>	<ul style="list-style-type: none"> <li>Observed weighing platform and process for undertaking measurements</li> <li>Observed the equipment printouts obtained from weighing of metal ladles (from the weighing platform) after each production run 12/14/20/</li> <li>For Furnace 3 &amp; Furnace 5, observed the capturing of printouts onto the furnace daily logsheets (Furnace 7 not operational during time of verification)</li> <li>Sampling the monitoring period, verified that printouts (as obtained from the weighing platform) are archived</li> <li>Sampling the monitoring period, data verification undertaken for Furnace 3, Furnace 5 &amp; Furnace 7, to determine the accuracy of transcription of data from the printouts onto the furnace daily logsheets</li> <li>Verified that furnace logsheets are password protected 12/14/20/</li> <li>Sampling the monitoring period, data verification was undertaken for Furnace 3, Furnace 5 &amp; Furnace 7 to determine accuracy of transcription of such data onto the CER Calculation Workbook</li> <li>Verified that the weighing platforms are calibrated daily following the internal procedure SOP:SiMn 161, and that such results are captured onto the furnace logsheets /12/</li> <li>Measured data is being cross-checked with product sales figures, with results for monitoring period:</li> </ul> <table border="1"> <thead> <tr> <th>Furnace Production (Platform)</th><th>Fines as collected (Weighbridge)</th><th>Saleable production (Weighbridge)</th></tr> </thead> <tbody> <tr> <td>86 017.13 tons</td><td>16 720.11 tons</td><td>72128.75 tons</td></tr> <tr> <td colspan="3">TOTAL (Fines + Saleable production): 88 848.86 tons</td></tr> <tr> <td colspan="3">Difference between saleable and furnace production: <b>3.3%</b></td></tr> </tbody> </table> <p>The above figures include all furnace production (including Furnace 1 &amp; Furnace 6) 12/14/20/</p>		Furnace Production (Platform)	Fines as collected (Weighbridge)	Saleable production (Weighbridge)	86 017.13 tons	16 720.11 tons	72128.75 tons	TOTAL (Fines + Saleable production): 88 848.86 tons			Difference between saleable and furnace production: <b>3.3%</b>		
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Difference between saleable and furnace production: <b>3.3%</b>														
<b>Findings:</b>	<ul style="list-style-type: none"> <li>Some dates were noted where there are no documented records of the daily calibration that had been undertaken of the weighing platform following the internal procedure SOP:SiMn. During the site visit, it was confirmed that calibrations are undertaken daily inline with the requirement of the Monitoring Plan and the site operation procedures, and that this is an issue of recording rather than implementation, and FAR 1 has been raised to improve record keeping at the facility.</li> <li>Some minor transcription errors were noted, where the weighing platform printout does not correspond with the value recorded on the furnace logsheet. (<b>CAR1</b>)</li> <li>In event where there is editing of data during the QA/QC of furnace logsheet, reasons are provided on the logsheet. However, there were still cases found where no information is provided (<b>FAR1</b>)</li> <li>It was noted that weighing platform printouts are being archived, although there were some records found to be missing in the archive (e.g. Furnace 5: 4, 9, 17 &amp; 28 Feb'10). (<b>FAR 1</b>)</li> <li>Furnace production has been cross-checked with saleable production (including recovered fines). The first version of the Monitoring Report only states that measured data correlates satisfactorily, not including the detail as per such correlation check undertaken, or the QA/QC process applied. (<b>CAR5</b>)</li> </ul>													
<b>Conclusions:</b>	After close out of the CARs, the parameter is reported accurately and in accordance with the monitoring plan.													

<b>Data / Parameter:</b>	<b>ECy</b>
<b>Data unit:</b>	Electricity consumption (MWh)/year
<b>Description:</b>	Annual grid electricity consumption by the submerged electric arc furnace
<b>Measurement Devices:</b>	Electricity meter per project furnace, metered in the furnace control room
<b>Measurement Frequency:</b>	Electricity consumption will be metered continuously on individual furnaces by an electricity

	meter and recorded monthly.																									
QA/QC Procedures Applied:	<ul style="list-style-type: none"><li>The meters will be maintained and calibrated every 5 years.</li><li>Consumption of each furnace will be cross-checked monthly with total electricity bill (ESKOM)</li></ul>																									
Verification Activities / Evidence Reviewed:	<ul style="list-style-type: none"><li>Electricity meter for each furnace was identified, and verified against the serial number.<ul style="list-style-type: none"><li>Furnace 3: 22kv serial 06470035: cert on 24/11/2006</li><li>Furnace 3: 33kv serial 00061498: cert on 25/04/2008 (33kv meter not used during this monitoring period)</li><li>Furnace 5: serial 06460054: cert on 22/11/2006</li><li>Furnace 7: serial 06390018: cert on 28/09/2006</li></ul></li><li>Manufacturers requirements for calibration is every 10yrs (as per email from manufacturer in monitoring manual) hence meets manufacturers requirements.</li><li>Confirmed that no electricity meter replacements have been undertaken over the monitoring period</li><li>Calibration requirements for each electricity meter was verified against the calibration frequency requirements (No meter calibration undertaken over monitoring period, as for all such meters, the last calibration covers all the meters for all the monitoring period)</li><li>Verified that for each furnace recording of the electricity meter readings are done by the control room operator every hour onto the furnace logsheet</li><li>Data verification was undertaken for Furnace 3, Furnace 5 &amp; Furnace 7 to determine accuracy of transcription of such data from logsheets into the TransAlloys Calculation Workbook /14/</li><li>Verified that the total electricity consumption, calculated from the electricity meter reading at the beginning and end of the monitoring period (as obtained from each furnace worksheet), corresponds with the electricity consumption as obtained within the Transalloys Calculation Workbook and accordingly reflected in the monitoring report. 12/14/20/</li><li>Reviewed the consumption of each furnace as monthly cross checked against the total electricity bill (ESKOM readings) /16/. This reconciliation sheet covers the meter readings (as undertaken by Transalloys) for Furnaces 1 to 7, respective baghouse filters, Plant auxiliaries, Canon and Brick Plant operations. On a monthly basis, the total of these meter readings are compared against the Eskom electricity bill. For the period July2009-October2009, the results were the same. However for the period November 2009 to February 2010, the following variance has been observed:<table><tr><td></td><td>Nov-09</td><td>Dec-09</td><td>Jan-10</td><td>Feb-10</td></tr><tr><td>Transalloys Total (kWh)</td><td>66,994,850</td><td>66,725,970</td><td>63,917,510</td><td>62,265,931</td></tr><tr><td>ESKOM Total (kWh)</td><td>70,418,600</td><td>71,005,625</td><td>65,707,725</td><td>62,823,900</td></tr><tr><td>Difference (kWh)</td><td>3,423,750</td><td>4,279,655</td><td>1,790,215</td><td>557,969</td></tr><tr><td>% Difference</td><td>4.9</td><td>6.0</td><td>2.7</td><td>0.9</td></tr></table></li></ul> <p>This discrepancy resulted in e-mail communication and meetings between Transalloys and ESKOM, of which records indicate that Eskom is awaiting outcome from an investigation before adjusting the November 2009 to January 2010 account, but will be using the Transalloys meter readings for February 2010. In effect Eskom has conceded that their readings are faulty as Transalloys reading are consistent with historical Mwh/ ton of product values (see section 4.4)</p>		Nov-09	Dec-09	Jan-10	Feb-10	Transalloys Total (kWh)	66,994,850	66,725,970	63,917,510	62,265,931	ESKOM Total (kWh)	70,418,600	71,005,625	65,707,725	62,823,900	Difference (kWh)	3,423,750	4,279,655	1,790,215	557,969	% Difference	4.9	6.0	2.7	0.9
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Findings:	<ul style="list-style-type: none"><li>The first version of the monitoring report indicated that the electricity metered monthly correspond satisfactorily with the grid company Eskom. However, discrepancies between these values exist which are neither reflected nor explained within the monitoring report. (CAR3)</li><li>Furnace 3 electricity consumption as reflected within the Transalloys Calculation Workbook and monitoring report reflect a value of 65,711 MWh compared with the value from the meter reading (obtained from the furnace daily logsheet) as 65,720 MWh (CAR2)</li></ul>																									
Conclusions:	After close out of the CARs, the parameter is reported accurately and in accordance with the monitoring plan.																									

