Project Title	Transalloys Manganese Alloy Smelter Energy Efficiency Project
ERM CVS Reference	2004.V1
CDM Project Reference Number	1027
Client Name	EcoSecurities International Ltd.
Client Address	40 Dawson Street, Dublin 2, Ireland

CDM Verification and Certification Report

ERM Certification and Verification Services
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London EC3A 8AA

Version Control	**Date**
Version 01	16 June 2011 (draft report)
Version 02	30 January 2012 (final report)
Version 02.1	04 April 2012 (final report after incompleteness)

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CER	Certified Emission Reduction(s)
CL	Clarification Request
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CO2	Carbon Dioxide
CO2e	Carbon Dioxide Equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
OEM	Original Equipment Manufacturer
PDD	Project Design Document
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
SABS	South African Bureau of Standards
UNFCCC	United Nations Framework Convention for Climate Change
VVM	Validation and Verification Manual

1. Project information

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

Date of publication of first Monitoring Report version	24 May 2011 (Version 1)
Final Monitoring Report date and version number	26 March 2012, Version 4
Monitoring Period	4th Monitoring Period: 01 March 2010 – 30 April 2011 (a total of 14 months of which 10 months were in 2010 and 4 months were in 2011)
Number of CERs	230,307 tCO_2e
Date(s) of Site Visit	08-09 June 2011

Date/version of Registered PDD	02 March 2007 Version Number 6
Date of Registration	19 October 2007
Approval date of revised monitoring plan	25 October 2009
Crediting Period	01 October 2004 – 30 September 2014 (fixed)

2. Verification Opinion and Certification Statement

ERM Certification and Verification Services (ERMCVS) was commissioned by EcoSecurities International Limited to verify and certify the emissions reductions reported for the period 01 March 2010 – 30 April 2011 as set out in the Monitoring Report of the CDM project activity Transalloys Manganese Alloy Smelter Energy Efficiency Project, Registration Reference 1027.

Basis of verification	ERM CVS based its verification work on: ▪ the approved methodology applied in the registered project design document (PDD) ▪ the registered PDD and approved monitoring plan (and revised monitoring plan (approved 25 October 2009)) ▪ previous verification reports ▪ 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 CDM Validation and Verification Manual
Responsibilities of ERM CVS	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.
Responsibilities of Client	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 accepted revised monitoring plan.
ERM CVS Conclusion	Based on the verification activities undertaken, ERM CVS concludes that the project activity is implemented and operated as described in the registered Project Design Document. The GHG emissions reductions were found to be appropriately measured and calculated in accordance with the applied monitoring methodology AM0038, version1, and ACM0002, version 6, 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.
Total GHG emission reductions certified	• Baseline emissions: 1,072,226 tCO_2 equivalents • Project emissions 837,718 tCO_2 equivalents • Leakage emissions: 0 t CO_2 equivalents • Emission reductions ('onsite' plus 'offsite' as per AM0038):234,508 tCO_2 equivalents • Onsite Emission reductions (as per PDD) $ER_{Onsite,y}$: 46,677 tCO_2 equivalents • 9% of onsite emissions to be deducted for uncertainty if $ER_{Onsite,y} > 0$: 4,201 tCO_2 equivalents • **Emission reductions (adjusted for uncertainty): 230,307 tCO_2 equivalents**

Report approved by	**Signature**
Name: Melanie Eddis	
Date 04 April 2012	

3. 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.

3.1. 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 Designated Operational Entity 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 approved revised monitoring plan; and
- Whether the reported data meet the key principles of data quality and are complete, reliable, consistent, accurate, valid, transparent and conservative.

3.2. 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 is set on page 2, 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 methodology applied in the registered project design document (PDD) /03/ and /04/
- the registered PDD /02/ and the validation report /16/
- the revised monitoring plan (approved 25 October 2009) /05/ and the associated validation report /17/
- previous verification reports /09/
- 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 CDM Validation and Verification Manual /26/

The verification considers both quantitative and qualitative information on emission reductions. The Monitoring Report /06/ 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.

ERM CVS conducts all its work under strict rules to safeguard impartiality and ensure the independence of the verification team. The verification does not provide any consulting or recommendations for the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring activities.

3.3. Description of Project Activity

The Transalloys Manganese Alloy Smelter Energy Efficiency Project, developed by Transalloys (Pty) Ltd, 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 the Witbank facility in South Africa. It primarily generates emission reductions (ERs) 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 included in the project boundary. 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 activity 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; and
- The same principles are applied for furnace 3. The units are smaller and so the design is a slightly 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.

3.3.1. Appointment of Team Members and Technical Reviewer

Based on ERM CVS’s review of the project a verification team was established that takes into account the coverage of the technical area(s), sectoral scope(s) and relevant host country experience for verifying the ER achieved by the project activity in the relevant monitoring period for this verification.

Personnel who undertook this verification were:

Verification Team	Role	CDM Knowledge	Coverage of technical area	Host country	Participated in site visit?
Mandy Momberg	Lead Verifier	√		√	**No**
Graham Paul	Verifier	√	partial	√	**Yes**
Brian Hayes	Technical Expert	√	√	√	**Yes**

Technical Review	Role	CDM Knowledge	Coverage of technical area	Host country	Participated in site visit?
Miguel Cortes	Technical Reviewer	√	partial		No

Mandy Momberg has over 20 years' experience in climate change, environmental sustainability and biodiversity related matters, which includes the validation and verification of Clean Development Mechanisms (CDM) projects, climate change risk assessments and greenhouse gas inventories. Mandy underwent CDM training with PricewaterhouseCoopers (SA) in 2007 where she was appointed DOE Manager. In addition, Mandy spent two years in the mining industry and gained experience in land stewardship, waste management, closure liabilities and environmental management systems. Mandy is a qualified and experienced ISO14001 Environmental Management Systems auditor and has further training in various environmental matters, including environmental law, environmental risk assessments, environmental auditing, air pollution control, water pollution control and waste management.

Brian Hayes was part of the verification team that completed both the 2nd and 3rd verifications. Brian has undergone formal CDM training as a lead auditor with PricewaterhouseCoopers (SA), 2006 and has experience on various CDM projects. Other key work experience includes 5 years in Engineering and Production as a Process Engineer and a Production Manager and 9 years experience in the field of SHEQ Management including Managing a team of consultants to Shell Nigeria for the implementation of sound Environmental Management systems since 2001; Technical Director to Shangoni Management Pty (Ltd), servicing the SA Mining and Process industries in environmental management, environmental legal compliance and associated services. Clients include De Beers, Harmony, African Rainbow Minerals, PPC, SA Breweries, BHP Billiton; Integration of Health, Safety, Quality Management systems since 1998; Establish structured Environmental Management within SA Breweries, which include management systems, resource optimization strategies, etc

Graham Paul was part of the verification team that completed both the 2nd and 3rd verifications. Graham has an MSc in Global Environmental Change and has project experience in climate strategy, carbon footprinting, climate risk assessment, the Clean Development Mechanism (CDM), carbon due diligence, and greenhouse gas data verification. His experience includes:

- Formal CDM validation and verification training through ERM CVS.
- Previous validation and verification work on projects covering approved methodologies ACM0002, AM0038, and ACM0017.

Miguel Cortes has five years of experience in CDM projects, nine years as Environmental Manager in the Cement Industry and two years of academic research in Environmental Studies. Highly qualified for technical assessment and handling of GHG emission reduction and carbon offset projects in Energy and Manufacturing Industries, Mining and Waste Water Management. Has in-depth knowledge of Organizational Environment Management Systems including air emission and waste water monitoring, air quality and noise characterization, audit processes for law compliance and performance, community stakeholder relationship management and land-cover restorations. Expert at design of Clean Development Mechanism (CDM) methodologies and provides technical, professional and economic support for environmental projects. His CDM experience includes:

- Design and development of CDM methodology AM0040 "Baseline and monitoring methodology for project activities using alternative raw materials that contain carbonates in clinker manufacturing in cement kilns" (The methodology was consolidated with AM0033 under ACM0015)
- Conducted many GHG and CDM project analyses in China, Mexico, Brazil, India, Argentina, Colombia, Bolivia, Macedonia, Egypt, Thailand and the Middle East
- Experience as Technical Reviewer of coal mine methane, waste heat recovery, waste water management and hydroelectric CDM projects

4. Verification activities

The verification approach is based on the approach depicted in the CDM Validation and Verification Manual /26/

4.1. Desk review

A detailed desk review was undertaken prior to the site visit. This included the registered PDD, including the revised monitoring plan (approved 25 October 2009) and the corresponding validation report, the applied monitoring methodology, previous verifications reports, relevant external data and reports, on-site documents, relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board. All monitoring procedures were discussed prior to the site visit.

A complete list of all documents reviewed is contained in Annex 1.

4.2. Site Visit

A site visit to the project activity was undertaken to assess implementation and operation of the project activity and to review evidence, and interview key personnel to confirm evidence associated with the data generation, aggregation, calculation and reporting of the monitoring parameters.

The site visit addressed:

- Assessment of the project implementation as per the registered PDD (including site walk through to confirm physical existence and operation of project components);
- Practical implementation of all aspects of the revised monitoring plan and conformance with the methodology;
- Review of information flows for generating, aggregating and reporting the monitoring parameters;
- Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the revised monitoring plan; a list of all interviewees is included in Annex 2.
- Cross-check between information provided in the Monitoring Report /06/ and data from other sources such as logsheets /11/ , the Transalloys CER Workbook /10/ product sales records /12/ and electricity invoices /13/ to establish the existence of a clear audit trail and records that validate or invalidate the stated data;
- Check monitoring equipment including calibration performance /08/ and observations of the monitoring practices /07/, /15/ and /18/ against the requirements of the PDD /02/, the revised monitoring plan /05/ and the selected methodologies /03/ and /04/;
- Review calculations and assumptions made in determining the GHG data and emission reductions;
- Review of on-site documentation, logsheets /11/, protocols /07/, calibration reports and calibration standards /08/, suppliers information /23/.
- Identification of quality control and quality control procedures /15/ in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

4.3. Reporting

After the site visit, a draft report is prepared with the preliminary findings of the verification. Where it is not possible to confirm compliance or to form a verification opinion, the following findings are raised:

- 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

- Forward Action Request (FAR): are raised to highlight issues related to the monitoring and reporting which require attention or adjustment for the next verification period; and

- Minor Issues (MI): are 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.

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 a CAR. Information or clarification provided 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.

After satisfactory close out of CARs, CLs and MIs, 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.

4.4. 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.

5. Findings of the desk review and site visit

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

Forward Action Request	*Date and document (Validation or verification)*	*Verification activities undertaken to close the FAR*	*Conclusion (OK/CAR/CL)*
From the 3rd verification: **FAR1:** 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.	Verification report for the 3rd Monitoring Report /09/ (3rd verification - ERM CVS)	The QA/QC procedure (SiMn300) /18/ for recording, handling, annotation and archiving of records associated with the CDM project was updated to address FAR01 (raised during the previous monitoring period), and ERM CVS verified during the site visit that the following takes place in accordance with the updated procedure: • recording and handling of data in furnace control rooms and lab; • manual transcription of data; • annotation where any data discrepancies, process changes, recipe changes, equipment failures etc. occur; and • availability of printout data for the monitoring period. FAR01 was closed.	OK

5.2. Project Implementation in accordance with the registered PDD

During the ERM CVS site visit, the verification team were taken around the entire site, visiting the three furnaces included in the project activity (Furnace 3, 5 and 7), the laboratory on site, as well as the offices where Transalloys staff work from. Document reviews were undertaken prior to the site visit as well as in the offices whilst on site. Furthermore, interviews were undertaken with the CDM programme manager (Transalloys Service Manager), the CDM QA/QC manager (Transalloys production superintendent), the laboratory manager and staff, furnace operators and EcoSecurities project managers.

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 yet 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 /27/.

The project started operating on 01 October 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 /02/, furnace 6 was to be retrofitted in 2008 and furnace 1 in 2009. According to the project manager the plan is still to potentially retrofit furnaces 1 and 6 but will only do so when economic conditions improve. 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 /06/ is found to be an accurate reflection of the actual implementation and operation, and aligned with the project description in the registered PDD /02/. The Verification team can confirm that there have been no changes to the project or to any attributes of the project between the 3rd and 4th verification periods.