<b>Data / Parameter:</b>	<b>Qpcoal,y</b>
Data unit:	Tonnes of coal/year
Description:	Annual consumption of coal used as reductant in the submerged electric arc furnace
<b>Measurement Devices</b>	Metered by weight hoppers with load cells
<b>Measurement Frequency</b>	The amount of coal put in each batch is weighed in hoppers with load cells and recorded daily per furnace
<b>QA/QC procedures</b>	The load cells will be maintained and calibrated regularly in line with the manufacturer's



<b>applied:</b>	requirements.
<b>Verification Activities / Evidence Reviewed</b>	<ul style="list-style-type: none"> <li>Printouts as generated from the weight hopper cells were observed /20/</li> <li>For Furnace 3 &amp; Furnace 5, observed the capturing of printouts onto the furnace logsheets (Furnace 7 not operational during time of verification). Entering the quantity per bin per shift into the daily sheet (furnace logsheet), and the total coal is calculated under the daily data tab (furnace logsheet) /12/</li> <li>Sampling the monitoring period, verified that printouts (as obtained from the weight hopper cells) are being archived/20/</li> <li>Sampling the monitoring period, data verification was undertaken for Furnace 3, Furnace 5 &amp; Furnace 7, to determine the accuracy of transcription of data from the printouts onto the furnace logsheets /12/20</li> <li>Sampling the monitoring period, cross checks of coal quantity data was undertaken for Furnace 3, Furnace 5 &amp; Furnace 7 to determine accuracy of transcription of such data onto the Transalloys Calculation Workbook</li> <li>Verified that the weigh hoppers are maintained regularly and tested weekly for accuracy according to internal procedure TAOP230 through review of data log sheets. As per the procedure, verification was undertaken of the weekly tests to confirm using standard mass weight, with the standard mass weight being calibrated annually. A recent system was implemented using the existing planned maintenance program for the testing of the batch weight and for recording of the weight, and the implementation of this was evaluated. This information is then transferred onto the logsheet.</li> </ul>
<b>Findings</b>	<ul style="list-style-type: none"> <li>Some minor transcription errors were noted, where the batchweigh printout does not correspond with the value recorded on the furnace logsheet. (<b>CAR1</b>)</li> <li>In event where there is editing of data during the QA/QC of furnace logsheet, reasons are provided on the logsheet. However, there were still cases found where no information is provided for such change. (<b>FAR1</b>)</li> <li>It was noted that batch weight printouts are being archived, although there were records found to be missing. (<b>FAR1</b>)</li> </ul>
<b>Conclusions</b>	After close out of the CARs, the parameter is reported accurately and in accordance with the monitoring plan.

<b>Data / Parameter:</b>	<b>Qpcoke,y</b>
<b>Data unit:</b>	Tonnes of coke/year
<b>Description:</b>	Annual consumption of coke used as reductant in the submerged electric arc furnace
<b>Measurement Devices</b>	Metered by weight hoppers with load cells
<b>Measurement Frequency</b>	The amount of coke put in each batch is weighed in hoppers with load cells and recorded daily per furnace
<b>QA/QC procedures applied:</b>	The load cells will be maintained and calibrated regularly in line with the manufacturer's requirements.
<b>Verification Activities / Evidence Reviewed</b>	<ul style="list-style-type: none"> <li>Printouts as generated from the weight hopper cells were observed /27/</li> <li>For Furnace 3 &amp; Furnace 5, observed the capturing of printouts onto the furnace logsheets (Furnace 7 not operational during time of verification). Entering the quantity per bin per shift into the daily sheet (furnace logsheet), and the total coke is calculated under the daily data tab (furnace logsheet) /12/</li> <li>Sampling the monitoring period, verified that printouts (as obtained from the weight hopper cells) are being archived /12/</li> <li>Sampling the monitoring period, data verification was undertaken for Furnace 3, Furnace 5 &amp; Furnace 7, to determine the accuracy of transcription of data from the printouts onto the furnace logsheets/12/</li> <li>Sampling the monitoring period, data verification was undertaken for Furnace 3, Furnace 5 &amp; Furnace 7 to determine accuracy of transcription of such data from the furnace logsheets onto the CER Workbook</li> <li>Verified that the weigh hoppers are maintained regularly and tested weekly for accuracy according to internal procedure TAOP230. As per the procedure, weekly tests are undertaken using standard mass weight, with the standard mass weight being calibrated annually. A recent system was implemented using the existing planned maintenance program for the testing of the batch weight and for recording of the weight. This information is then transferred onto the furnace logsheet /12/.</li> </ul>
<b>Findings</b>	<ul style="list-style-type: none"> <li>Transcription errors were noted, where the batchweigh printout does not correspond with the value recorded on the furnace logsheet. (<b>CAR1</b>)</li> <li>In event where there is editing of data during the QA/QC of furnace logsheet, reasons are provided on the logsheet. However, there were still cases found where no information is</li> </ul>

	<p>provided for such change. (FAR1)</p> <p>It was noted that batch weight printouts are being archived, although there were records found to be missing (FAR1)</p> <ul style="list-style-type: none"> <li>It was noted that printouts archived for batchweigh data at furnace 7 are not useful to Transalloys and don't provide the data necessary to verify the batchweigh data in the daily logsheets. (FAR1)</li> </ul>
<b>Conclusions</b>	After close out of the CARs, the parameter is reported accurately and in accordance with the monitoring plan

<b>Data / Parameter:</b>	<b>Qppaste,y</b>
Data unit:	Tonnes of electrode paste/year
Description:	Annual consumption of electrode paste used as electrode in the submerged electric arc furnace
<b>Measurement Devices</b>	<p>The number of paste cylinders put into the electrode is logged each time a new cylinder is used</p> <p>The average weight of each cylinder is calculated based on weighing paste trucks (arriving at the facility) on a weighbridge and dividing on a monthly basis the total weight by number of cylinders delivered to the facility</p> <p>The annual figure is obtained by summing the daily product of number of cylinders used and monthly average weight</p>
<b>Measurement Frequency</b>	<ul style="list-style-type: none"> <li>Logging every time a new paste cylinder is used</li> <li>Each paste truck arriving on site is weighed on the weighbridge</li> </ul>
<b>QA/QC procedures applied:</b>	The weighbridge will be maintained and calibrated regularly in line with the manufacturer's requirements to ensure its accuracy. Average weight of each cylinder will be compared to indications of the supplier.
<b>Verification Activities / Evidence Reviewed</b>	<ul style="list-style-type: none"> <li>Verified that the number of paste cylinders are recorded and information is captured onto the furnace logsheets /12/</li> <li>Sampling the monitoring period, data verification was undertaken for Furnace 3, Furnace 5 &amp; Furnace 7 to determine accuracy of transcription of data from the furnace daily logsheets into the CER Calculation Workbook</li> <li>Observed the physical equipment cells, electrodes and weighbridge</li> <li>Reviewed weighbridge operation, calibration records and procedures. (Weighbridge serial 991019, calibrated by JCS Scales, certification number VC501, certification date 20/01/2009 as well as certification number 0725, certification date 28/01/2010)</li> <li>Observed that daily weighbridge data are entered daily into a calculation sheet, from which the total monthly paste mass is calculated. A sample of such data was also verified to confirm accuracy.</li> <li>Verified the cross check between average weight of each cylinder and the indications of the supplier. Figures match supplier' indications within 0.12% for 700 mm cylinders (used in furnace 5&amp;7) and 0.08% for the 500mm cylinders (used in furnace 3)</li> </ul>
<b>Findings</b>	No issues were identified.
<b>Conclusions</b>	The parameter is reported accurately and in accordance with the monitoring plan

<b>Data / Parameter:</b>	<b>EFcoal,y</b>
Data unit:	tCO <sub>2</sub> /tcoal
Description:	Emission factor applied for the coal consumed as reductant in year y
<b>Measurement Devices</b>	The 2006 IPCC value of 3.1 tCO <sub>2</sub> /tcoal is used in the project as set out in the monitoring plan. If new IPCC guidelines are released, this value may be updated according to latest relevant EB guidance".
<b>Measurement Frequency</b>	NA
<b>QA/QC procedures applied:</b>	NA
<b>Verification Activities / Evidence Reviewed</b>	<p>Observed default emission factor in the 2006 IPCC guidelines (3.1tCO<sub>2</sub>/tcoal).</p> <ul style="list-style-type: none"> <li>ERM CVS confirmed that there is no relevant EB guidance observed relating to updated default coal emission factor.</li> </ul> <p>Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 for the correct use of the default emission factor in the Transalloys calculation workbook.</p>
<b>Findings</b>	No concerns were noted and compliance to the monitoring plan requirements confirmed
<b>Conclusions</b>	The parameter is consistent with the Monitoring Plan.