Compliance question	Verification activities undertaken	Findings	Conclusion (OK/CAR/CL)
Are all physical features of the project activity in place as per the registered PDD?	During the ERM CVS site visit, the verification team were taken around the entire site, visiting the three furnaces included in the project activity (furnace 3, 5, and 7), the laboratory on site, as well as the offices where Transalloys staff work from. Document reviews were undertaken prior to the site visit as well as in the offices whilst on site. Furthermore, interviews were undertaken with the CDM programme manager (Transalloys Service Manager), the CDM QA/QC manager (Transalloys production superintendent), the laboratory manager and staff, furnace operators and EcoSecurities project managers.	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 /02/ and the revised monitoring plan /5/. Furnaces 3, 5 and 7 have been retrofitted as described in the PDD. Electricity meters have been installed at each furnace (i.e. 3 electricity meters), the weigh bridge records were available for paste used, weigh hoppers equipment printouts recorded the amount of coal and coke used and platform scales measure the SiMn production. QA/QC procedures are applied in the laboratory on the recorded SiMn, coal, coke, paste and fluxes used (a full discussion is included in Section 6.1 below). 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 /27/.	OK
Is the project activity operated as per the registered PDD?	During the ERM CVS site visit, the verification team were taken around the entire site, visiting the three furnaces included in the project activity (Furnace 3, 5 and 7), the laboratory on site, as well as the offices where Transalloys staff work from. Document reviews were undertaken prior to the site visit as well as in the offices whilst on site. Furthermore, interviews were undertaken with the CDM programme manager (Transalloys Service Manager), the CDM QA/QC manager (Transalloys production superintendent), the laboratory manager and staff, furnace operators and EcoSecurities project managers.	The project started operating on 01 October 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 /02/, furnace 6 was to be retrofitted in 2008 and furnace 1 in 2009. According to the project manager the plan is still to potentially retrofit furnaces 1 and 6 but may only do so if economic conditions improve drastically. As it stands, during the monitoring period of 14 months (01 March 2010 – 30 April 2011): • furnace 3 operated for 10 months in 2010 and 4 months in 2011 with approximately 15 days of no production during the monitoring period, due to maintenance and operational reasons. • furnace 5 operated for 10 months in 2010 and 4 months in 2011 with approximately 15 days of no production during the monitoring period and • furnace 7 operated for 10 months in 2010 and 4 months in 2011 with approximately 8 days of no production during the monitoring period. Transalloys have all the metering and monitoring equipment in place at the 3 retrofitted furnaces in order to monitor the project parameters. Furthermore, the data	OK

		storage processes and systems have been confirmed to be in accordance with the revised monitoring plan /05/.	
Has there been any variance in the data and variables provided in the Monitoring Report compared with the registered PDD that has caused an increase in emission reductions or likely to increase the estimates in future monitoring periods?	During the ERM CVS site visit, the verification team were taken around the entire site, visiting the three furnaces included in the project activity (Furnace 3, 5 and 7), the laboratory on site, as well as the offices where Transalloys staff work from. Document reviews were undertaken prior to the site visit as well as in the offices whilst on site. Furthermore, interviews were undertaken with the CDM programme manager (Transalloys Service Manager), the CDM QA/QC manager (Transalloys production superintendent), the laboratory manager and staff, furnace operators and EcoSecurities project managers.	The emission reductions determined in this 4th monitoring period are higher (197%) than predicted in the PDD, and the reasons given are related to the reduction in 'onsite emissions' (related to the coal, coke, paste used), higher electricity savings of the entire plant, and the delay of the retrofit of furnace 1 and furnace 6. **CAR1** was raised as ERM CVS found the details provided in the first version of the monitoring report did not adequately describe the operational and management changes that took place during the monitoring period. **CL3** was also subsequently raised requesting an explanation of how the increased electricity savings observed during this monitoring period do not constitute a permanent change in the assumptions applied at the time of validation and registration of the project, particularly in relation to the values applied in the sensitivity analysis. Please refer to CAR1, CL3 and Section 5.6 below for detail and discussion on the comparison of ERs with that estimated in the PDD. CAR1 and CL3 were closed (see section 7)	~~CAR1~~ ~~CL3~~ Ok

Conclusion

Based on the verifier's site visit, all physical features of the project activity have been fully implemented in accordance with the registered PDD and the monitoring equipment was installed as described in the revised Monitoring Plan /5/. ERM CVS confirmed, through the visual inspection that all physical features of the proposed CDM project activity have been implemented in accordance with the registered PDD. The project activity was also confirmed to be fully operational in accordance with the registered PDD.

ERM CVS confirmed that the project activity is implemented in accordance with the registered PDD and monitored in accordance with the revised monitoring plan and during the site visit it was confirmed that:

- the installed capacity and number of units have not changed from the previous monitoring period and that furnace 1 and furnace 6 had not been retrofitted yet;
- no component has been added nor has the technology been extended;
- the project is still a single site activity;
- the scale of the project has not changed;
- the applicability criteria of the methodologies are maintained.

    - Submerged electrical arc furnaces are used for production of silicomanganese (SiMn) both in the project case and baseline.

    - The electricity consumed, both in the project case and the baseline, by the submerged electric arc furnace is sourced from the grid and not by onsite generation - all the electricity is bought from national utility Eskom.

    - The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available - there is only one national grid for South Africa, and therefore the geographic and system boundaries can be clearly identified.

- The quality of the raw material and SiMn produced is not affected by the project activity and remains unchanged - this quality has been unchanged and this is monitored in the project and compared against the baseline. In particular, the production has to meet certain specifications and it is shown that these specifications are still met in the project.

5.3. Compliance of the revised monitoring plan with the monitoring methodology

The verification team reviewed the revised monitoring plan against the requirements of the approved monitoring methodology.

Compliance question	Verification activities undertaken	Findings	Conclusion (OK/CAR/CL)
Is the monitoring plan in compliance with the applied methodology?	The project participants sought revision to the Monitoring Plan in the 2nd verification period. The Revised Monitoring Plan was validated by DNV and was approved by the CDM Executive Board on 25 October 2009. The validation report confirmed conformance with the monitoring methodology. ERM CVS reviewed the Monitoring Plan (in the registered PDD) /02/ and also the revised monitoring plan /05/ and confirmed that the revised monitoring plan /05/ conforms with the applied methodologies (AM0038 version 01 /03/ and ACM0002 version 06 /04/).	The revised monitoring plan correctly lists the parameters to be monitored in accordance with the approved methodologies and ERM CVS considers it to be compliant with AM0038 version 01 and ACM0002 version 06, and it is applied correctly by the CDM project activity	OK

Conclusion

The revised monitoring plan is in accordance with the approved methodologies applied by the CDM project activity. No requests were made to the CDM Executive Board for deviation from the approved methodology.

5.4. Compliance of monitoring with the monitoring plan

The verification team evaluated whether the monitoring arrangements on site are in compliance with the revised monitoring plan /05/ which was approved on 25 October 2009.

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 /05/ in accordance with AM0038 version 01 /03/. All parameters stated in the monitoring plan have been applied and the monitoring equipment has been installed and operated as required.

The monitoring of project parameters as per the revised monitoring plan /05/ and the implementation of management quality assurance and quality control procedures /18/ (including the revision and implementation of the QA/QC procedures for the recording, handling, annotation and archiving of records, to address the FAR raised during the **3rd verification**) have been properly implemented in accordance with the revised monitoring plan /05/ with the aid of a monitoring manual /07/ produced by EcoSecurities for the Transalloys site.

The key elements of the revised monitoring plan include:
- Collection of data at the weigh hoppers and platform scales;
- Performing lab analyses on these samples;
- Entering data into spreadsheets (in the furnace control rooms);
- Developing a Monitoring Report for each monitoring period; and
- Archiving data and reports.

Any exceptions identified per project parameter during the verification are noted as CLs or CARs and are provided in section 6 where a full description of each of these parameters and the verification activities associated with their monitoring is discussed.

5.4.1. Monitoring parameters

The verification team evaluated the monitoring of each parameter stated in the monitoring plan. These included:

- Project emission parameters
- Baseline emission parameters
- Leakage parameters

The parameters used are listed below and a full description of each of these parameters and the verification activities associated with monitoring of each one is included in Section 6.

A: List of Parameters – Baseline emissions

ID	*Parameters*	*Data Unit*	*Parameter Description*	*Source of data*			*Calculated Parameters*
				Direct measurement	*Sampling*	*External Source*	
A1	**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			
A2	**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			
A3	**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			
A4	**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			

A5	**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.			
A6	**EFbcoal,i**	$tCO_2/tcoal$	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	
A7	**EFbcoke,i**	$tCO_2/tcoke$	Emission factor applied for the coke consumed as reductant based on carbon content				Calculated using equation 4.19, p4.33 of IPCC (2006)
A8	**EFbpaste,i**	tCO_2/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.	
A9	**Quality of coalb**	Mass fraction of each component (%m/m)	Quality of coal based on elementary analysis and other relevant properties		Transalloys lab analyses		
A10	**Quality of cokeb**	Mass fraction of each component (%m/m)	Quality of coke based on elementary analysis and other relevant properties		Transalloys lab analyses		
A11	**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	
A12	**Quality of SiMnb**	Text	Quality of SiMnb, based on elementary analysis and other relevant properties		Transalloys lab analyses		
A13	**Quality of ore**	Text	Quality of ore, based on elementary analysis and other		Transalloys lab		

			relevant properties		analyses		
A14	**Quality of fluxes**	Text	Quality of fluxes, based on elementary analysis and other relevant properties		Transalloys lab analyses		

B: List of Parameters – Project emissions

ID	*Parameters*	*Data Unit*	*Parameter Description*	*Source of data*			*Calculated Parameters*
				Direct measurement	*Sampling*	*External Source*	
B1	**QPy,monitored**	Tonnes of SiMn/year	Quantity of SiMn production in year y during the project activity	Data monitored at each tapping of the furnace			
B2	**ECy**	MWh/year	Annual grid electricity consumption by the submerged electric arc furnace	Metered continuously			
B3	**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			
B4	**Qpcoke,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			
B5	**Qppaste,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.			

B: List of Parameters – Project emissions

ID	Parameters	Data Unit	Parameter Description	Source of data			Calculated Parameters
				Direct measurement	Sampling	External Source	
B6	**EFpcoal,y**	tCO_2/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	
B7	**EFpcoke,y**	tCO_2/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)		
B8	**EFppaste,y**	tCO_2/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.	
B9	**Quality of coalp**	Mass fraction of each component (%m/m)	Quality of coal based on elementary analysis and other relevant properties		Transalloys lab analyses		
B10	**Quality of cokep**	Mass fraction of each component (%m/m)	Quality of coke based on elementary analysis and other relevant properties		Transalloys lab analyses		
B11	**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	
B12	**EFy,offsite**	tCO_2/MWh	Grid emission factor			The Grid electricity emission factor (EFy,offsite in tCO_2e/MWh) for South Africa is established ex ante according	

B: List of Parameters – Project emissions

ID	Parameters	Data Unit	Parameter Description	Source of data			Calculated Parameters
				Direct measurement	Sampling	External Source	
						to ACM0002 V6	
B13	**Quality of SiMnp**	Mass fraction of each component (%m/m)	Quality of SiMnp, based on elementary analysis and other relevant properties		Transalloys lab analyses		
B14	**Quality of ore**	Mass fraction of each component (%m/m)	Quality of ore, based on elementary analysis and other relevant properties		Transalloys lab analyses		
B15	**Quality of fluxes**	Mass fraction of each component (%m/m)	Quality of fluxes, based on elementary analysis and other relevant properties		Transalloys lab analyses		

C: List of Parameters – Leakage emissions

ID	Parameters	Data Unit	Parameter Description	Source of data			Calculated Parameters
				Direct measurement	Sampling	External Source	
	Leakage is zero according to AM0038 version 01, and applied as such.						

5.4.2. Management and operational system

Transalloys maintains an ISO9000 quality management system. The project activity has a monitoring manual /07/, which provides guidance on how the revised monitoring plan /05/ is implemented. The project activity has an on site CDM Management Team and operates within the Transalloys standard operating procedures /18/.

The revised Monitoring Plan /05/ 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.

Compliance question	Verification activities undertaken	Findings	Conclusion (OK/CAR/CL)
Have all parameters stated in the monitoring plan, the applied	During the ERM CVS site visit, the verification team were taken around the entire site, visiting the three	All parameters listed in the monitoring plan and applied methodology have been sufficiently monitored and updated as	OK

methodology and the relevant CDM EB decisions been sufficiently monitored and updated as applicable?	furnaces included in the project activity (Furnace 3, 5 and 7), the laboratory on site, as well as the offices where Transalloys staff work from. Document reviews were undertaken prior to the site visit as well as in the offices whilst on site. Furthermore, interviews were undertaken with the CDM programme manager (Transalloys Service Manager), the CDM QA/QC manager (Transalloys production superintendent), the laboratory manager and staff, furnace operators and EcoSecurities project managers. ERM CVS reviewed the Monitoring Report and emission reduction spreadsheet.	applicable. See section 6.	
Is the accuracy of equipment used for monitoring in accordance with the relevant guidance prepared by the CDM EB and controlled and calibrated in accordance with the monitoring plan?	During the ERM CVS site visit, the verification team were taken around the entire site, visiting the three furnaces included in the project activity (Furnace 3, 5 and 7), the laboratory on site, as well as the offices where Transalloys staff work from. Document reviews were undertaken prior to the site visit as well as in the offices whilst on site. Furthermore, interviews were undertaken with the CDM programme manager (Transalloys Service Manager), the CDM QA/QC manager (Transalloys production superintendent), the laboratory manager and staff, furnace operators and EcoSecurities project managers. ERM CVS reviewed the Monitoring Report and emission reduction spreadsheet.	The equipment used for monitoring is in accordance with the registered PDD /02/ and the revised monitoring plan /05/. The equipment is maintained and calibrated in line with manufacturers' requirements and internal procedures MF02WP, SOP SiMn161 and TAOP230 /18/. However, the new electricity meters (used to measure ECy) do not have the associated 'manufacturers requirements' for maintenance and calibration included in the monitoring manual as per all other pieces of equipment used for monitoring purposes (see parameter ECy in section 6). The Monitoring Manual version 6 /07/ was updated to include the manufacturer's specifications and **CAR4** was closed.	~~CAR4~~ Ok
Are monitoring results recorded consistently as per the approved frequency?	During the ERM CVS site visit, the verification team were taken around the entire site, visiting the three furnaces included in the project activity (Furnace 3, 5 and 7), the laboratory on site, as well as the offices where Transalloys staff work from. Document reviews were undertaken prior to the site visit as well as in the offices whilst on site. Furthermore, interviews were undertaken with the CDM programme manager (Transalloys Service Manager), the CDM QA/QC manager (Transalloys production superintendent), the laboratory manager and staff, furnace operators and EcoSecurities project managers. ERM CVS reviewed the Monitoring Report and emission reduction spreadsheet.	Monitoring of each parameter is undertaken in line with the revised monitoring plan /05/ except for EFpcoke,y (emission factor for coke consumed as reductant in year y). The average of the coke emission factor as calculated in the workbook was not done in accordance with the revised monitoring plan /05/ i.e. monthly averages of carbon contents should be used for the calculation of a monthly emission factor and the annual emission factor should be calculated as the average of monthly emission factors and used for the CER calculations (see parameter ECy in section 6). The M4 ER workbook /10/ and the Monitoring Report /06/ were updated to include the correct calculation method, and values to determine the average coke emission factor and **CAR7** was closed	~~CAR7~~ OK