<b>Data / Parameter:</b>	<b>EF<sub>coke,y</sub></b>
Data unit:	tCO <sub>2</sub> /tcoke
Description:	Emission factor applied for the coke consumed as reductant in year y
<b>Measurement Devices</b>	The carbon content of coke is measured daily in the on site laboratory following the site standard operating procedures which comply with the requirements of the South African Bureau of Standards requirement for testing of volatile and fixed carbon content. The laboratory is ISO 9000 certified and participates in a local inter laboratory testing program. All equipment in the laboratory is calibrated and certificates to this effect are maintained on site.
<b>Measurement Frequency</b>	Coke samples are taken daily at the weigh hoppers and delivered to the laboratory for testing purposes. Monthly averages of carbon contents are used for the calculation of a monthly emission factor. This emission factor is calculated using equation 4.19, (p4.33 of IPCC (2006)). The annual emission factor is calculated as the average of monthly emission factors and used for emission calculations. In accordance with the requirements of the Monitoring plan "If values are missing or inconsistent for some months, the average of previous and next 3 months will be used".
<b>QA/QC procedures applied:</b>	Daily results are capture in the daily laboratory log sheets which are reviewed for compliance with product specifications. In addition samples of product are sent to the neighbouring laboratory for cross correlation and testing to ensure accuracy.
<b>Verification Activities / Evidence Reviewed</b>	<ul style="list-style-type: none"> <li>• Interview with laboratory manager and technical staff</li> <li>• Observed the physical equipment at the laboratory used for the analysis of samples.</li> <li>• Observed hard copies of ISO certificate for the laboratory and hardcopies of Standard Operating Procedures for testing of coke samples /23/</li> <li>• Data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm the monthly averages of carbon contents are used for calculation of a monthly emission factor.</li> <li>• Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm the emission factor is calculated using the equation stated above and that the annual emission factor is calculated as the average of monthly emission factors and used for emission calculations.</li> <li>• Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm the correct use of carbon content of volatiles default value from IPCC (2006) as per equation 4.19, p4.33 of IPCC (2006).</li> <li>• Observed internal procedures as part of SHEQ internal management system confirming that lab analyses are done according to national SABS standards /26/</li> <li>• Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that when values are missing or inconsistent for some months, the average of previous and next 3 months will be used. Reviewed process of recording of test results and associated QA/QC process.</li> <li>• Review of historical and current coke supplier agreements where product specification ranges are provided for.</li> </ul>
<b>Findings</b>	No concerns were noted and compliance to the monitoring plan requirements confirmed.
<b>Conclusions</b>	The parameter is reported accurately and in accordance with the monitoring plan

<b>Data / Parameter:</b>	<b>EF<sub>paste,y</sub></b>
Data unit:	tCO <sub>2</sub> /tpaste
Description:	Emission factor applied for the electrode paste consumed as electrode in year y
<b>Measurement Devices</b>	N/A – the fixed carbon content and volatile information is provided by the suppliers with each delivery of paste to site.
<b>Measurement Frequency</b>	The information is recorded daily from the paste delivery sheets.
<b>QA/QC procedures applied:</b>	<ul style="list-style-type: none"> <li>• In accordance with the monitoring plan the emission factor is calculated using equation 4.19, p4.33 of IPCC (2006). Fix carbon and volatiles content analyses are obtained from the supplier. Carbon content in the volatiles (C<sub>v</sub>) is not available in these analyses hence, in accordance with the monitoring plan, the same value as for the coke of 80% is used.</li> <li>• Similarly the project-specific value is compared to EF<sub>bpaste,y</sub> and the maximum between the two values is taken for EF<sub>paste,y</sub>.</li> </ul>
<b>Verification Activities / Evidence Reviewed</b>	<ul style="list-style-type: none"> <li>• Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm the emission factor is calculated using the equation/ process stated in the monitoring plan.</li> <li>• Observed supplier documentation on fix carbon and volatiles content for the months when deliveries took place, as per the calculation workbooks.</li> </ul>

	<ul style="list-style-type: none"> <li>Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm a value of 80% is used for the carbon content in the volatiles.</li> <li>Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that for the months when supplier analysis reports are not available, the conservative value of 3.67 tCO<sub>2</sub>/t suggested by the methodology AM0038 v1 is used, as stated in the monitoring report.</li> <li>Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that the maximum between EFbpaste,y (3.32tCO<sub>2</sub>/t according to monitoring plan) and EFppaste,y is used.</li> </ul>
<b>Findings</b>	No concerns were noted and compliance to the monitoring plan requirements confirmed.
<b>Conclusions</b>	The parameter is reported accurately and in accordance with the monitoring plan.

<b>Data / Parameter:</b>	<b>Quality of coalp</b>
Data unit:	Mass fraction of each component of coal
Description:	Quality of coal based on elementary analysis and other relevant properties
<b>Measurement Devices</b>	The mass fraction coal is measured daily in the on site laboratory following the site standard operating procedures which comply with the requirements of the South African Bureau of Standards requirement for testing of coal. The laboratory is ISO 9000 certified and participates in a local inter laboratory testing program. All equipment in the laboratory is calibrated and certificates to this effect are maintained on site.
<b>Measurement Frequency</b>	Daily testing is undertaken on samples taken at the weigh hoppers
<b>QA/QC procedures applied:</b>	Daily results are capture in the daily laboratory log sheets which are reviewed for compliance with product specifications. In addition samples of product are sent to the neighbouring laboratory for cross correlation and testing to ensure accuracy.
<b>Verification Activities / Evidence Reviewed</b>	<ul style="list-style-type: none"> <li>Interview with laboratory manager and technical staff</li> <li>Observed the physical equipment at the lab used for the analysis of samples.</li> <li>Observed hard copies of ISO certificate for the laboratory and hardcopies of Standard Operating Procedures for testing of coal samples /23/24/.</li> <li>Observed the physical equipment at the lab used for the analysis of samples</li> <li>Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that quality of coal is reported in terms of fixed carbon, volatiles, S and P contents.</li> <li>Observed in the log sheets that the quality of coal is reported monthly as per the monitoring report.</li> <li>Observed internal procedures as part of SHEQ internal management system confirming that lab analyses are done according to the applicable standards set by the South African Bureau of Standards , as is stated in the monitoring report. /26/</li> <li>Reviewed supplier contracts where product specification for coal quality is mentioned and compared this with supplier contracts used in the baseline line year of 2003 and observed that product quality specifications have not changed.</li> </ul>
<b>Findings</b>	No concerns were noted and compliance to the monitoring plan requirements.
<b>Conclusions</b>	The parameter is reported accurately and in accordance with the monitoring plan .The coal quality is consistent with the baseline year of 2003.

<b>Data / Parameter:</b>	<b>Quality of cokep</b>
Data unit:	Mass fraction of each component of coke
Description:	Quality of coke based on elementary analysis and other relevant properties
<b>Measurement Devices</b>	The mass fraction coke is measured daily in the on site laboratory following the site standard operating procedures which comply with the requirements of the South African Bureau of Standards requirement for testing of coke. The laboratory is ISO 9000 certified and participates in a local inter laboratory testing program. All equipment in the laboratory is calibrated and certificates to this effect are maintained on site.
<b>Measurement Frequency</b>	Daily testing is undertaken on samples taken at the weigh hoppers
<b>QA/QC procedures applied:</b>	Daily results are capture in the daily laboratory log sheets which are reviewed for compliance with product specifications. In addition samples of product are sent to the neighbouring laboratory for cross correlation and testing to ensure accuracy.
<b>Verification Activities /</b>	<ul style="list-style-type: none"> <li>Interview with laboratory manager and technical staff</li> </ul>

<b>Evidence Reviewed</b>	<ul style="list-style-type: none"> <li>Observed the physical equipment at the lab used for the analysis of samples.</li> <li>Observed hard copies of ISO certificate for the laboratory and hardcopies of Standard Operating Procedures for testing of samples/24/.</li> <li>Observed the physical equipment at the lab used for the analysis of samples.</li> <li>Sampling the full monitoring period, data verification of sampled data was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that quality of coke is reported in terms of fixed carbon, volatiles, S and P contents.</li> <li>Observed that the quality of coke is reported monthly as per the monitoring report.</li> <li>Observed internal procedures as part of SHEQ internal management system confirming that lab analyses are done according to the applicable standards set by the South African Bureau of Standards 23/24</li> <li>Reviewed supplier contracts where product specification for coke quality is mentioned and compared this with supplier contracts used in the baseline year of 2003 and observed that product quality specifications have not changed.</li> </ul>
<b>Findings</b>	No concerns were noted and compliance to the monitoring plan requirements confirmed.
<b>Conclusions</b>	The parameter is reported accurately and in accordance with the monitoring plan. The coke quality is consistent with the baseline year of 2003.

<b>Data / Parameter:</b>	<b>Quality of electrode pastep</b>
Data unit:	Mass fraction of each component of coke
Description:	Quality of coke based on elementary analysis and other relevant properties
<b>Measurement Devices</b>	N/A – the fixed carbon content and volatile information is provided by the suppliers with each delivery of paste to site.
<b>Measurement Frequency</b>	The information is recorded daily from the paste delivery sheets.
<b>QA/QC procedures applied:</b>	Results are reviewed against historical values to demonstrate consistency.
<b>Verification Activities / Evidence Reviewed</b>	Observed supplier documentation on fix carbon and volatiles content for the months when deliveries took place, as per the calculation workbooks /14/. Reviewed historical data to ensure that paste quality has been consistent.
<b>Findings</b>	No concerns were noted and compliance to the monitoring plan requirements confirmed.
<b>Conclusions</b>	The parameter is reported accurately and in accordance with the monitoring plan. The paste quality is consistent with the base year.

<b>Data / Parameter:</b>	<b>EF,y offsite</b>
Data unit:	Grid emission factor (tCO <sub>2</sub> /MWh)
Description:	Grid emission factor
<b>Measurement Devices</b>	The Grid electricity emission factor (EF <sub>y,offsite</sub> in tCO <sub>2</sub> e/MWh) for South Africa is established <i>ex ante</i> according to ACM0002 V6
<b>Measurement Frequency</b>	NA
<b>QA/QC procedures applied:</b>	NA
<b>Verification Activities / Evidence Reviewed</b>	Observed the calculations and assumptions of this <i>ex ante</i> calculation within the PDD. Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that grid emission factor stated above is used throughout the calculation workbooks
<b>Findings</b>	No concerns were noted and compliance to the monitoring plan requirements
<b>Conclusions</b>	The parameter is used consistently and accurately and in accordance with the monitoring plan

<b>Data / Parameter:</b>	<b>Quality of SiMnp</b>
Data unit:	Mass fraction of each component of SiMn (%m/m)
Description:	Quality of SiMn produced during the project activity
<b>Measurement Devices</b>	The mass fraction of the finished product is measured daily in the on site laboratory following the site standard operating procedures which comply with the requirements of the South African Bureau of Standards requirements. The laboratory is ISO 9000 certified and participates in a local inter laboratory testing program. All equipment in the laboratory is calibrated and

	certificates to this effect are maintained on site.
<b>Measurement Frequency</b>	Daily testing is undertaken.
<b>QA/QC procedures applied:</b>	Results are cross checked to ensure that the quality remains between pre-determined specifications for Mn, C, Si, P and S. Product samples of sent to other laboratories to ensure accuracy of testing.
<b>Verification Activities / Evidence Reviewed</b>	<ul style="list-style-type: none"> <li>Interview with laboratory manager and technical staff</li> <li>Observed the physical equipment at the lab used for the analysis of samples.</li> <li>Observed hard copies of ISO certificate for the laboratory and hardcopies of Standard Operating Procedures for testing of samples /25/</li> <li>Observed the physical equipment at the lab used for the analysis of samples.</li> <li>Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that quality of SiMn is reported daily in terms of Mn, C, Si, P and S /12/</li> <li>Observed internal procedures as part of SHEQ internal management system confirming that lab analyses are done according to the applicable standards set by the South African Bureau of Standards 23/24;</li> </ul>
<b>Findings</b>	No concerns were noted and compliance to the monitoring plan requirements.
<b>Conclusions</b>	The parameter is reported accurately and in accordance with the monitoring plan; and product quality was consistent with the base year.

<b>Data / Parameter:</b>	Quality of ore
Data unit:	Mass fraction of each component of ore (%m/m)
Description:	Quality of ore
<b>Measurement Devices</b>	The mass fraction of the ore (Mn, Fe, SiO <sub>2</sub> , CaO) is measured daily in the on site laboratory following the site standard operating procedures which comply with the requirements of the South African Bureau of Standards requirements. The laboratory is ISO 9000 certified and participates in a local inter laboratory testing program. All equipment in the laboratory is calibrated and certificates to this effect are maintained on site.
<b>Measurement Frequency</b>	Daily testing is undertaken.
<b>QA/QC procedures applied:</b>	<ul style="list-style-type: none"> <li>Results are cross checked to ensure that the quality remains between pre-determined specifications</li> </ul>
<b>Verification Activities / Evidence Reviewed</b>	<ul style="list-style-type: none"> <li>Interview with laboratory manager and technical staff</li> <li>Observed the physical equipment at the lab used for the analysis of samples.</li> <li>Observed hard copies of ISO certificate for the laboratory and hardcopies of Standard Operating Procedures for testing of samples.</li> <li>Observed the physical equipment at the lab used for the analysis of samples.</li> <li>Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that quality of ore is reported monthly in terms of its composition (e.g. contents in Mn, Fe, SiO<sub>2</sub>, CaO /12/..</li> <li>Observed internal procedures as part of SHEQ internal management system confirming that lab analyses are done according to national SABS standards 23/24.</li> <li>Reviewed supplier contracts where product specification for ore quality is defined and compared this with supplier contracts used in the baseline line year of 2003 and observed that ore quality specifications are consistent.</li> </ul>
<b>Findings</b>	No concerns were noted and compliance to the monitoring plan requirements.
<b>Conclusions</b>	The parameter is reported accurately and in accordance with the monitoring plan; and the ore quality is consistent with the baseline year of 2003.

<b>Data / Parameter:</b>	Quality of fluxes
Data unit:	Mass fraction of each component of fluxes (%m/m)
Description:	Quality of fluxes
<b>Measurement Devices</b>	The mass fraction of fluxes (Mn, Fe, SiO <sub>2</sub> , CaO) are measured, when fluxes are used, in the on site laboratory following the site standard operating procedures which comply with the requirements of the South African Bureau of Standards requirements. The laboratory is ISO 9000 certified and participates in a local inter laboratory testing program. All equipment in the laboratory is calibrated and certificates to this effect are maintained on site.