Have QA/QC procedures been applied in accordance with the monitoring plan?	During the ERM CVS site visit, the verification team were taken around the entire site, visiting the three furnaces included in the project activity (Furnace 3, 5 and 7), the laboratory on site, as well as the offices where Transalloys staff work from. Document reviews were undertaken prior to the site visit as well as in the offices whilst on site. Furthermore, interviews were undertaken with the CDM programme manager (Transalloys Service Manager), the CDM QA/QC manager (Transalloys production superintendent), the laboratory manager and staff, furnace operators and EcoSecurities project managers. ERM CVS reviewed the Monitoring Report and emission reduction spreadsheet.	The management and QA/QC procedures /18/ for each parameter have been applied in accordance with the revised monitoring plan /05/. **CAR2** was raised as the frequency of calibration of the platform scales (used to measure QPy) and the batch weigh system (used to measure Qpcoal,y and Qpcoke,y) were changed from routine daily calibrations to routine weekly calibrations during this monitoring period (the calibration of the scales were still assessed three times a day, at the start of each shift). The Monitoring Report /06/ and CDM Monitoring Manual /07/ were updated to reflect this, in line with the calibration procedures for platform scales and batch weight scale tests /18/. A letter from the OEM /29/ was provided which indicated that the test and calibration frequency of the platform scales /29/ should be determined by the user. For periods where weekly platform scale calibration records were not available the maximum permissible error of 2.5% was deducted in accordance with EB52 Annex 60 /30/. **CAR2** was closed. Refer to section 6.1 (below for further discussion).	~~*CAR2*~~ OK
Have the management and operational systems for monitoring been fully implemented as stated in the monitoring plan?	During the ERM CVS site visit, the verification team were taken around the entire site, visiting the three furnaces included in the project activity (Furnace 3, 5 and 7), the laboratory on site, as well as the offices where Transalloys staff work from. Document reviews were undertaken prior to the site visit as well as in the offices whilst on site. Furthermore, interviews were undertaken with the CDM programme manager (Transalloys Service Manager), the CDM QA/QC manager (Transalloys production superintendent), the laboratory manager and staff, furnace operators and EcoSecurities project managers. ERM CVS reviewed the Monitoring Report and emission reduction spreadsheet.	The management and operations systems including QA/QC procedures /18/ for each parameter have been implemented and applied in accordance with the revised monitoring plan /05/.	OK

Conclusion

ERM CVS confirmed that the data acquisition process, data transferring process, archiving process and reporting process occur as required by the revised monitoring plan /05/. The monitoring has been carried out in accordance with the monitoring requirements contained in the revised monitoring plan /05/.

5.5. Assessment of data and calculation of GHG emission reductions

The verification team evaluated the calculations in the Monitoring Report /06/ and the calculation Workbook /10/ 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 revised monitoring plan /05/ and applied methodology /03/ and /04/
- Completeness of data during the monitoring period
- Supporting evidence and audit trails, such as plant log books, inventories, purchase records and laboratory analysis results.
- Assumptions used in the calculations and their basis
- Application of emission factors, IPCC default values and other reference values.

The emission reduction calculations are contained in the Transalloys ER Workbook /10/. In the CER Workbook, on the CER Summary tab, cell B6 refers to the monitoring period for which the ER Workbook relates to. This referred to the incorrect monitoring period (**CAR8** was raised). The M4 ER Workbook /10/ was updated, and the monitoring period is reflected correctly, however the date and version number of the Monitoring Report /06/ (in the Overview tab) were reflected incorrectly and **CAR8** was extended to include this correction.

The calculation Workbook /10/ contains the following worksheets:

- 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 greenhouse gas emission reductions achieved by the project activity are calculated in accordance with the approved methodology using the following equations (from the M4 ER workbook /10/ and Monitoring Plan /05/):

1.	BEy = BEy,offsite + BEy,onsite for each furnace
	BEy,offsite = QPy,max x secb x EFy,offsite
	BEy,onsite = QPy,max x EFb,onsite
	EFb,onsite = (Qb,coal x EFb,coal + Qb,coke x EFb,coke + Qb,paste x EFb,paste) / QP
	QPy,max = minimum(QPy,monitored, QPhistoric)
2.	PEy = PEy,offsite + PEy,onsite for each furnace
	PEy,offsite = QPy,max x secp x EFy,offsite

	PEy,onsite = QPy,max x EFp,y,onsite
	EFp,y,onsite = (Qp,coal x EFp,coal + Qp,coke x EFp,coke + Qp,paste x EFp,paste) / QP
	QPy,max = minimum(QPy,monitored, QPhistoric)
3.	Ly = 0
4.	ERy = BEy - PEy - Ly for each furnace
5.	ERy,onsite = BEy,onsite - PEy,onsite
6.	$BEy = BEy_{,F3} + BEy_{,F5} + BEy_{,F7}$
7.	$PEy = PEy_{,F3} + PEy_{,F5} + PEy_{,F7}$
8.	$L = L_{F3} + L_{F5} + L_{F7} = 0$
9.	ERy,not adjusted = BEy - PEy - Ly
10.	$ERonsite,y = ERonsite,y_{,F3} + ERonsite,y_{,F5} + ERonsite,y_{,F7}$
11.	Uncertainty adjustment component = 0.91 x ERonsite,y if ERonsite,y > 0
	Uncertainty adjustment component = 0 if ERonsite,y ≤ 0
12.	ERy = ERy,not adjusted - Uncertainty adjustment component

*According to methodology AM0038 /03/, uncertainty is taken into account by discounting 'onsite' emission reductions. This is done using the uncertainty of overall onsite emissions, which has been calculated at 9.0% in the PDD /02/.

Compliance question	Verification activities undertaken	Findings	Conclusion (OK/CAR/CL)
Were data available throughout the monitoring period in accordance with the monitoring plan and methodology?	Document reviews (CER workbook /10/, PDD /02/, appropriate methodologies /03/ and /04/, revised monitoring plan /05/) were undertaken prior to the site visit as well as in the offices whilst on site. Furthermore, interviews were undertaken with the CDM programme manager (Transalloys Service Manager), the CDM QA/QC manager (Transalloys production superintendent), the laboratory manager and staff, furnace operators and EcoSecurities project managers.	Data were available throughout the monitoring period in accordance with the revised monitoring plan /05/ and methodologies /03/ and /04/.	OK
Has the project participant used appropriate methods and formulae for calculating baseline, project and leakage emissions?	Document reviews (CER workbook /10/, PDD /02/, appropriate methodologies /03/ and /04/, revised monitoring plan /05/) were undertaken prior to the site visit as well as in the offices whilst on site. Furthermore, interviews were undertaken with the CDM programme manager (Transalloys Service Manager), the CDM QA/QC manager (Transalloys production superintendent), the laboratory manager and staff, furnace operators and EcoSecurities project managers.	The PP has used appropriate methods and formulae for calculating baseline and project emissions. There are no leakage emissions calculated as per project methodologies /03/ and /04/, PDD /02/ and revised monitoring plan /05/.	OK
Has the project participant justified all assumptions, emission factors and default values that have been	Document reviews (CER workbook /10/, PDD /02/, appropriate methodologies /03/ and /04/, revised monitoring plan /05/) were undertaken prior to the site visit as	The PP has justified all assumptions, emission factors and default values that have been applied in CER calculations /10/ as per project methodologies /03/ and /04/,	OK

applied?	well as in the offices whilst on site. Furthermore, interviews were undertaken with the CDM programme manager (Transalloys Service Manager), the CDM QA/QC manager (Transalloys production superintendent), the laboratory manager and staff, furnace operators and EcoSecurities project managers.	PDD /02/ and revised monitoring plan /05/. After notification of incompleteness by UNFCCC, the CER workbook /10/ was updated to enhance the transparency of the spreadsheet where adjustments were made to apply the maximum permissible error of the instrument where calibrations were delayed in accordance with EB52 Annex 60 /30/ The error found at subsequent calibrations was always below the maximum permissible error, and therefore the maximum permissible error was used as the correction factor for the missed calibrations. ERM CVS checked the spreadsheet and verified that the adjustments are accurate and complete.	

Conclusion

Emission reductions have been calculated in accordance with the registered PDD /02/, revised monitoring plan /05/ and the applied methodologies /03/ and /04/, and it was determined that the data processing and emission reductions calculations /10/ resulted in real and measurable emission reductions. All data was available and assumptions, emission factors and default values were justified and ERM CVS cross-checked the information with project methodologies /03/ and /04/, PDD /02/ and revised monitoring plan /05/.

5.6. Comparison of emission reductions with those predicted in the PDD

Emission reductions for the years 2009-2014 in the registered PDD were predicted to be 66,553 tCO_2e.

The predicted emission reductions in the PDD for the 14 month long monitoring period (01 March 2010 – 30 April 2011) are therefore, calculated pro rata, 77,645 tCO_2e.

Emission reductions reported in the Monitoring Report /06/ for this 4th monitoring period (01 March 2010 – 30 April 2011) were 230,307 tCO_2e.

The amount of emissions reductions reported during the **4th monitoring period** represents 297% of the estimated forecasted emissions in the PDD due to a combination of factors that both positively and negatively influenced the estimated emission reductions. More emission reductions than were predicted in the PDD were also certified, and issued, during the 2nd monitoring period (01 April 2008 – 30 June 2009), and 3rd monitoring period (01 July 2009 – 20 February 2010). The PP has set out the reasons for the increase in emission reductions as follows:

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 2.51 tCO_2/tSiMn for 2011 being lower than the baseline emission factor of 2.93 tCO_2/SiMn, predicted in the PDD /2/. 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 a reduction in the amount of coke required in the smelting process, a result of the project activity. This was verified through discussion with the on site production superintendent and services manager and is in line 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 (consumption of 4.91 MWh/tSiMn) 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 in line 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/tSiMn electricity savings (2003 baseline), the project has achieved 0.88 MWh/tSiMn (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.

During the review of reason 2b, ERM CVS found the detail provided for electricity savings for the CDM project boundary (i.e. each furnace) was not adequate, since operational and management changes for the entire Transalloys site were implemented during the monitoring period, with a noticeable reduction in the MWh/t SiMn produced. **CAR 1** was raised to discuss the implications of operational and management changes on the CDM project, CER production and to demonstrate that the reported CER production is conservative. The Monitoring Report /06/ was updated and justification was provided in accordance with predictions made in the registered PDD, and **CAR1** was closed. However, the sensitivity analysis (and demonstration of additionality) in the registered PDD only applied an electricity reduction of 0.4MWh/tSiMn, even though it was predicted that up to 1MW reduction could be achieved under the correct operating conditions. **CL3** was therefore also raised requesting an explanation of how the increased electricity savings observed during this monitoring period does not constitute a permanent change in the assumptions applied at the time of validation and registration of the project, particularly in relation to the values applied in the sensitivity analysis.

The PP demonstrated that the actual performance of project activity since its implementation remains within the original assumptions applied in the PDD; (i.e. energy savings are below the maximum electricity expectation of 1.0 MWh/tSiMn and accumulative energy saving less than 0.4 MWh). ERM CVS cross checked the calculations and concludes that these have been undertaken accordingly to the data from plant records of SiMn production and electricity consumption stated in the Monitoring Report /6/. Therefore, the values and results represent consistently the real performance of project activity. Moreover, taking into account that the Verification team confirmed that the project has been implemented and operated as set out in the PDD, it is concluded that the increased electricity savings observed during the 4th monitoring period do not constitute a permanent change in the assumptions applied at the time of validation and registration of the project.

CL3 was therefore closed.

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.

5.7. Other observations

No further observations were noted.

6. Parameters verification

6.1. Verification activity

The status of each monitored parameter is set out below.

ID:	**B1 – project emissions**
Data / Parameter:	**QPy,monitored**
Data unit:	Tonnes of SiMn
Description:	Quantity of SiMn production in year y during the project activity
Measurement Devices and location	Weighing metal ladles on a weighing platform
Measurement Frequency:	The ladles are filled at each tapping of the ”production run” 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.
QA/QC Procedures Applied, including calibration:	▪ The weighing platform is maintained and calibrated regularly in line with the manufacturer’s requirements /29/ ▪ Measured data are cross-checked with product sales records /12/
Verification Activities / Evidence Reviewed:	**Measurement Device** ▪ Observed weighing platform and process for undertaking measurements ▪ Observed the equipment printouts obtained from weighing of metal ladles (from the weighing platform) after each production run ▪ For Furnace 5 and Furnace 7, observed the capturing of printouts onto the furnace daily logsheets /11/ ▪ During sampling conducted for the monitoring period, ERM CVS verified that printouts /11/ (as obtained from the weighing platform) are archived. **Measurement Frequency and data record** ▪ Data verification was undertaken for Furnace 7, to determine the accuracy of transcription of data from the printouts /11/ onto the furnace daily logsheets /11/ ▪ Verified that furnace logsheets /11/ are password protected ▪ Verification checks were undertaken to determine accuracy of transcription of such data into the CER Calculation Workbook /10/ **Calibration** Verified that the weighing platforms are calibrated weekly following the internal procedure SOP SiMn 161 /18/, and that such results are captured in the furnace logsheets /11/ (the frequency of calibration was changed from daily to weekly for this monitoring period, with the procurement of new ‘test weights’ used in the calibration process). Where calibrations were delayed, the error found at subsequent calibrations was below the maximum permissible error, and therefore the maximum permissible error was used as the correction factor for the missed calibrations. ERM CVS verified that the maximum permissible error was deducted in accordance with EB52 Annex 60 /30/. See CAR2 **Cross checking** ▪ Measured data (furnace production) is cross-checked with product sales figures /12/ (saleable product). The results stated in the Monitoring Report are as follows:

	<table><tr><th>Furnace Production (Platform)</th><th>Saleable production (Sales + stock difference</th></tr><tr><td>192,347 tonnes</td><td>177,828 tonnes</td></tr><tr><td colspan="2">Difference between furnace production and saleable production is 7.55%</td></tr></table> The above figures include all furnace production (including Furnace 1& Furnace 6)
Findings:	▪ In terms of the QA/QC process for QPy – furnace production vs saleable product – the detail provided on how the tonnes of saleable production was obtained in the QA/QC process was unclear as well as the reason as to why the difference between furnace production and saleable product (7.55%) is acceptable (**CL1**). The Monitoring Report ver 2 /06/ was updated to provide detail on how the tonnes of saleable production were obtained, namely saleable product (177,828t) is the sum of three components: declared furnace production (167,123t); sold fines (6,042t); and recovered materials (4,663t). Declared furnace production is 86.89% of total furnace production, which is an improvement of 3.04% from the previous verification period. A number of improvements were made in the production process, which would have contributed to this improvement. **CL1** was closed. ▪ The frequency of calibration of the platform scales (used to measure QPy) and the batch weigh system (used to measure Qpcoal,y and Qpcoke,y) were changed from routine daily calibration to routine weekly calibration during this monitoring period, as very little change in the scales were observed from day-to-day. Calibration tests were performed at the start of each shift (i.e. 3 times per day) and if the maximum permissible error (i.e. 2.5%) was exceeded the scales were calibrated immediately, otherwise routine calibration was performed weekly. The Monitoring Report /06/ and monitoring manual /07/ stated that the calibration procedures take place daily and this detail needs to be updated in line with current practices. Furthermore, the change in procedure needs to be supported by documentation from the manufacturer (**CAR2**). The Monitoring Report /06/ and CDM Monitoring Manual /07/ were updated to reflect weekly calibration in line with the calibration procedures for platform scales and batch weight scale tests /18/. A letter from the supplier /29/ was provided which indicates that Transalloys should determine the test and calibration frequency of the platform scales/29/. Where calibrations were delayed, the error found at subsequent calibrations was below the maximum permissible error, and therefore the maximum permissible error was used as the correction factor for the missed calibrations. ERM CVS verified that the maximum permissible error was deducted in accordance with EB52 Annex 60 /30/. **CAR2** was closed. ▪ The calculation to sum the total SiMn produced in 2011 at Furnace 3, on the tab entitled "F3 – daily furnace data" (cell B434) in the CER workbook is incorrect. The CER workbook /10/ must be updated to present this change (the number in this cell is not used in the calculation of CERs and hence this change error does not affect the CER calculation) (**CAR3**). The formula was corrected in Transalloys M4 ER Workbook v10 28 07 2011 /10/, and **CAR3** was closed
Conclusions:	After close out of the above mentioned CL and CARs, the parameter is concluded to be monitored and updated consistently in accordance with the revised monitoring plan /05/ and methodology /03/.

ID:	**B2 – project emissions**
Data / Parameter:	**ECy**

<table>
<tr><td>Data unit:</td><td>Electricity consumption MWh/year</td></tr>
<tr><td>Description:</td><td>Annual grid electricity consumption by the submerged electric arc furnace</td></tr>
<tr><td>Measurement Devices and location</td><td>Electricity meter per project furnace, metered in the furnace control room</td></tr>
<tr><td>Measurement Frequency:</td><td>Electricity consumption will be metered continuously on individual furnaces by an electricity meter and recorded monthly.</td></tr>
<tr><td>QA/QC Procedures Applied, including calibration:</td><td>▪ The meters will be maintained and calibrated in line with manufacturers' requirements /07/
▪ Consumption of furnaces will be cross-checked monthly with total electricity bill (ESKOM) /13/.</td></tr>
<tr><td>Verification Activities / Evidence Reviewed:</td><td>
Measurement Device

• Electricity meters for each furnace were identified, and verified against the serial numbers.

<table>
<tr><td>Furnace</td><td>Serial number</td><td>Calibration date</td><td>Valid until</td></tr>
<tr><td>F3 – 22KV</td><td>06470035</td><td>24 November 2006</td><td>23 November 2011</td></tr>
<tr><td>F3 – 33KV#</td><td>00061498</td><td>25 April 2008</td><td>24 April 2013</td></tr>
<tr><td>F3 – 22KV*</td><td>95679335</td><td>02 June 2009</td><td>01 June 2014</td></tr>
<tr><td>F5</td><td>06460054</td><td>22 November 2006</td><td>21 November 2011</td></tr>
<tr><td>F7</td><td>06390018</td><td>28 September 2006</td><td>27 September 2011</td></tr>
<tr><td>F7**</td><td>96505392</td><td>11 March 2010</td><td>10 March 2015</td></tr>
</table>
meter not used during this monitoring period – meter used for a portion of the 3rd monitoring period but removed and replaced with meter no. 06470035 during that monitoring period – its calibration certificate is still valid if used again in the future hence included here.
* meter used since 23 October 2010
** meter used since 19 September 2010

• It was confirmed that meters were changed in Furnace 3 and Furnace 7. The electrical engineer confirmed that electricity meters were changed during the monitoring period. The reasons given were that Transalloys wanted to match their meters with those used by Eskom (as there has been an issue with Eskom metering in the past), and the new meters have associated software that allows online data capture and review.

Measurement Frequency and data record

• Verified that for each furnace, electricity consumption is metered continuously and that the meters are read and data recorded hourly into the furnace logsheets /11/ by the control room operator.
• Verification checks were undertaken to determine accuracy of transcription of such data from logsheets /11/ into the Transalloys CER Workbook /10/
• Verified that the total electricity consumption, calculated from the electricity meter reading at the beginning and end of the monitoring period, corresponds with the electricity consumption reported within the Transalloys CER Workbook /10/ and accordingly reflected in the Monitoring Report /06/.

Calibration

• Calibration requirements for each electricity meter was verified against the calibration frequency requirements as found in the monitoring manual /7/.

Cross checking
</td></tr>
</table>

	• The consumption of electricity by the furnaces (and other uses on site) recorded by the meters were cross-checked with the total ESKOM electricity bill. For the monitoring period the monthly values correlate satisfactorily. The total difference over the period was 143MWh (0.02%).
Findings:	• Inconsistencies were noted between the start dates of replacement meters for furnaces 3 and 7 – the logsheets /11/ did not comply with the Monitoring Report /06/. The meter replacement dates should be confirmed and the updated information provided in the Monitoring Report /06/ (**CL2**). The replacements dates were correctly reflected in the Monitoring Report ver 2 /06/ and **CL2** was closed. • The CDM Monitoring Manual /07/ contained details of all 'manufacturers' requirements' related to the equipment used in monitoring each parameter, except for the 'manufacturers requirements' for the new meters in furnace 3 and furnace 7 (**CAR4**). The Transalloys CDM Monitoring Manual v6 (dated 28 July 2011) /07/ was updated to include new electricity meter specifications as per the manufacturer' requirements and **CAR 4** was closed. • The calculation to sum the total MWh of electricity used in 2011 at Furnace 3, on worksheet "F3 – daily furnace data" (cell C434) was incorrect. The CER workbook /10/ must be updated to represent this change (the number in this cell is not used in the calculation of CERs and hence this change error does not affect the CER calculation) (**CAR5**). The formula was corrected in Transalloys M4 ER Workbook v10 28 07 2011 /10/, and **CAR 5** was closed. • The calculation to sum the total MWh of electricity used in 2011 at Furnace 7, on worksheet "F7 – daily furnace data" (cell C434) was incorrect. The CER workbook /10/ must be updated to represent this change (the number in this cell is not used in the calculation of CERs and hence this change error does not affect the CER calculation) (**CAR6**). The formula was corrected in Transalloys M4 ER Workbook v10 28 07 2011 /10/, and **CAR6** was closed.
Conclusions:	After close out of the above mentioned CL and CARs, the parameter is concluded to be monitored and updated consistently in accordance with the revised monitoring plan and methodology.

ID:	**B3 – project emissions**
Data / Parameter:	**Qpcoal,y**
Data unit:	Tonnes of coal/year
Description:	Annual consumption of coal used as reductant in the submerged electric arc furnace
Measurement Devices and location	Metered by weigh hoppers with load cells
Measurement Frequency:	The amount of coal put in each batch is weighed in hoppers with load cells and recorded daily per furnace
QA/QC Procedures Applied, including calibration:	The load cells will be maintained and calibrated regularly in line with the manufacturer's requirements.
Verification Activities / Evidence Reviewed:	**Measurement Device** • Printouts as generated from the weight hopper cells were observed • For Furnace 5 & Furnace 7, observed the capturing of printouts onto the furnace logsheets /11/, entering the weight per bin per shift into the daily sheet (furnace logsheet /11/), and the total coal is calculated under the daily data tab (furnace logsheet /11/) **Measurement Frequency and data record** • It was verified that equipment printouts (as obtained from the weight hopper cells at each

	production run) are archived, as per procedure /18/. • Verification checks were undertaken to determine the accuracy of transcription of data from the printouts onto the furnace logsheets /11/. **Calibration** • Verified that the weigh hoppers are maintained regularly and tested weekly for accuracy according to internal procedure TAOP 230 /18/ through review of data log sheets /11/. As per the procedure, verification was undertaken of the weekly tests to confirm using standard mass weight, with the standard mass weight calibrated annually. This information is transferred onto the logsheet /11/. Where calibrations were delayed, the error found at subsequent calibrations was below the maximum permissible error, and therefore the maximum permissible error was used as the correction factor for the missed calibrations. ERM CVS verified that the maximum permissible error was deducted in accordance with EB52 Annex 60 /30/. See CAR 2. **Cross checking** • Cross checks of coal quantity data /23/ was to determine accuracy of transcription of such data onto the Transalloys CER Workbook /10/.
Findings:	The frequency of calibration of the platform scales (used to measure QPy) and the batchweigh system (used to monitor Qpcoal,y and Qpcoke,y) were changed from daily calibration to weekly calibration, during this monitoring period,. The Monitoring Report /06/ and monitoring manual /07/ stated that the calibration procedures take place daily and this detail needs to be updated in line with current practices (**CAR2**). The Monitoring Report /06/ and Monitoring Manual /07/ were updated to reflect weekly calibration in line with the calibration procedures for platform scales and batch weight scale tests /18/ which is aligned with the Transalloys CDM Monitoring Manual v6 28 07 2011/07/, and a correspondence provided from the supplier /29/ indicates that Transalloys should determine the test and calibration frequency of the batchweigh scales. Where weekly batchweigh scale calibration records were not available the maximum permissible error of 2.5% was deducted in accordance with EB52 Annex 60 /30/ and **CAR2** was closed,
Conclusions:	After close out of the above mentioned CAR, the parameter is concluded to be monitored and updated consistently in accordance with the revised monitoring plan and methodology.

ID:	**B4 – project emissions**
Data / Parameter:	**Qpcoke,y**
Data unit:	Tonnes of coke/year
Description:	Annual consumption of coke used as reductant in the submerged electric arc furnace
Measurement Devices and location	Metered by weight hoppers with load cells
Measurement Frequency:	The amount of coke put in each batch is weighed in hoppers with load cells and recorded daily per furnace
QA/QC Procedures Applied, including calibration:	The load cells will be maintained and calibrated regularly in line with the manufacturer's requirements
Verification Activities / Evidence Reviewed:	**Measurement Device** • Printouts as generated from the weight hopper cells were observed • For Furnace 5 & Furnace 7, observed the capturing of printouts onto the furnace logsheets /11/, entering the weight per bin per shift into the daily sheet (furnace logsheet /11/), and the total coke is calculated under the daily data worksheet (in the furnace logsheet /11/)

	Measurement Frequency and data record • During sampling conducted, ERM CVS verified that printouts (as obtained from the weight hopper cells) are archived • During sampling conducted, data verification was undertaken for Furnace 7, to determine the accuracy of transcription of data from the printouts onto the furnace logsheets /11/. **Calibration** Verified that the weigh hoppers are maintained regularly and tested weekly for accuracy according to procedure TAOP 230 /18/ through review of data log sheets /11/. 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. This information was transferred onto the logsheet /11/. Where calibrations were delayed, the error found at subsequent calibrations was below the maximum permissible error, and therefore the maximum permissible error was used as the correction factor for the missed calibrations. ERM CVS verified that the maximum permissible error was deducted in accordance with EB52 Annex 60 /30/. See CAR 2. **Cross checking** • Sampling the monitoring period, cross checks of coal quantity data /23/ was undertaken for Furnace 7 to determine accuracy of transcription of such data onto the Transalloys CER Workbook /10/.
Findings:	The frequency of calibration of the platform scales (used to measure QPy) and the batchweigh system (used to monitor Qpcoal,y and Qpcoke,y) were changed from daily calibration to weekly calibration, during this monitoring period. The Monitoring Report /06/ and monitoring manual /07/ stated that the calibration procedures take place daily and this detail needs to be updated in line with current practices (**CAR2**). The Monitoring Report /06/ and Monitoring Manual /07/ were updated to reflect weekly calibration in line with the calibration procedures for platform scales and batch weight scale tests /18/ which is aligned with the Transalloys CDM Monitoring Manual v6 28 07 2011 /07/, and a correspondence provided from the supplier /29/ indicates that Transalloys should determine the test and calibration frequency of the batchweighscales. Where weekly batchweigh scale calibration records were not available the maximum permissible error of 2.5% was deducted in accordance with EB52 Annex 60 /30/ and **CAR2** was closed,
Conclusions:	After close out of the above mentioned CAR, the parameter is concluded to be monitored and updated consistently in accordance with the revised monitoring plan and methodology.

ID:	**B5 – project emissions**
Data / Parameter:	**Qppaste,y**
Data unit:	Tonnes of electrode paste/year
Description:	Annual consumption of electrode paste used as electrode in the submerged electric arc furnace
Measurement Devices and location	The number of paste cylinders put into the electrode is logged each time a new cylinder is used. The average weight of each cylinder is calculated based on weighing trucks delivering the paste (arriving at the facility) on a weighbridge and dividing on a monthly basis the total weight by number of cylinders delivered to the facility. The annual figure is obtained by summing the daily product of number of cylinders used and monthly average weight.
Measurement Frequency:	• Logging every time a new paste cylinder is used. • Each paste truck arriving on site is weighed on the weighbridge
QA/QC Procedures Applied, including	The weighbridge will be maintained and calibrated regularly in line with the manufacturer's requirements to ensure its accuracy /07/. Average weight of each cylinder will be compared to

<table>
<tr><td>calibration:</td><td>indications of the supplier.</td></tr>
<tr><td>Verification Activities / Evidence Reviewed:</td><td>
Measurement Device

• Verified that the number of paste cylinders are recorded and captured onto the furnace logsheets /11/
• Observed the physical equipment cells, electrodes and weighbridge

• The weighbridge meter was identified and verified against the serial number:

<table>
<tr><td>Serial number</td><td>Calibration date</td><td>Valid until</td></tr>
<tr><td>991019*</td><td>28 January 2010</td><td>27 January 2012</td></tr>
<tr><td>TA19072010 (incorrectly labeled on certificate as “Trans002”</td><td>30 July 2010</td><td>29 July 2012</td></tr>
<tr><td>**TA19072010</td><td>12 January 2011</td><td>11 January 2013</td></tr>
</table>
* ended use 30 July 2010
** started use 30 July 2010.