<b>Measurement Frequency</b>	Daily testing is undertaken when fluxes are used.
<b>QA/QC procedures applied:</b>	<ul style="list-style-type: none"> <li>Results are cross checked to ensure that the quality remains between pre-determined specifications</li> </ul>
<b>Verification Activities / Evidence Reviewed</b>	<ul style="list-style-type: none"> <li>Interview with laboratory manager and technical staff</li> <li>Observed the physical equipment at the lab used for the analysis of samples.</li> <li>Observed hard copies of ISO certificate for the laboratory and hardcopies of Standard Operating Procedures for testing of samples 23/.</li> <li>Observed the physical equipment at the lab used for the analysis of samples.</li> <li>Sampling the full monitoring period, data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that quality of fluxes is reported when used in terms of its composition (e.g. contents in Mn, Fe, SiO<sub>2</sub>, CaO /12</li> <li>Observed internal procedures as part of SHEQ internal management system confirming that quality of fluxes were consistent</li> </ul>
<b>Findings</b>	No concerns were noted and compliance to the monitoring plan requirements.
<b>Conclusions</b>	The parameter is reported accurately and in accordance with the monitoring plan; and the quality of the fluxes are deemed to be consistent with the base year.

## 6. Conclusions

Issue	Comments
Is the project documentation in accordance with the requirements of the registered PDD and relevant provision of decision 17/CP.7, EB decisions and guidance and the COP/MOP?	Project documentation is compliant with the requirements of the registered PDD and decisions and guidance of the EB and COP/MOP
Have onsite inspections been performed that may comprise, inter alia, a review of performance records, interviews with project participants and local stakeholders, collection of measurements, observations of established practices and testing of the accuracy of monitoring equipment?	On site inspection of equipment, all supporting data including cross-reference with database, and manual plant logs, and review of calculations were performed. Any instances where inconsistencies with the monitoring plan were noted are discussed in Section 4. These have been closed out prior to the verification being finalised.
Has data from additional sources been used? If yes, please give detail and significance	Default data from IPCC documents and data from supplier documentation has been used in calculations of emissions reductions. No concerns were noted and compliance to the monitoring plan requirements is confirmed.
Have the monitoring results and monitoring methodologies been applied correctly, and is their documentation complete and transparent?	The monitoring methodologies have been applied correctly. Any inconsistencies are discussed in section 4. These have been closed out prior to verification being finalised.
Have any recommendations for changes to the monitoring methodology for future crediting periods been issued to the project participant?	No recommendations for any changes have been made.
Determine the reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the CDM project activity, based on the data and information using calculation procedures consistent with those contained in the registered project design document and the monitoring plan.	The reduction in anthropogenic emissions was verified to be 82,934 tCO <sub>2</sub> e for the monitoring period 01 July 2009 - 28 February 2010, as stated in the monitoring report.
Identify and inform the project participants of any concerns related to the conformity of the actual project activity and its operation with the registered project design document.	The project activity conforms to the project description set out in the PDD.
Has the monitoring report been posted on the UNFCCC website? Please give address below.	The monitoring report was posted on the UNFCCC website on 6 April 2010

## Overall Conclusion

	Conclusion
Project implementation in accordance with the registered PDD	The project activity is implemented and operated in accordance with the registered PDD
Compliance of Monitoring Plan with approved methodology	The Monitoring Plan is compliant with the approved methodology, AM0038 v1 and ACM0002 v6.
Compliance of monitoring with validated Monitoring Plan	The actual monitoring conducted for the Transalloys project for the monitoring period 01/07/2009 - 28/02/2010 is in compliance with the approved Revised Monitoring Plan.
Total tonnes of emission reductions verified as achieved during the monitoring period by the defined project activity	82,934 tonnes of CO <sub>2</sub> equivalent.



## 7. Remediation Requests

## 7.1. Clarification Requests

<b>CL1</b>	
<b>Comment:</b>	<p>The efficiency improvement in emissions reductions (calculated as emissions reductions divided by baseline emissions) for the monitoring period under review for each furnace is noted as:</p> <p>F3: 14.1% (2009), 8.9% (2010), 12.8% (Total),  F5: 14.9% (2009), 12.1% (2010), 14.2% (Total),  F7: 17.5% (2009), 23.8% (2010), 19.7% (Total).</p> <p>Hence the implementation of the project has resulted in similar improvements in emission reductions (versus baseline emissions) at F3 and F5, but a somewhat higher efficiency improvement at F7.</p>
<b>Clarification Request:</b>	<b>CL1:</b> Please clarify the reasons for the greater emissions reductions at furnace 7 versus those at Furnace 3 and 5.
<b>PP Response:</b>	<p>Although all 3 furnaces have had their PCD adjusted (relocation of the electrodes) as part of the retrofit towards optimisation, Furnace 7 is the one for which the optimal calculated PCD has been able to be most closely achieved. The optimal PCD was determined during design phase to be around 4100mm for F7 and F5 (which are both 12m furnaces). Furnace 7's PCD is now set to 4m, as opposed to 3.81m only for F5 due to structural constraints in the roof (Furnace 7's roof was rebuilt around the optimized PCD requirements). Similar physical constraints appeared for F3, which is an 8m furnace and had extra modifications during retrofit such as conversion from a rotating to a stationary furnace. Thus the major difference between Furnace 5 and 3 on one side and F7 on the other side is that F5 and F3's PCDs were improved over the baseline but the optimization peak was not achieved. For Furnace 7 the optimization peak has been achieved and thus a greater electrical efficiency is now achieved, generating more emission reductions.</p> <p>Additionally to this, it is worth noting that the smelting process implies complex chemical reactions and even a small difference in the shape of the furnace will impact its performance, as it is not a linear system. Every furnace being 'unique' in the sense that there is no standard furnace, they will automatically react differently to a change to their internal structure.</p>

**Documentation provided:** Electrode column Layout & Measurements TA F1-7 / 17/

**Verification activity**

Review of the Electrode column Layout & Measurements TA F1-7 / 17/

**Reason for acceptance / non-acceptance**

On the basis of the documentation, review by expert and argumentation provided by project developer the reasoning is accepted  
CL 1 is closed.

<b>CL2</b>	
<b>Comment:</b>	<p>Despite the fact that paper print outs showing batchweigh data for raw material use in Furnace 7 were available for the monitoring period, it is unclear how this information is used in the QA/QC process of daily shift totals for raw material use.</p>
<b>Clarification Request:</b>	<b>CL2:</b> Please clarify the application of the QA/QC process for daily batchweigh data for furnace 7.
<b>PP Response:</b>	<p>The QA/QC process for F7 is the same as for the other furnaces and is stipulated in the Transalloys procedure SiMn300 provided. This document shows that a thought through QA/QC system is in place to limit reporting transcriptions errors at all furnaces.</p> <p>An example of the application of this procedure at Furnace 7 is CAR 1 issues 10 and 11; in both cases point 2.3 of the procedure was followed: where printouts were found with the same tap number the sum of the two are recorded in the logsheet.</p> <p>For the batchweigh data, the same practice applies: the shift total printouts are used to cross check that the value has been entered correctly by the operator, as per point 2.1 of the procedure. An example of such printout is provided with our answer for the afternoon shift on the 7/07/2010 at Furnace 7, where the data can be crosschecked with the data entered in the logsheet filled for production data reporting, also provided. When an error is identified, it is not common practice at F7 to make an annotation on the printout but only on the logsheet, hence contrarily to F3 and F5 no annotation can be found on the printouts for batchweigh at F7. The project developer is working to improve this practice for QA/QC at F7.</p>

**Documentation provided:**

- SiMn300 Checking of Logsheets /18/

- 1002\_F7\_LOGSHEET Fce 7\_February\_2010\_7
- F7 batchweigh shift total printout 7.02.2010 /20/

**Verification activity**

Review of SiMn300 has been undertaken along with log sheets and the batch weigh shift total print out.

**Reason for acceptance / non-acceptance**

- On the basis of the documentation provided (SiMn300 Checking of Logsheets /18/; 1002\_F7\_LOGSHEET Fce 7\_February\_2010\_7; F7 batchweigh shift total printout 7.02.2010 /20/ ) this CL is closed. The PP has demonstrated that the QA/QC procedure has been satisfactorily applied for batchweigh data for raw material use in Furnace 7.
- CL 2 is Closed

**CL3**

**Comment:** In Section E.5 of the monitoring report, annual predictions of emission reductions are presented against emissions reductions for this monitoring period which is misleading.

**Clarification Request:** Please also include in the table the predicted emission reductions for the same period as the monitoring period.

**PP Response:** The monitoring report was revised, and some typographic errors were also corrected.

**Documentation provided:**

- Transalloys CER Workbook M3 -1.Jul.2009\_28.Feb.2010 (ERM) V3 (#14)
- 1027 Transalloys Monitoring Report 3rd Monitoring Period V3 (#5)

**Verification activity**

The revised monitoring report was reviewed

**Reason for acceptance / non-acceptance**

A footnote has been added to the monitoring report section E.5. to show the comparative time periods. CL 3 is closed.

**7.2. Corrective Action Requests****CAR1**

**Comment:** A review of the daily logsheet data against the archived data (equipment printouts) was undertaken. A sample of the data points were reviewed for the monitoring period (note that F7 did not operate for July, August and half of September of 2009). The following data points were assessed on each log sheet:

- Tap data (SiMn production);
- Batchweigh data (Coal use and coke use).

(Electricity use (MWh) and paste use were compared with utility invoices and supplier invoices respectively).

Minor differences were observed between daily logsheet data and the archived data, these include:

Issue No.	Furnace	Data verified	Date in logsheet	ERM Finding
1	3	Logsheets vs Batch weight printout	07 Dec '09	UM Bin 3 data doesn't correlate. - No annotation.
2	5	Logsheets vs Batch weight printout	17 Feb '10	The 24 total values for raw material has been incorrectly entered into the N/S BW totals
3	3	Logsheets vs Platform scale printout – Tap 3J0141	5 Feb '10	Printout records reflect 12000 kg. Logsheets reflect 12800
4	3	Logsheets vs Batch weight printout	24 Feb '10	Printout not corresponding to data within logsheet. It was indicated that such was due to change in recipe, but such reason was not provided on the Logsheets.

	5	3	Logsheet vs Platform scale printout (Tap 3J0129)	3 Feb '10	Printout indicates 22 450 kg (Tap mass – Logsheet reflects 12 250. No explanation provided on logsheet for correction)
	6	3	Logsheet vs Platform scale printout	20 Dec '09	Printer error for taps numbered 889 and 891
	7	3	Logsheet vs Batch weight printout	22 Dec '09	Morning shift errors - printout record vs logsheet not equal.
	8	3	Logsheet vs Platform scale printout	11 Dec '09	3I0835 no printout record of tap mass
	9	3	Logsheet vs Platform scale printout	08 Dec '09	Tap mass of 3i0822 does not correlate with platform scale printout
	10	7	Logsheet vs Platform scale printout	4 Feb'10	- Printout record vs logsheet not equal for 2 taps out of 9: tap 296 and 297
	11	7	Logsheet vs Platform scale printout	20 Feb'10	- Printout record vs logsheet not equal for 2 taps out of 9

**Corrective Action Request:** **CAR1:** Please provide annotation in the logsheets for the above identified dates describing the inconsistencies found between the archived equipment printouts (where available) and the daily logsheets and make corrections where appropriate.

**PP Response:** The logsheets annotated with an explanation for the inconsistencies found are provided with our response. Because issues number 2 and 3 affect the ER calculations, the CER workbook has been corrected accordingly.

#### Documentation provided:

- 912\_F3\_LOGSHEET Fce 3\_December\_2009\_7 8 11 20 22
- 1002\_F3\_LOGSHEET Fce 3\_February\_2010\_3 5 24
- 1002\_F5\_LOGSHEET Fce 5\_February\_2010\_17
- 1002\_F7\_LOGSHEET Fce 7\_February\_2010\_4 20
- Transalloys CER Workbook M3 -1.Jul.2009\_28.Feb.2010 (ERM) V2

#### Verification activity

Documents listed above have been reviewed.

#### Reason for acceptance / non-acceptance

The corrective action is closed as the requested changes have been made and the logsheet and the monitoring report correctly indicate this.

CAR 1 is Closed.

#### CAR2

**Comment:** A review of the electricity use (ECy) identified a difference in recorded Furnace 3 consumption when comparing the logsheets, Transalloys Calculation Workbook and monitoring report. The total consumption as per the logsheets is 65720 MWh (start meter of 48140 and ending meter as 113860), but according to the workbook and monitoring report, total electricity consumption is 65711 MWh. The reason was found to be due to a meter reading being incorrectly recorded in August and September of the monitoring period.

**Corrective Action Request:** **CAR2:** Please correct the meter reading recording in the daily logsheets, calculation workbook and monitoring report.

**PP Response:** The correction of 9MWh has been made (2MWh – Aug 2009, 7MWh – Sept 2009) and this is reflected in the monitoring workbook and monitoring report.

**Documentation provided:** Transalloys CER Workbook M3 -1.Jul.2009\_28.Feb.2010 (ERM) V2

#### Verification activity

*Transalloys Calculation Workbook* was reviewed along with the monitoring report.

#### Reason for acceptance / non-acceptance

The changes requested have been made the Transalloys Calculation Worksheet and monitoring report now show the correct values.

CAR 2 is Closed.

<b>CAR3</b>	
<b>Comment:</b>	In the monitoring report, under the QA/QC procedure for electricity use (ECy) the following is stated: "Values reported are cross-checked with electricity metered monthly by the grid company Eskom. The two values correlate satisfactorily during this Monitoring Period." This cross check is also set out in the monitoring plan. However, the verification process identified that there has been an issue with the monitoring meters belonging to Eskom not reading the same MWh usage as the meters belonging to Transalloys. There has been communication between the two companies in aid of addressing the issue. Eskom has stated that they will invoice Transalloys for the coming months using the MWh usage metered by Transalloys as opposed to their own meters.
<b>Corrective Action Request:</b>	<b>CAR3:</b> Please update the QA/QC procedure (ECy) in the monitoring report to reflect the actual QA/QC procedures that have taken place, and the results thereof.
<b>PP Response:</b>	The procedure for QA/QC of electricity data is to compare Eskom's billing values, on a monthly basis, with the values recorded by Transalloys onsite. Over the duration of the monitoring period the Transalloys values and the Eskom values have a correlation coefficient of 99.7%. The total difference over this period is 10 051MWh or 2.4% of the Transalloys measurements. This difference is explained by an error in the Eskom metering, emails from Eskom (shown to the Verifiers on site) identify the error as Eskom's and suggest using Transalloys data for billing purposes until Eskom's own metering system can be replaced. Eskom is currently repairing and where necessary replacing their equipment. The same has been added in the Monitoring Report as requested.

**Documentation provided:** 1027 Transalloys Monitoring Report 3rd Monitoring Period V2

#### Verification activity

Review of 1027 Transalloys Monitoring Report 3rd Monitoring Period V2 .

#### Reason for acceptance / non-acceptance

CAR3 closed as the monitoring report has been updated to reflect the QA/QC process undertaken with respect to the electricity data. It was confirmed on site that the minor discrepancy during this time period was due to Eskom's metering used for cross checking. No problems were identified with the Transalloys meters used to generate the electricity consumption used in the emission reduction calculations.

CAR3 is closed.

<b>CAR4</b>	
<b>Comment:</b>	In the monitoring report, under the QA/QC procedure for both coal use (Qpcoal), and coke use (Qpcoke), the following is stated: "The weigh hoppers are maintained regularly and tested weekly for accuracy according to internal procedure TAOP230". This provides information on the QA/QC procedure for maintaining equipment but does not provide information on the QA/QC procedure for ensuring the coal use and coke use data is accurate.
<b>Corrective Action Request:</b>	<b>CAR4:</b> Please update the QA/QC procedure (Qpcoal and Qpcoke) in the monitoring report to reflect the procedure that ensures the accuracy of the data.
<b>PP Response:</b>	Furnace operators are provided with a 'recipe' for adding 'ingredients' on a batch basis. The actual mass of each of the 'ingredients' added is recorded and compared to the 'recipe' as per <b>SiMn300: Procedure for QA/QC of logsheets</b> (provided to the Verifiers). In addition <b>SiMn300</b> requires that the shift and day totals for all 'ingredients' be checked against the printouts for that furnace by the furnace superintendent. The Monitoring Report has been updated to reflect this procedure.