• It was confirmed that the weighbridge meter display was changed (as there were problems reading the display) during the monitoring period – The weighbridge serial number was incorrectly stated as ‘Trans002’ on the calibration certificate /08/ and on 12 January 2011 a new calibration certificate /08/ was issued upon calibration for the new meter (display) and recorded the serial number correctly as “TA19072010”.

Measurement Frequency and data record

• During sampling conducted, data verification was undertaken for Furnace 7 to determine accuracy of transcription of data from the furnace daily logsheets /11/ into the CER Calculation Workbook /10/.
• Observed that weighbridge data are captured and the total monthly paste mass is calculated /11/. A sample of such data was also verified to confirm accuracy.

Calibration

• Calibration requirements for the weighbridge /07/ were verified against the calibration frequency requirements /08/

Cross checking

• Verified the cross check between average weight of each cylinder and the indications of the supplier /24/. Figures match supplier’s indications within 0.05% for 700 mm cylinders (used in furnaces 5 and7) and 0.24% for the 500mm cylinders (used in furnace 3).
</td></tr>
<tr><td>Findings:</td><td>No issues were identified.</td></tr>
<tr><td>Conclusions:</td><td>The parameter is reported accurately and in accordance with the monitoring plan</td></tr>
</table>

ID:	**B6 – project emissions**
Data / Parameter:	**EFpcoal,y**
Data unit:	tCO_2/tcoal
Description:	Emission factor applied for the coal consumed as reductant in year y
Measurement Devices and	The 2006 IPCC value of 3.1tCO_2/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

location	guidance.
Measurement Frequency:	NA
QA/QC Procedures Applied, including calibration:	NA
Verification Activities / Evidence Reviewed:	Verified the default emission factor in the 2006 IPCC guidelines (as 3.1 tCO_2/tcoal). • ERM CVS confirmed that there is no relevant EB guidance relating to updated default coal emission factor. • data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 and it was determined that the correct default emission factor was applied in the Transalloys CER workbook /10/.
Findings:	No issues were identified.
Conclusions:	The parameter is reported accurately and in accordance with the monitoring plan

ID:	**B7 – project emissions**
Data / Parameter:	**EFpcoke,y**
Data unit:	tCO_2/tcoke
Description:	Emission factor applied for the coke consumed as reductant in year y
Measurement Devices and location	The carbon content of coke is measured at least monthly in the on-site laboratory in accordance with the site standard operating procedures.
Measurement Frequency:	Coke samples are taken daily at the weigh hoppers and delivered to the laboratory for testing purposes. Results are transferred manually onto the Proximate Analysis Raw Material Data Sheet /20/, and then transferred onto the Laboratory Analysis Calculation Sheet /21/, from where data is transferred onto the CER Calculation Workbook /10/. 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 revised monitoring plan /05/ "If values are missing or inconsistent for some months, the average of previous and next 3 months will be used".
QA/QC Procedures Applied, including calibration:	Analyses are undertaken in accordance with the South African Bureau of Standards for testing of volatile and fixed carbon content. The laboratory is ISO9000 certified. All laboratory equipment calibration records /08/ and certificates /08/ to this effect are maintained on site.
Verification Activities / Evidence Reviewed:	• Interviews with the laboratory Supervisor and laboratory technical staff • Observed the physical equipment, which include weighing scales and laboratory ovens at the laboratory used for the analysis of samples. • Reviewed the laboratory procedure /19/ for determining carbon content and volatiles • Observed that laboratory analyses are captured onto the Proximate Analysis Raw Material Data Sheet /20/ • Confirmed accuracy of transcription of data from the Proximate Analysis Raw Material Data Sheet /20/ onto the Laboratory Analysis Calculation Sheet /21/ and onto the CER Calculation Workbook /10/. • Confirmed the monthly averages of carbon contents are used for calculation of a monthly emission factor • Confirmed 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. • Confirmed the correct use of carbon content of volatiles default value from IPCC (2006) as per equation 4.19, p4.33 of IPCC (2006). • Confirmed that when values were missing or inconsistent for some months, the average of

	the previous 3 months and next 3 months were used (this approach was not required for this monitoring period). • Observed calibration certificates /08/ for the laboratory equipment as used: • Observed internal procedures as part of Transalloys SHEQ management system /15/ confirming that lab analyses are done according to national SABS standards. • Viewed hard copies of ISO9000 certificate for the laboratory /22/. **Cross checking** • Reviewed process of recording of test results and associated QA/QC process. Sighted the logbook for daily balance calibration checklist /28/ • Reviewed if change in coke supplier occurred through discussions with Services Manager. • Review emission factors as applied during 3rd verification period compared to this 4th verification period.

3rd Verification Period ($EF_{pcoke,y}$)		4th Verification Period ($EF_{pcoke,y}$)	
2009	**2010**	**2010**	**2011**
3.01	2.97	3.03	3.06

Findings:	The average of the coke emission factor as calculated in the workbook /10/ was not done in accordance with the revised monitoring plan /05/ i.e. monthly averages of carbon contents should be used for the calculation of a monthly emission factor and the annual emission factor should be calculated as the average of monthly emission factors and used for the emission calculations (**CAR7**). The M4 ER Workbook /10/ and the Monitoring Report /06/ were updated to include the correct calculation method, and values to determine the average coke emission factor and **CAR7** was closed.
Conclusions:	After close out of the above mentioned CAR, the parameter is concluded to be monitored and updated consistently in accordance with the revised monitoring plan and methodology.

ID:	**B8 – project emissions**
Data / Parameter:	**EFppaste,y**
Data unit:	tCO_2/tpaste
Description:	Emission factor applied for the electrode paste consumed as electrode in year y
Measurement Devices and location	The fixed carbon content and volatile information is provided by the supplier. For this monitoring period, a conservative value of 3.67 tCO_2/t was applied (as suggested by the methodology AM0038 version 01) /3/.
Measurement Frequency:	The information is recorded monthly from the supplier information sheet /24/. For this monitoring period, a conservative value of 3.67 tCO2/t was applied (as suggested by the methodology AM0038 version 01) /3/.
QA/QC Procedures Applied, including calibration:	In accordance with the revised monitoring plan /05/ either: ▪ the emission factor is calculated using equation 4.19, p4.33 of IPCC (2006) /32/. Fix carbon and volatiles content analyses are obtained from the supplier. Carbon content in the volatiles (Cv) was not available in these analyses hence, in accordance with the revised monitoring plan /05/, the same value as for the coke of 80% was used. Similarly the project-specific value is compared to EFbpaste,y and the maximum of the two values was taken for EFppaste,y, or ▪ Where a monthly analysis was not available, the conservative value of 3.67 tCO_2/t (IPCC default value) was used.

Verification Activities / Evidence Reviewed:	**Measurement Frequency and data record and cross checking** • Data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that for the months when supplier analysis reports were not available, the conservative value of 3.67 tCO_2/t suggested by the methodology AM0038 version 01 /3/ was used, as stated in the Monitoring Report /06/. • Verified the correct use of the conservative value as contained within the revised Monitoring Plan /05/ and methodology AM0038 version 01 /03/, a value of 3.67 tCO_2/t was applied. • Data verification was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm the emission factor applied was the conservative value of 3.67 tCO_2/t and that this value was applied for every month during the monitoring period.
Findings:	No issues were identified.
Conclusions:	The parameter is reported accurately and in accordance with the monitoring plan

ID:	**B9 – project emissions**
Data / Parameter:	**Quality of coalp**
Data unit:	Mass fraction of each component of coal (%m/m)
Description:	Quality of coal based on elementary analysis and other relevant properties
Measurement Devices and location	The mass fraction coal is measured at least monthly in the on site laboratory in accordance with the site standard operating procedures.
Measurement Frequency:	At least monthly analyses are undertaken on samples taken at the weigh hoppers. Results are transferred manually onto the Proximate Analysis Raw Material Data Sheet /20/, and then transferred onto the Laboratory Analysis Calculation Sheet /21/, from where data is transferred onto the CER Calculation Workbook /10/.
QA/QC Procedures Applied, including calibration:	Lab analyses are undertaken according to South African Bureau of Standards. The laboratory is ISO9000 certified. All laboratory equipment calibration records and certificates to this effect are maintained on site.
Verification Activities / Evidence Reviewed:	• Interviews with the Laboratory Supervisor and laboratory technical staff • Observed the physical equipment, which include weighing scales and laboratory ovens at the laboratory used for the analysis of samples. • Reviewed the laboratory procedure for determining carbon content and volatile properties • Observed calibration certificates /08/ for the laboratory equipment as used. • Observed internal procedures as part of Transalloys SHEQ management system /15/ confirming that lab analyses are done according to national SABS standards • Viewed hard copies of ISO9000 certificate for the laboratory **Cross checking** • Reviewed process of recording of test results and associated QA/QC process. Sighted the logbook for daily balance calibration checklist /28/ • Reviewed if change in coal supplier occurred through sighting of supplier contract for coal /23/.
Findings:	No issues were identified.
Conclusions:	The parameter is reported accurately and in accordance with the monitoring plan

ID:	**B10 – project emissions**

Data / Parameter:	**Quality of cokep (%m/m)**
Data unit:	Mass fraction of each component of coke
Description:	Quality of coke based on elementary analysis and other relevant properties
Measurement Devices and location	The mass fraction of coke is measured at least monthly at the on-site laboratory in accordance with the site standard operating procedures.
Measurement Frequency:	At least monthly analyses are undertaken on samples taken at the weigh hoppers. Results are transferred manually onto the Proximate Analysis Raw Material Data Sheet /20/, and then transferred onto the Laboratory Analysis Calculation Sheet /21/, from where data is transferred onto the CER Calculation Workbook /10/.
QA/QC Procedures Applied, including calibration:	Lab analyses are undertaken according to South African Bureau of Standards. The laboratory is ISO9000 certified. All laboratory equipment calibration records and certificates to this effect are maintained on site.
Verification Activities / Evidence Reviewed:	• Interviews with the Laboratory Supervisor and laboratory technical staff • Observed the physical equipment, which include weighing scales and laboratory ovens at the laboratory used for the analysis of samples. • Reviewed the laboratory procedure for determining carbon content and volatile properties • Observed calibration certificates /08/for the laboratory equipment as used. • Observed internal procedures as part of Transalloys SHEQ management system /15/ confirming that lab analyses are done according to national SABS standards • Viewed hard copies of ISO9000 certificate for the laboratory. **Cross checking** • Reviewed if change in coke supplier occurred through discussions with Services Manager.
Findings:	No issues were identified.
Conclusions:	The parameter is reported accurately and in accordance with the monitoring plan

ID:	**B11 – project emissions**
Data / Parameter:	**Quality of electrode pastep**
Data unit:	Mass fraction of each component of paste
Description:	Quality of paste based on elementary analysis and other relevant properties
Measurement Devices and location	NA – the fixed carbon content and volatile information is provided by the suppliers
Measurement Frequency:	Supplier laboratory analysis report /24/ as per new paste deliveries
QA/QC Procedures Applied, including calibration:	Results are reviewed against historical values to demonstrate consistency.
Verification Activities / Evidence Reviewed:	**Measurement Frequency and data record** Observed paste specification data sheet /24/ as provided by the supplier Compared paste supplier specification data sheet /24/ with paste composition data contained in Monitoring Report /06/.

	Cross checking Reviewed historical data /24/ to ensure that paste quality has been consistent.
Findings:	No issues were identified.
Conclusions:	The parameter is reported accurately and in accordance with the monitoring plan

ID:	**B12 – project emissions**
Data / Parameter:	**EF,y offsite**
Data unit:	Grid emission factor (tCO_2/MWh)
Description:	Grid emission factor
Measurement Devices and location	The Grid electricity emission factor (EFy,offsite in tCO_2e/MWh) for South Africa is established *ex ante* according to ACM0002 version 06 /04/.
Measurement Frequency:	NA
QA/QC Procedures Applied, including calibration:	NA
Verification Activities / Evidence Reviewed:	**Measurement Frequency and data record and cross checking** Observed the calculations and assumptions of this *ex ante* calculation within the registered PDD /02/. Data verification for the full monitoring period was undertaken for Furnace 3,Furnace 5 and Furnace 7 to confirm that grid emission factor stated above was used throughout the calculation workbooks /10/
Findings:	No issues were identified.
Conclusions:	The parameter is reported accurately and in accordance with the monitoring plan

ID:	**B13 – project emissions**
Data / Parameter:	**Quality of SiMnp**
Data unit:	Mass fraction of each component of SiMn (%m/m)
Description:	Quality of SiMn produced during the project activity
Measurement Devices and location	The mass fraction of the finished product is measured daily in the on-site laboratory in accordance with the site standard operating procedures.
Measurement Frequency:	Daily testing is undertaken.
QA/QC Procedures Applied, including calibration:	Lab analyses are undertaken according to South African Bureau of Standards. The laboratory is ISO9000 certified. All laboratory equipment calibration records and certificates to this effect are maintained on site. Results are cross checked to ensure that the quality remains between pre-determined specifications for Mn, C, Si, P and S.