#### Documentation provided:

- SiMn300 Checking of Logsheets
- 1027 Transalloys Monitoring Report 3rd Monitoring Period V2

#### Verification activity

Review of SiMn300 Checking of Logsheets and 1027 Transalloys Monitoring Report 3rd Monitoring Period V2.

#### Reason for acceptance / non-acceptance

The monitoring report has been appropriately updated.

CAR4 is closed –

<b>CAR5</b>	
<b>Comment:</b>	In the monitoring report, under the QA/QC procedure for SiMn production (QPy) the following is stated: "The measured data correlates satisfactorily with the product sales record during this Monitoring Period." However data is compared with both the product sales record and the "saleable production" (which includes recovered material).
<b>Corrective Action Request:</b>	<b>CAR5:</b> Please update the QA/QC procedure (QPy) in the monitoring report to reflect the actual QA/QC procedures that have taken place, and the results thereof.
<b>PP Response:</b>	<p>Furnace Production is checked against the Product Sales Record as per the monitoring plan. However since not all material produced can be sold it is necessary to add the unsaleable mass of SiMn and the amount still in stock to the product sales records in order to be able to compare these values. In this Monitoring Period the SiMn furnaces produced 86 017t, whilst 71 811t were sold and 315t remain in stock. Thus saleable material plus stock accounts for 72 126t, or 84% of Furnace Production. The major loss of material between Furnace Production and Saleable Product is fines generation, fines cannot be sold.</p> <p>During this monitoring period approximately 16 720t of fines were generated, thus 19.4% of Furnace Production is lost to fines. Therefore 86 017t was produced by the furnaces, and 88 846t are accounted for by Fines, Product Sales Record and Stock.</p> <p>The difference in totals (3%) is due to Furnace Production being weighed on platform scales whilst the metal is still in ladles whereas Fines, Product Sales Record and Stock are weighed on weighbridges, as well as spillage, from ladles, during handling that is later added back into processing once the metal has cooled. The spillage mass is discounted from the total production claimed to be conservative.</p>

**Documentation provided:** 1027 Transalloys Monitoring Report 3rd Monitoring Period V2 /5/

#### Verification activity

Review of 1027 Transalloys Monitoring Report 3rd Monitoring Period V2

#### Reason for acceptance / non-acceptance

The Monitoring report has been appropriately updated.

CAR5 is closed

CAR6				
Comment:	A small number of minor transcription errors from logsheets into the CER Calculation Workbook were found. These include:			
	Date	Issue:	ERM CVS Finding	
	16-Dec-09	Logsheets data vs workbook data - coal	Minor difference in coal amount between logsheet and workbook	
	17-Dec-09	Logsheets data vs workbook data - coal	Minor difference in coal amount between logsheet and workbook	
	22-Dec-09	Logsheets data vs workbook data - coal	Minor difference in coal amount between logsheet and workbook	
	23-Dec-09	Logsheets data vs workbook data - coal	Minor difference in coal amount between logsheet and workbook	
	31-Dec-09	Logsheets data vs workbook data - paste	Minor difference in paste amount between logsheet and workbook	
Corrective Action Request:	CAR6: Please correct the transcription errors found between the logsheets and the CER Calculation Workbook.			
PP Response:	The errors relating to the coal amounts at furnace 7 were due to a formula error in the summary sheet of the logsheet, this error has been rectified in the logsheet but the workbook data was correct so it has not been changed in the workbook. The discrepancy in paste cylinders at furnace 7 is a typographical error - the correct value is 8 cylinders. This has been corrected in the monitoring workbook.			
	Date	Workbook Value	Logsheets Value	Response
	16 Dec 2009	99,301 Kg	99,284 Kg	Formula error in the logsheet presented during site visit. No correction needed in the CER workbook.
	17 Dec 2009	107,004 Kg	106980 Kg	Formula error in the logsheet presented during site

	22 Dec 2009	86,964 Kg	86,984 Kg	visit. No correction needed in the CER workbook.
	23 Dec 2009	121,228 Kg	121,218 Kg	Formula error in the logsheet presented during site visit. No correction needed in the CER workbook.
	31 Dec 2009	17 cylinders	8 cylinders	Formula error in the logsheet presented during site visit. No correction needed in the CER workbook.
				Cylinders not recorded correctly. The error has been corrected in the CER workbook.

**Documentation provided:**

- 912\_F7\_LOGSHEET Fce 7\_December\_2009\_16 17 22 23 31 )
- Transalloys CER Workbook M3 -1.Jul.2009\_28.Feb.2010 (ERM) V2 (#14)
- 1027 Transalloys Monitoring Report 3rd Monitoring Period V2 (#5)

**Verification activity**

Review of 912\_F7\_LOGSHEET Fce 7\_December\_2009\_16 17 22 23, Transalloys CER Workbook M3 -1.Jul.2009\_28.Feb.2010 (ERM) V2, 1027 Transalloys Monitoring Report 3rd Monitoring Period V2

**Reason for acceptance / non-acceptance**

The transcription errors have been corrected and the CER workbook and monitoring report reflect the appropriate changes.

CAR6 is closed

<b>CAR7</b>	
<b>Comment:</b>	During the <b>2nd verification</b> , FAR4 stated, "During the QA/QC process of the logsheet data, data may be edited if incorrect. However, there is no information provided as to why the data was edited or in many cases how it has been edited. There is a need for a procedure for the QA/QC of logsheet data to be developed and for this procedure to include processes for the changing of data in logsheets".
<b>Corrective Action Request:</b>	<b>CAR7:</b> Please update the procedure for the QA/QC of logsheet data and how this procedure has been integrated into a Transalloys Standard Operating Procedure. Please then revise the monitoring report to refer to this.
<b>PP Response:</b>	<ul style="list-style-type: none"> <li>▪ The Procedure for QA/QC of logsheet data has been formalized as procedure SiMn300: Procedure for QA/QC of logsheets, and has been loaded onto the site's QMS system. A copy of this procedure has been provided to the Verifiers.</li> <li>▪ The monitoring report has been updated to reflect this procedure.</li> </ul>

**Documentation provided**

- SiMn300 Checking of Logsheets
- 1027 Transalloys Monitoring Report 3rd Monitoring Period V2

**Verification activity**

Review of SiMn300 Checking of Logsheets and 1027 Transalloys Monitoring Report 3rd Monitoring Period V2

**Reason for acceptance / non-acceptance**

The procedure was found to be appropriate and described in the monitoring report.

CAR7 is closed.

**7.3. Forward Action Requests**

<b>FAR1</b>	
<b>Comment:</b>	<p>The QA/QC processes for the recording, handling, annotation and archiving of records for the CDM project was not consistently applied at the site. Particular examples include the following:</p> <ul style="list-style-type: none"> <li>▪ QA/QC process of logsheet data to specifically allow for the recording of any departure from "normal conditions".</li> <li>▪ Recording of the outcomes of the procedures in terms of calibration and testing of platform scales in furnace logsheets.</li> <li>▪ completeness of equipment printout archiving to include all daily logsheet data.</li> <li>▪ printouts archived for batchweigh data at furnace 7, which do not provide the data necessary to verify the batchweigh data in the daily logsheets. SiMN300 should be applied at each furnace.</li> </ul>

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<b>Forward Action Request:</b>	<b>FAR1:</b> Please review and update the QA/QC procedures for recording, handling, annotation and archiving of records associated with the CDM project and implement a process to ensure that they are consistently applied across the site.
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<b>PP Response:</b>	This will be presented during the next verification.
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**Documentation provided**

n/a

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**Verification activity**

n/a

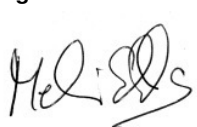
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**Reason for acceptance / non-acceptance**n/a

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## 8. Verification Opinion and Certification Statement

ERM Certification and Verification Services (ERM CVS) was commissioned by Ecosecurities International Ltd to verify and certify the emissions reductions reported for the period 01 July 2009 – 28 February 2010 as set out in the monitoring report of the CDM project activity Transalloys Manganese Alloy Smelter Energy Efficiency Project, Registration Reference 1027.

<b>Basis of verification</b>	ERM CVS based its verification work on: <ul style="list-style-type: none"> <li>the approved methodology applied in the registered project design document (PDD)</li> <li>the registered PDD and approved revised monitoring plan</li> <li>previous verification reports</li> <li>UNFCCC criteria referred to in the Kyoto Protocol criteria and the CDM modalities and procedures as agreed in the Bonn Agreement and the Marrakech Accords</li> <li>relevant decisions, guidance and clarifications of the CMP and CDM Executive Board and any other information and references relevant to the project activity's reported emission reductions</li> <li>the CDM Validation and Verification Manual</li> </ul>
<b>Responsibilities of ERM CVS</b>	ERM CVS is responsible to provide an independent verification conclusion on the reported GHG emission reductions for the project during the relevant monitoring period. The verification activities included desk review, site visit, close out of open issues, preparation of report and technical review.
<b>Responsibilities of Client</b>	The client is responsible for the preparation of the information and GHG emissions data and the reported GHG emissions reductions of the project on the basis set out within the approved revised monitoring plan.
<b>ERM CVS Conclusion</b>	Based on the verification activities undertaken, ERM CVS concludes that the project activity is implemented and operated as described in the registered PDD.  The GHG emissions reductions set out in the monitoring report, version 3, dated 08 December 2010 were found to be appropriately measured and calculated in accordance with the applied monitoring methodologies AM0038 v1 and ACM0002 v6 and the revised monitoring plan approved on 25 October 2009.  Based on the verification activities undertaken, ERM CVS concludes that the reported emission reductions are fairly stated.
<b>Total GHG emission reductions certified</b>	<ul style="list-style-type: none"> <li>Baseline emissions: 533,725 t CO<sub>2</sub> equivalents</li> <li>Project emissions 449,435 t CO<sub>2</sub> equivalents</li> <li>Leakage emissions: 0 t CO<sub>2</sub> equivalents</li> <li>Emission reductions: 84,291 t CO<sub>2</sub> equivalents</li> <li>Onsite Emission reductions (for uncertainty as per PDD) ERO<sub>onsite,y</sub>: 15,071 t CO<sub>2</sub> equivalents</li> <li>Emissions to be deducted for uncertainty if ERO<sub>onsite,y</sub>&gt;0: 1,356 t CO<sub>2</sub> equivalents</li> <li><b>Emission reductions (adjusted for uncertainty): 82,934 t CO<sub>2</sub> equivalents</b></li> </ul>
<b>Report approved by</b>	<b>Signature</b>  
<b>Name: Melanie Eddis</b>	
<b>Date 15 December 2010</b>	



**Annex 1: Reference Documents**

#	Document	Date/Version/Status
1	AM0038 - methodology for improved electrical energy efficiency of an existing submerged electric arc furnace used for the production of SiMn	Version 1
/2/	ACM 0002 – Consolidated methodology for grid connected electricity generation from renewable sources - used for grid emission factor calculation	Version 6
/3/	Project Design Document for CDM project Transalloys Manganese Alloy Smelter Energy Efficiency Project.	Version 6, 02 March 2007
/4/	Revised Monitoring Plan for Transalloys Manganese Alloy Smelter Energy Efficiency Project – reference 1027	Approved 25 October 2009
/5/	<b>1027 Transalloys Monitoring Report 3rd Monitoring Period</b> Monitoring Report of Transalloys Manganese Alloy Smelter Energy Efficiency Project, CDM Monitoring Report Monitoring period No 3: 01/07/2009 - 28/02/2010	Version 1 dated 29/03/2010 Version 2 dated 08/06/2010 Version 3 dated 08/12/2010
6	<b>Monitoring Manual:</b> Transalloys CDM Monitoring Manual	Version 3 - 10 February 2010
7	<b>Calibration certificates:</b> “Mass Calibration Certs”; “Transalloys test weight test certificates”, electricity meters certificates, and weighbridge calibration certificates	Various Dates
8	<b>Verification Report</b> for Transalloys Manganese Alloy Smelter Energy Efficiency Project – first monitoring period	6 October 08
9	<b>Verification Report</b> for Transalloys Manganese Alloy Smelter Energy Efficiency Project – second monitoring period	01 December 2009
10	<b>Meeting minutes on continual improvement:</b> 0545 Transalloys Manganese Alloy Smelter Energy Efficiency project,	15 December 2009.; 23 November 2009
11	<b>Ore quality contracts:</b> “transalloys ore purchase agreement”	06 April 2010
12	<b>Transalloys furnace monthly logsheets -incorporating daily data</b> 907_F3_LOGSHEET Fce 3_July_2009.xls 907_F5_LOGSHEET Fce 5_July_2009.xls 910_F7_LOGSHEET Fce 7_September_2009.xls 912_F3_LOGSHEET Fce 3_December_2009.xls 912_F5_LOGSHEET Fce 5_December_2009.xls 912_F7_LOGSHEET Fce 7_December_2009.xls 1002_F3_LOGSHEET Fce 3_February_2010.xls 1002_F5_LOGSHEET Fce 5_February_2010.xls 1002_F7_LOGSHEET Fce 7_February_2010.xls	As shown
13	<b>Lab sheets:</b> 907 JUL 2009.xls 912 DEC 2009.xls 1002 FEBRUARY 2010.xls	As shown
14	<b>Transalloys calculation workbook:</b> Transalloys CER Workbook M3 -1.Jul.2009_28.Feb.2010	06 April 2010 23 August 2010 08 December 2010
15	<b>Product Sales Record (for the monitoring period):</b> Electricity and SiMn Crosscheck	
16	<b>Eskom electricity invoices (for the monitoring period):</b> Electricity and SiMn Crosscheck	
17	Electrode column Layout & Measurements TA F1-7	22 July 2010
18	SiMn300 Checking of Logsheets	22 Jul7 2010

#	Document	Date/Version/Status
19	1002_F7_LOGSHEET Fce _	7_February_2010
20	F7 batchweigh shift total printout 7.02.2010 - 912_F3_LOGSHEET Fce 3_December_2009_7 8 11 20 22 - 912_F7_LOGSHEET Fce 7_December_2009_16 17 22 23 - 1002_F3_LOGSHEET Fce 3_February_2010_3 5 24 - 1002_F5_LOGSHEET Fce 5_February_2010_17 - 1002_F7_LOGSHEET Fce 7_February_2010_4 20	As shown
21	Project registration information on the UNFCCC website <a href="http://cdm.unfccc.int/Projects/DB/DNV-CUK1174913531.12/view">http://cdm.unfccc.int/Projects/DB/DNV-CUK1174913531.12/view</a>	
22	EB 55 Report Annex 1: CDM Validation and Verification Manual.	Version 01.2, 30 July 2010
23	ISO 9000 Certificate number 01 100 928008 - TUV Rheinland Inspection Services	valid until 2012-06-11
24	Equipment Maintenance Schedules & Calibration records	Various Dates
25	Weighbridge serial 991019, calibrated by JCS Scales, Certification number VC501, Certification number 0725	VC501 – 20/01/2009 0725 - 28/01/2010
26	SHEQ internal management system	Current version
27	Batch weigh print outs – large collection of sheets used daily for each furnace	Various Dates
28	Validation Report for Transalloys Manganese Alloy Smelter Energy Efficiency Project	Version 2 29 August 2007
29	Validation Report of Revised Monitoring Plan for Transalloys Manganese Alloy Smelter Energy Efficiency Project	03 August 2009