Verification Activities / Evidence Reviewed:	**Measurement Device** • Interviews with the laboratory supervisor and laboratory technical staff • Observed the physical equipment at the lab used for the analysis of samples (X-Ray Analyser and Carbon/Sulphur Determinator) **Measurement Frequency and data record** • Data verification for the full monitoring period was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that quality of SiMn is reported daily • Verified the full monitoring period for Furnace 3, Furnace 5 and Furnace 7 to confirm that quality of SiMn is consistent with the base year in terms of Mn, Si, P and S **Calibration** • Observed laboratory daily calibration sheet for X-Ray Analyser and Carbon/Sulphur Determinator • Observed SiMn running standard certificate as used for X-Ray Analyser calibration • Observed certificate for calibration material as used for Carbon/Sulphur Determinator **Cross checking** • Observed internal procedures as part of SHEQ internal management system /15/ confirming that lab analyses are done according to the applicable standards set by the South African Bureau of Standards
Findings:	No issues were identified.
Conclusions:	The parameter is reported accurately and in accordance with the monitoring plan

ID:	**B14 – project emissions**
Data / Parameter:	**Quality of ore**
Data unit:	Mass fraction of each component of ore (%m/m)
Description:	The mass fraction of the ore (Mn, Fe, SiO_2, CaO) is measured at least monthly in the on-site laboratory following the site standard operating procedures /18/.
Measurement Devices and location	The mass fraction of each component of the ore is measured at least monthly in the on-site laboratory in accordance with the site standard operating procedures
Measurement Frequency:	At least monthly testing is undertaken
QA/QC Procedures Applied, including calibration:	Lab analyses are undertaken according to South African Bureau of Standards. The laboratory is ISO9000 certified. All laboratory equipment calibration records and certificates to this effect are maintained on site. Results are reviewed and anomalous results investigated.
Verification Activities / Evidence Reviewed:	**Measurement Device** • Interviews with the laboratory supervisor and laboratory technical staff • Observed the physical equipment at the lab used for the analysis of samples (X-Ray Analyser and Carbon/Sulphur Determinator) **Measurement Frequency and data record** • Data verification for the full monitoring period was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that quality of ore is reported at least monthly • Data verification for the full monitoring period for Furnace 3, Furnace 5 and Furnace 7 to confirm that quality of ore is consistent with the base year in terms of Mn, Fe, CaO and SiO_2

	Calibration • Observed laboratory daily calibration sheet for X-Ray Analyser and Carbon/Sulphur Determinator /28/ • Observed ore running standard certificate as used for X-Ray Analyser calibration /25/ • Observed certificate for calibration material as used for Carbon/Sulphur Determinator /33/ **Cross checking** • 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; • Discussion held with Services Manager, to review if change in ore supply has occurred.
Findings:	No issues were identified.
Conclusions:	The parameter is reported accurately and in accordance with the monitoring plan

ID:	**B15– project emissions**
Data / Parameter:	**Quality of fluxes**
Data unit:	Mass fraction of each component of “fluxes” (%m/m)
Description:	Quality of fluxes
Measurement Devices and location	The mass fraction of each component of the measured fluxes is measured in the on-site laboratory in accordance with the site standard operating procedures /18/
Measurement Frequency:	When fluxes are used
QA/QC Procedures Applied, including calibration:	Lab analyses are undertaken according to South African Bureau of Standards. The laboratory is ISO9000 certified. All laboratory equipment calibration records and certificates to this effect are maintained on site. Results are reviewed and anomalous results investigated.
Verification Activities / Evidence Reviewed:	**Measurement Device** • Interviews with the laboratory supervisor and laboratory technical staff • Observed the physical equipment at the lab used for the analysis of samples (X-Ray Analyser and Carbon/Sulphur Determinator) **Measurement Frequency and data record** • Data verification for the full monitoring period was undertaken for Furnace 3, Furnace 5 and Furnace 7 to confirm that quality of fluxes are reported, when fluxes are used. • Data verification for the full monitoring period 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_2, CaO). **Calibration** • Observed laboratory daily calibration sheet for X-Ray Analyser and Carbon/Sulphur Determinator /28/ • Observed fluxes running standard certificate as used for X-Ray Analyser calibration /25/ • Observed certificate for calibration material as used for Carbon/Sulphur Determinator /33/ **Cross checking** • Observed internal procedures as part of SHEQ internal management system /15/ confirming that lab analyses are done according to the applicable standards set by the South African Bureau of Standards

Findings:	No issues were identified.
Conclusions:	The parameter is reported accurately and in accordance with the monitoring plan

6.2. Parameters Consistency

Baseline Emission Parameter	***ID***	***Monitoring Plan***	***Methodology***	***Monitoring Report/ Project implementation***	***Implementation***	***Verification***
QPi	A1	•	•	•	•	✓
ECi	A2	•	•	•	•	✓
Qbcoal,i	A3	•	•	•	•	✓
Qbcoke,i	A4	•	•	•	•	✓
Qbpaste,i	A5	•	•	•	•	✓
EFbcoal,i	A6	•	•	•	•	✓
EFbcoke,i	A7	•	•	•	•	✓
EFbpaste,i	A8	•	•	•	•	✓
Quality of coalb	A9	•	•	•	•	✓
Quality of cokeb	A10	•	•	•	•	✓
Quality of electrode pasteb	A11	•	•	•	•	✓
Quality of SiMnb	A12	•	•	•	•	✓
Quality of ore	A13	•	•	•	•	✓
Quality of fluxes	A14	•	•	•	•	✓

Project Emission Parameter	***ID***	***Monitoring Plan***	***Methodology***	***Monitoring Report/ Project implementation***	***Implementation***	***Verification***
QPy	B1	•	•	•	•	✓
ECy	B 2	•	•	•	•	✓
Qpcoal,y	B 3	•	•	•	•	✓
Qpcoke,y	B 4	•	•	•	•	✓
Qppaste,y	B 5	•	•	•	•	✓
EFpcoal,y	B 6	•	•	•	•	✓
EFpcoke,y	B 7	•	•	•	•	✓
EFppaste,y	B 8	•	•	•	•	✓
Quality of coalp	B 9	•	•	•	•	✓
Quality of cokep	B 10	•	•	•	•	✓
Quality of electrode pastep	B 11	•	•	•	•	✓
EFy,offsite	B 12	•	•	•	•	✓
Quality of SiMnp	B 13	•	•	•	•	✓
Quality of ore	B 14	•	•	•	•	✓
Quality of fluxes	B 15	•	•	•	•	✓

Leakage Parameter	*ID*	*Monitoring Plan*	*Methodology*	*Monitoring Report*	*Implementation*	*Verification*
Leakage is zero according to AM0038 v1 /3/, and applied as such.						

7. Corrective Action Requests, Clarification Requests and Forward Action Requests

7.1. Clarification Requests

CL1	
Date raised	09 June 2011
Comment:	The detail provided for the QA/QC process for QPy (furnace production vs saleable product) on how the tonnes of saleable production was obtained in the QA/QC process is unclear as well as the reason as to why the difference between furnace production and saleable product is acceptable.
Clarification Request:	**CL1:** Please provide more detail into the QA/QC process including why the difference between product from furnace and saleable product is acceptable.
PP Response:	The QA/QC process for QPy in the Monitoring Report has been updated with further detail.
Documentation provided	Updated Monitoring Report: "Transalloys M4 Monitoring Report V2 28 07 2011 [track changes]"
Verification activity	
Reviewed updated Monitoring Report.	
Reason for acceptance / non-acceptance	
The Monitoring Report has been updated to provide detail on how the tonnes of saleable production was obtained: Saleable product (177,828t) is the sum of three components: Declared furnace production (167,123t); sold fines (6,042t); and recovered materials (4,663t). Declared furnace production is 86.89% of total furnace production, which is an improvement of 3.04% from the previous verification period. A number of improvements were made in the production process, which would have contributed to this improvement. **CL1** was closed.	

CL2	
Date raised	09 June 2011
Comment:	The replacement dates of meters in furnaces 3 and 7 were unclear – the logsheets do not seem to comply with the Monitoring Report. The meter replacement dates should be confirmed and the updated information provided in the Monitoring Report.
Clarification Request:	**CL2**: Please confirm meter replacement dates in furnaces 3 and 7 and update the Monitoring Report to reflect this detail.

PP Response:	Electricity meters replacement dates have been amended in the Monitoring Report.
Documentation provided	Updated Monitoring Report: "Transalloys M4 Monitoring Report V2 28 07 2011 [track changes]"

Verification activity

Reviewed updated Monitoring Report

Reason for acceptance / non-acceptance

The replacements dates have been correctly reflected within the Monitoring Report.

CL2 was closed.

CL3	
Date raised	24 October 2011
Comment:	The Monitoring Report ver 2 /06/ was updated to include justifications for the reduction in on-site emissions (to address CAR01), and this was found to be in accordance with the predictions made in the registered PDD; as the PDD states "the aim is to achieve approximately a 0.5MWh reduction in specific electricity consumption, with a belief that up to 1MWh could be achieved under the correct operating conditions". However, ERM CVS has noted that the financial analysis in the PDD only applied a 0.1MWh/tSiMn electricity reduction and that the sensitivity analysis considered an additional 0.3 MWh/tSiMn reduction. The electricity savings achieved during this monitoring period amounted to 0.88 MWh/tSiMn. Therefore, although the project activity and its operations conform to those described in the registered PDD, the sensitivity analysis (which inputted into the demonstration of additionality) in the registered PDD applied an electricity reduction of 0.4MWh/tSiMn, even though it was predicted that up to 1MW reduction could be achieved under the correct operating conditions. The financial assessment (spreadsheet calculations) applied at validation stage are not available on the UNFCCC website, and it is not possible to evaluate what impact this increase in efficiency during the monitoring period has on the assumptions applied in the PDD for the sensitivity analysis. ERM CVS therefore requests the PPs to explain how the increased electricity savings observed during this monitoring period do not constitute a change in the operational assumptions applied at the time of validation and registration of the project, which could require an approval of the changes in accordance with the EB Procedure for seeking notification and approval of changes to the PDD.
Clarification Request:	**CL3**: Please explain how the increased electricity savings observed during this monitoring period do not constitute a permanent change in the assumptions applied at the time of validation and registration of the project, particularly in relation to the values applied in the sensitivity analysis.
PP Response:	PP agrees that the electricity savings in this monitoring period ("M4", i.e. 01/03/2010 - 30/04/2011) are higher than the values applied in the sensitivity analysis, and indeed the registered PDD predicts this. There is however, no permanent change between the PDD and the actual project performance, such that a change to the PDD is not required. The essence of this illusion of higher performance is that the Verifying DOE is requesting a comparison between a *portion* of the crediting period ("M4") and the *whole* crediting period (i.e. sensitivity analysis) to date. To undertake a fair and representative comparison between M4's and the whole crediting period's (i.e. the sensitivity analysis') electricity savings, there needs to be an "apple with apple" comparison necessitating inclusion of past project

history *with* M4's performance in making a comparison with the sensitivity analysis value.

Electricity savings during M4 were 0.88 MWh/tSiMn, *however* the project experienced substantially smaller electricity savings prior to M4, even underperforming (i.e. using more electricity than the baseline scenario per ton of product) during the early stages. It is therefore misleading to "ignore" these earlier periods of underperformance when comparing actual and sensitivity analysis electricity savings. Applying 0.88 MWh/tSiMn for electricity savings across the *whole* crediting is mis-representative since there is *actual* data available for ca. seven years. Please see Table 1 (below), as reproduced from prior issuances, including M4:

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total[1]
$QP_{y,monitored}$ (Total[2]) [tSiMn]	94,426	11,016	40,640	101,355	89,838	96,464	50,475	115,239	43,752	548,778
EC_y (Total) [MWh]	463,904	59,065	199,640	499,489	439,106	423,426	218,337	474,179	172,757	2,485,999
Average Electricity Consumption [MWh/tSiMn]	4.91	4.53								
Average Electricity Savings (2003 Level)		**0.38 MWh/tSiMn**								

Table 1 – Actual project performance data

The result of the second approach to achieving an "apple with apple" comparison (as per Table 1's actual data) is that *actual electricity savings from the start of the crediting period through the end of M4, are 0.38 MWh/tSiMn, which are lower than the 0.4 MWh/tSiMn used in the sensitivity analysis of the registered PDD*. Therefore, the increased M4 electricity savings do not constitute a permanent change in the assumptions applied at the time of validation and registration of the project, particularly in relation to the values applied in the sensitivity analysis.

In addition to the above, PP has hereunder undertaken (below in Table 2) a detailed comparison between the actual project performance and the registered PDD's assumptions/predictions/expectations. This comparison confirms that the project is performing as was estimated in the PDD:

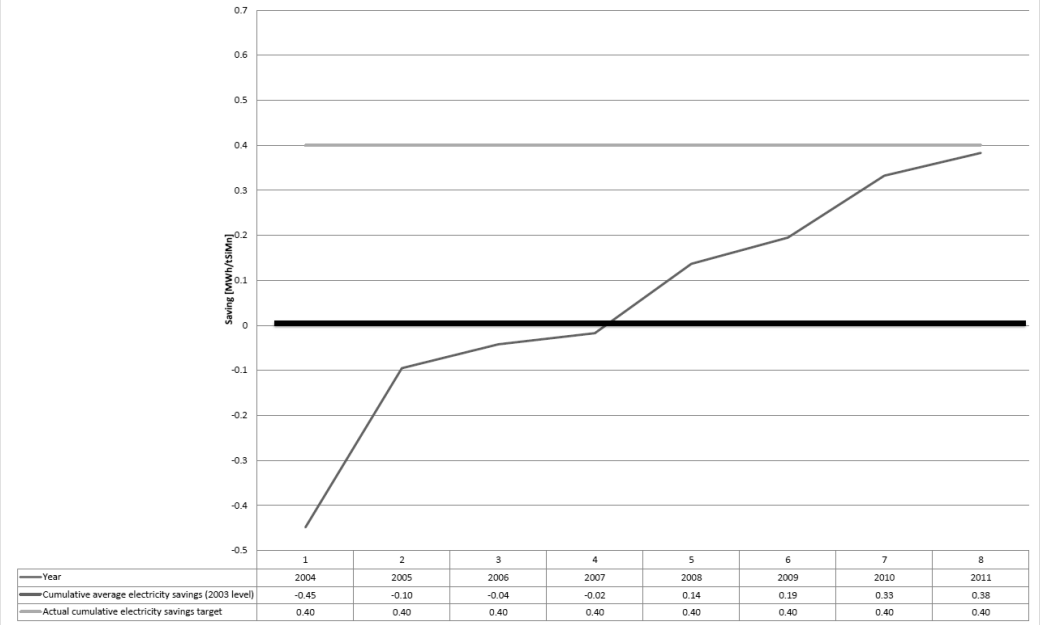
Actual	PDD
The project started in 2004 with electricity savings of -0.45 MWh/tSiMn (yes, *negative*), and increased *progressively* (as was predicted in the PDD) year after year to reach (in 2011) 0.96 MWh/tSiMn.	At project registration (19/10/2007), there were 3 years of *actual* data available (i.e. 10/2004 – 10/2007): **Year** | **2004[3]** | **2005[4]** | **2006** | **2007** **Elec. savings [MWh/tSiMn]** | -0.45 | 0.00 | -0.04 | 0.02 The PDD expected the performance to *progressively* improve in the future. Registered PDD (p.20): "The technical performance of the project and in particular the availability (production rate) will certainly increase in future years due to better handling of the new design – metal production has an important craftsmanship aspect to it, with a lot of learning by doing when it comes to adjusting operating parameters to a new furnace design."
The highest performance to date is 0.96 MWh/tSiMn (2011), which is in line with PDD expectations/targets.	The project's goal was to attain savings of 1 MWh/tSiMn - this is very clear *throughout* the PDD. - PDD (p.2): "The aim is to achieve approximately a 0.5MWh reduction in specific electricity consumption, with a belief that up to 1MWh could be achieved under the correct operating conditions, should the retrofitting be successful."

[1] 2004-2011.
[2] Furnaces 3, 5, and 7.
[3] 2004 only covers 3 months of F7 data (10-12/2004), since F3 and F5 were not retrofitted at that time.
[4] 2005 only covers 2 months of F3 data (11-12/2005), and 1 month of F5 data (12/2005), in addition to complete F7 data. The 3 furnaces were fully operational with the retrofit as of 12/2005.

		- PDD p.12 Table 5: Electricity savings expected in alternative "b)" of the project (i.e. project activity not implemented under the CDM) are 0.5 to 1 MWh/tSiMn.
	The actual cumulative electricity savings from crediting period start (i.e. 01/10/2004) through end of M4 (30/04/2011), are 0.38 MWh/tSiMn, which remain *lower* than the 0.4 MWh/tSiMn used in *both* the estimation of emission reductions *and* the sensitivity analysis of the registered PDD (Graph 1 below).	**PDD ERs estimates:** PDD Section A.4.4 - The 0.4 MWh/tSiMn used is an *assumption* employed for the sake of simplicity (to employ the *same* annual electricity savings from the project start till the end of the crediting period (30/09/2014)). PDD Section A.4.4 (p.6): "Assuming savings of 0.4MWh per tonne of SiMn produced once the furnaces are retrofitted, the following emission reductions can be expected from the project:" The *initial* PDD assumption was 0.6 MWh/tSiMn for expected saving (across the crediting period), but this was decreased to the current 0.4 MWh/tSiMn value during validation. Validation commenced 11/2006, and at that time, there was actually an *increase* in electricity consumption per tonne of product. Consequently the DoE (in their Validation Checklist[5]) raised CAR 1: "The estimated GHG emissions reduction is not achieved during an implementation time of up to 2 years. A written explanation and updated estimations of GHG emission reduction is to be provided. The PDD is to be updated accordingly."[6] To close CAR 1, the PDD assumption (i.e. using 0.6 MWh/tSiMn) was *reduced*, and 0.4 MWh/tSiMn was used instead. In summary, *even after 7 years of operation, this efficiency savings target has yet to be attained*. **PDD sensitivity analysis:** At the time of writing this section of the PDD, there were two possibilities to employ in the sensitivity analysis: - An increasing (with time) electricity savings estimate (starting with low/negative savings and increasing with time to reach the target); or - An average fixed value for the whole crediting period. The latter was chosen, for simplicity and conservativeness, and is indeed a conservative approach, since the expected/actual savings/revenues started low and were expected to increase with time to reach a target of 1 MWh/tSiMn, "averaging out" to 0.4 MWh/tSiMn over the *whole* crediting period, as used in the PDD ER estimates. Employing 0.4 MWh/tSiMn in the IRR calculation is conservative, since the IRR is the discount rate that makes the present value of estimated cash flows equal to the initial investment - the initial year of any investment will have a higher weight than the following year by the discount value percentage (12% in this project). The project started with electricity losses which gradually shifted to electricity savings. The sensitivity analysis employs a flat average without weighing the early years more heavily, which is conservative. Sensitivity analysis is part of the investment analysis section of the PDD (B.4), and the first step of this section is to define the alternatives to the project activity. One of the alternatives is the identical project activity but *without* CDM revenues. Please refer to section B.4, Table 5 on p.11 of the PDD, where alternative "b)" is defined. Therein, the defining characteristics of this alternative are electricity savings of 0.5 to 1 MWh/tSiMn. Clearly, the target of this alternative is 1 MWh/tSiMn of savings reached by the end of the period considered, and the 0.4 MWh/tSiMn employed as a constant value throughout the period considered in the sensitivity analysis is therefore a conservative value in light of the explanation above. PDD Section B.4 (p.20): "*Discussion of the results of the sensitivity analysis:* The technical performance of the project and in particular the availability (production rate) will certainly increase in future years due to better handling of the new design – metal production has an important craftsmanship aspect to it, with a lot of learning by doing when it comes to adjusting operating parameters to a new furnace design."

[5] See Validation Report, p. 37: "Have conservative assumptions been used to calculate project GHG emissions?"
[6] Please refer to p. 44 of Validation Report.

	Therefore, *the PDD expectation* (as per Section B.4, of which sensitivity analysis is a part) *exactly matches actual project performance* (i.e. starting with low performance and improving with time to reach the 1 MWh/tSiMn target (which is fair to compare with the latest actual value of 0.96 MWh/tSiMn) and with expected average savings of 0.4 MWh/tSiMn (which is fair to compare with the actual value of 0.38 MWh/tSiMn so far since the start of project operation). Please refer to Graph 1 below. This was the intention with 0.4 MWh savings *since the beginning*: *It represents a weighted average over the crediting period of efficiency improvement between 0 and 1 MWh*. It was *always* the intention to have the efficiency improving *all the way through the crediting period*, and it is unrealistic to assume that the efficiency achieved after 7 years of operation could have been obtained on day 1. Likewise, it is misrepresentative to compare the performance of the project today with the average expected performance over the run of the project from the first day.



	1	2	3	4	5	6	7	8
Year	2004	2005	2006	2007	2008	2009	2010	2011
Cumulative average electricity savings (2003 level)	-0.45	-0.10	-0.04	-0.02	0.14	0.19	0.33	0.38
Actual cumulative electricity savings target	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40

Graph 1 – Actual cumulative elec. saving/yr vs. Target

Documentation provided	**Verification Reports** for Transalloys Manganese Alloy Smelter Energy Efficiency Project : – First monitoring period (01 October 2004 – 31 March 2008): 06 October 2008 /9/ – Second monitoring period (01 April 2008 – 30 June 2009): 01 December 2009 /9/ – Third monitoring period (01 July 2009 – 28 February 2010): 795V1 EcoSecurities Transalloys 3rd FVR 15Dec2010c uploaded.pdf /9/ PDD, Version 6 /02/ and Validation Report for Transalloys, Version 2 /16/ Transalloys spreadsheet CL3 – Table 1- Energy Savings /31/

Verification activity

Documents and calculations verified by ERM CVS:

Transalloys M4 ER Workbook v10 28 07 2011 /10/

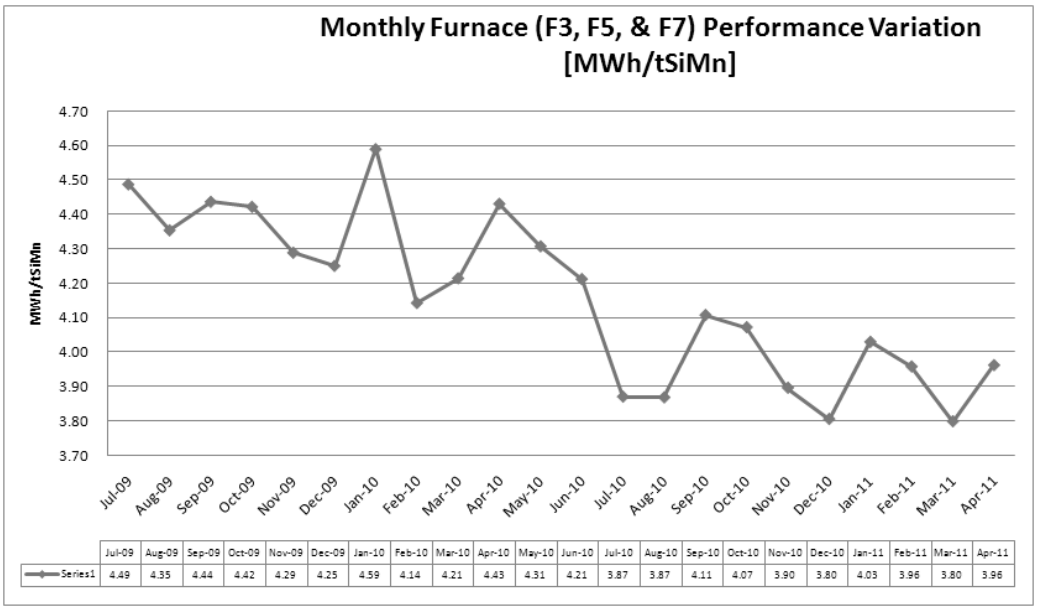
Transalloys M4 Monitoring Report V2 28 07 2011 /06/ Verification Reports for Transalloys Manganese Alloy Smelter Energy Efficiency Project /09/ Transalloys spreadsheet CL3 – Table 1- Energy Savings /31/
Reason for acceptance / non-acceptance
PP has demonstrated that the actual performance of project activity since its implementation stays within the original assumptions applied in the PDD; (i.e. energy savings are below the maximum electricity expectation of 1.0 MWh/tSiMn and accumulative energy saving less than 0.4 MWh). ERM CVS cross checked the calculations and concludes that these have been done accordingly to the data from plant records of SiMn production and electricity consumption stated in the Monitoring Report /6/. Therefore, the values and results represent consistently the real performance of project activity. Moreover, taking into account that the Verification team confirmed that the project has been implemented and operated as set out in the PDD, it is concluded that the increased electricity savings observed during the 4th monitoring period dos not constitute a permanent change in the assumptions applied at the time of validation and registration of the project. **CL3** was closed.

7.2. Corrective Action Requests

CAR1	
Date raised	09 June 2011
Comment:	During the review of reasons as to the difference in ERs achieved during the monitoring period versus that amount estimated in the PDD, the detail provided for reason 2b ("Higher electricity savings") was not adequate due to the fact that operational and management changes took place on site during the monitoring period and the detail of these management and operational changes, as well as their effect on the CDM project and CER achieved was not discussed.
Corrective Action Request:	**CAR1:** Relating to the difference in ERs achieved during the monitoring period versus that amount estimated in the PDD (and the noticeable reduction in MWh/ton SiMn produced for this monitoring period), please quantify the influence of the management and operational changes with subsequent electricity efficiency improvements, and the potential effect on CERs if not CDM related.
PP Response:	No major modifications were undertaken in the furnaces aside from the Pitch Centre Diameter ("PCD") modification. There have been continuous management and operational changes, some of which *could* have been applied to the baseline scenario, but this does not change the fact that *once* a major change, (such as with the project PCD), has been effected, further fine-tuning is *necessary* to realise optimum furnace performance. Without such fine-tuning, it would be unrealistic and improbable to achieve the set target. The methodology is *clear* that the baseline should be fixed and based on real data, such that even if the same management and operational changes had been applied to the baseline scenario (without the PCD modification), it would be impossible to quantify the effect on furnace electricity consumption. Graph 1 (below) illustrates the high variation in furnace performance *without* undertaking any change (major or minor). The only apparent non-PCD reason for increased furnace performance relates to the reduction of slag usage in the furnaces (and the accompanying reduction in electricity consumption per product), *however* this improvement is *a direct bi-product of the PCD change*: Prior to PCD optimisation, there had been

electrode depth issues which resulted in frequent electrode breaks and carbon build-up, and the need to add slag to the mix to facilitate the reaction. *After* the PCD was optimised, the project developer was able to fine tune electrode depths, reducing the dependence on slag (as an additive), resulting in energy savings, since more slag in the furnaces requires more electricity without yielding increased product.

The Monitoring Report for M4 has been amended to include further detail relating to the difference in CERs achieved during the monitoring period versus that amount estimated in the PDD.



Graph 1: Erratic furnace performance

Documentation provided

Updated Monitoring Report: "Transalloys M4 Monitoring Report V2 28 07 2011 [track changes]"

Updated CER workbook: "TransAlloys M4 ER Workbook v10 28 07 2011"

Verification activity

Reviewed Monitoring Report, Version 2; PDD, Version 6 and Validation Report for Transalloys, Version 2

Reason for acceptance / non-acceptance

Justifications provided in the updated Monitoring Report were verified by ERM CVS and found to be correctly motivated and in accordance with the assumption made in the registered PDD that up to 1MWh could be achieved under the correct operating conditions", and **CAR01** was closed. However, the sensitivity analysis (and demonstration of additionality) in the registered PDD only applied an electricity reduction of 0.4MWh/tSiMn, even though it was predicted that up to 1MW reduction could be achieved under the correct operating conditions. **CL03** was raised requesting an explanation of how the increased electricity savings observed during this monitoring period does not constitute a permanent change in the assumptions applied at the time of validation and registration of the project, particularly in relation to the values applied in the sensitivity analysis.

CAR1 was closed.

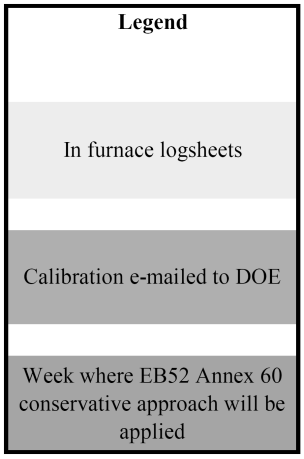
<table>
<tr><td>CAR2</td><td></td></tr>
<tr><td>Date raised</td><td>09 June 2011

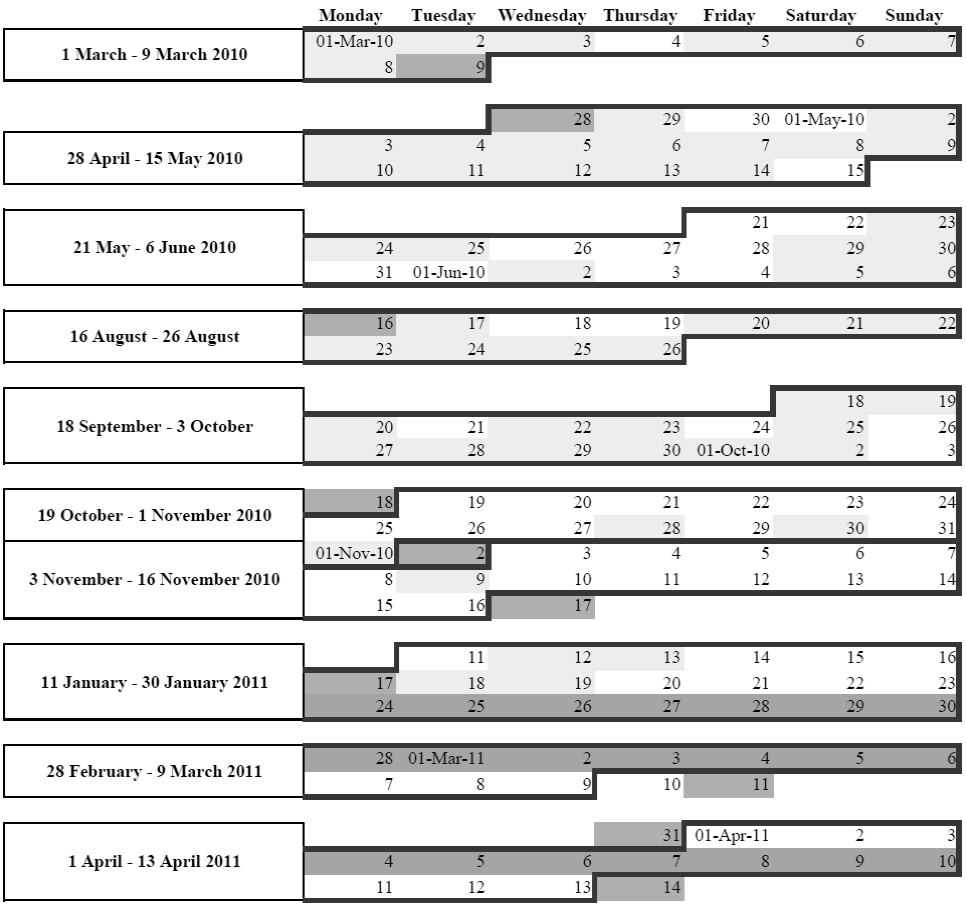
Updated 22 March 2012</td></tr>
<tr><td>Comment:</td><td>The frequency of calibration of the platform scales (used to measure QPy) and the batch-weigh system (used to measure Qpcoal,y and Qpcoke,y) were changed from routine daily calibration to routine weekly calibration during the monitoring period, as very little change (drift) was observed. The scales' calibration was assessed three times a day (at the start of each shift) and if the maximum permissible error (300kg) was exceeded calibration was performed straight away, otherwise routine calibration was performed weekly. The Monitoring Report /06/ and monitoring manual /07/ stated that the calibration procedures take place daily, which was inconsistent with the procedure /18/ which requires weekly calibration.

In addition, the manufacturer's requirements for the platform scales as per the monitoring manual /07/ refer to daily frequency of calibration and not weekly calibration.

Furthermore, the calibration records for the 4th monitoring period for platform scales 2 and 3, and the batchweigh system (at furnace 7) did not reflect the change in calibration frequency (higher frequency of calibration on occasions (relative to the weekly calibration required by the updated procedure), while also a lower frequency of calibration on occasions). A lower calibration frequency than that stipulated in the revised monitoring plan (manufacturers requirements) was of concern. The periods where calibration took place less than once a week are as follows:

<table>
<tr><th>Platform scales 2 and 3:</th><th>Batchweigh system (furnace 7):</th></tr>
<tr><td>01 March – 09 March 2010</td><td>12 March 2010 – 24 March 2010</td></tr>
<tr><td>28 April 2010 – 15 May 2010</td><td>03 June 2010 – 16 June 2010</td></tr>
<tr><td>21 May 2010 – 06 June 2010</td><td>18 June 2010 – 30 June 2010</td></tr>
<tr><td>16 August 2010 – 26 August 2010</td><td>02 July 2010 – 14 July 2010</td></tr>
<tr><td>18 Sept 2010 – 03 Oct 2010</td><td>30 July 2010 – 11 August 2010</td></tr>
<tr><td>19 October 2010 – 1 November 2010</td><td>28 August 2010 – 05 September 2010</td></tr>
<tr><td>03 November 2010 – 16 November 2010</td><td>17 September 2010 – 29 September 2010</td></tr>
<tr><td>11 January 2011 – 30 January 2011</td><td>22 October 2010 – 03 November 2010</td></tr>
<tr><td>28 February 2011 – 9 March 2011</td><td>05 November 2010 – 17 November 2010</td></tr>
<tr><td>01 April 2011 – 13 April 2011</td><td>19 November 2010 – 1 December 2010</td></tr>
<tr><td></td><td>10 December 2010 - 06 January 2011</td></tr>
<tr><td></td><td>28 January 2011 – 09 February 2011</td></tr>
<tr><td></td><td>11 March 2011 – 30 March 2011</td></tr>
<tr><td></td><td>08 April 2011 – 27 April 2011</td></tr>
</table>
</td></tr>
<tr><td>Corrective Action</td><td>CAR2: The calibration documents and records for the platform scales and the batch-weigh system</td></tr>
</table>

Request:	require alignment to address the following: a) Please provide consistency between documents (monitoring manual, Monitoring Report, procedural documents) in relation to the frequency of calibration of the platform scales (used to measure QPy) and the batchweigh system (used to measure Qpcoal,y and Qpcoke,y). b) In addition, please provide documentation from the manufacturer of the platform scales to support either daily or weekly calibration. c) Please provide the calibration records for platform scales 2 and 3, as well as the batchweigh system (for furnace 7) that were not available during the site visit. If these calibration records are not available at the frequency specified by the monitoring plan (i.e. manufacture's requirements), please apply the maximum permissible error (in accordance with EB52 Annex 60) to these parameters (Qp,y, Qpcoke,y, and Qpcoal,y) in order to ensure a conservative approach to the CER calculations, such that the adjusted measured values shall result in lower baseline emissions and higher project emissions.
PP Response:	a) The platform scales' and batchweigh system's calibration frequencies have been updated in the Monitoring Manual and Monitoring Report for consistency with the relevant procedures. b) A letter from the platform scales manufacturer supporting a weekly calibration regime is attached with this response. c) (i) Platform scales 2 and 3 calibrations: Calibrations were performed daily until the revision of procedure MiSn 161 on 24/04/2010, when the calibration frequency was changed to weekly. The daily system was employed for the previous 3 successful CER issuances, and in the case of such procedural changes, the transition (from daily to weekly) is undertaken progressively. As such, there are only 3 calendar weeks in this monitoring period where there was no calibration recorded, and these were: 24-30/01/2011; 28/02-06/03/2011; and 04-10/04/2011. This can be appreciated more by referring to the following "calendar" (with accompanying legend): 



	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1 March - 9 March 2010	01-Mar-10	2	3	4	5	6	7
	8	9					
28 April - 15 May 2010			28	29	30	01-May-10	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	
21 May - 6 June 2010						21	22	23
	24	25	26	27	28	29	30
	31	01-Jun-10	2	3	4	5	6
16 August - 26 August	16	17	18	19	20	21	22
	23	24	25	26			
18 September - 3 October						18	19
	20	21	22	23	24	25	26
	27	28	29	30	01-Oct-10	2	3
19 October - 1 November 2010	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
3 November - 16 November 2010	01-Nov-10	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17				
11 January - 30 January 2011		11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
28 February - 9 March 2011	28	01-Mar-11	2	3	4	5	6
	7	8	9	10	11		
1 April - 13 April 2011				31	01-Apr-11	2	3
	4	5	6	7	8	9	10
	11	12	13	14			

	Available Calibrations	Source
01-09/03/2010	01/03/2010	F3 logsheet, cell AM42
	02/03/2010	F7 logsheet, cell AM 42
	03/03/2010	F3 logsheet, cell AM42
	05/03/2010	F7 logsheet, cell AM42
	06/03/2010	F5 logsheet, cell AM42
	07/03/2010	F7 logsheet, cell AM42
	08/03/2010	F7 logsheet, cell AM42
	09/03/2010	Attached calibration PDF
28/04-15/05/2010	28/04/2010	Attached calibration PDF
	29/04/2010	F3 logsheet, cell AM42
	02/05/2010	F3 logsheet, cell AM42
	03/05/2010	F3 logsheet, cell AM42

		04/05/2010	F3 logsheet, cell AM42
		05/05/2010	F3 logsheet, cell AM42
		06/05/2010	F3 logsheet, cell AM42
		07/05/2010	F3 logsheet, cell AM42
		08/05/2010	F3 logsheet, cell AM42
		09/05/2010	F3 logsheet, cell AM42
		10/05/2010	F3 logsheet, cell AM42
		11/05/2010	F3 logsheet, cell AM42
		12/05/2010	F3 logsheet, cell AM42
		13/05/2010	F3 logsheet, cell AM42
		14/05/2010	F3 logsheet, cell AM42
	21/05-06/06/2010	23/05/2010	F5 logsheet, cell AM42
		24/05/2010	F7 logsheet, cell AM42
		25/05/2010	F5 logsheet, cell AM42
		29/05/2010	F7 logsheet, cell AM42
		30/05/2010	F7 logsheet, cell AM42
		02/06/2010	F3 logsheet, cell AM42
		05/06/2010	F3 logsheet, cell AM42
		06/06/2010	F3 logsheet, cell AM42
	16-26/08/2010	16/08/2010	Attached calibration PDF
		17/08/2010	F3 logsheet, cell AM42
		20/08/2010	F3 logsheet, cell AM42
		21/08/2010	F3 logsheet, cell AM42
		22/08/2010	F3 logsheet, cell AM42
		23/08/2010	F3 logsheet, cell AM42
		24/08/2010	F5 logsheet, cell AM42
		25/8/2010	F3 logsheet, cell AM42
		26/8/2010	F3 logsheet, cell AM42
	18/09-03/10/2010	18/9/2010	F3 logsheet, cell AM42
		19/9/2010	F3 logsheet, cell AM42

	20/9/2010	F3 logsheet, cell AM42
	22/9/2010	F3 logsheet, cell AM42
	23/9/2010	F3 logsheet, cell AM42
	25/9/2010	F3 logsheet, cell AM42
	27/9/2010	F3 logsheet, cell AM42
	28/9/2010	F3 logsheet, cell AM42
	29/9/2010	F3 logsheet, cell AM42
	30/9/2010	F3 logsheet, cell AM42
	1/10/2010	F3 logsheet, cell AM42
	2/10/2010	F3 logsheet, cell AM42
19/10-01/11/2010	28/10/2010	F3 logsheet, cell AM42
	30/10/2010	F3 logsheet, cell AM42
	1/11/2010	F3 logsheet, cell AM42
03-16/11/2010	09/11/2010	F3 logsheet, cell AM42
	18/11/2010	F3 logsheet, cell AM42
11-30/01/2011	12/1/2011	F3 logsheet, cell AM42
	13/1/2011	F3 logsheet, cell AM42
	17/1/2011	Attached calibration PDF
	18/1/2011	F3 logsheet, cell AM42
	19/01/2011	F3 logsheet, cell AM42
	31/01/2011	Attached calibration PDF
28/02-09/03/2011	25/02/2011	F3 logsheet, cell AM42
	11/03/2011	Attached calibration PDF
01-13/04/2011	31/03/2011	Attached calibration PDF
	14/04/2011	Attached calibration PDF

The Monitoring Report and emission reduction workbook have been updated to reflect the application of the maximum permissible error (in accordance with EB52 Annex 60) for the 3 calendar weeks (in this monitoring period) where no platform scale 2 & 3 calibration were available (i.e. 24-30/01/2011; 28/02-06/03/2011; and 04-10/04/2011).

	(ii) Batchweigh system (Furnace 7): For conservativeness, the maximum permissible error (in accordance with EB52 Annex 60) for the periods specified has been be applied, and all related calculations and documents have been amended to reflect the new (reduced) project emission reductions.

Documentation provided

Updated Monitoring Report: "Transalloys M4 Monitoring Report V2 28 07 2011 [track changes]"

Updated Monitoring Manual: " Transalloys CDM Monitoring Manual v6 28 07 2011 [clean]"

Letter from platform scales manufacturer: "JCS Scales calibration recommendation 21 07 2011"

Remaining Platform 2 & 3 calibrations: "Platform 2 & 3 calibrations for ERM 28 07 2011"

Verification activity

Documents verified by ERM CVS:

Monitoring Manual "Transalloys CDM Monitoring Manual v6 28 07 2011" /07/

Letter from platform scales manufacturer "JCS Scales calibration recommendations 21 07 2011" /29/

Monitoring Report "Transalloys M4 Monitoring Report V2 28 07 2011" /06/

MF02WP Calibration of Platform Scale and Pressductor scale /18/

TAOP 230 Carrying out batch weight scale tests /18/

Platform 2&3 Scale Calibration Tests as provided /14/

Logbook for daily balance calibration checklist /28/

TransAlloys M4 ER Workbook v10 28 07 2011 /10/

Reason for acceptance / non-acceptance

The Monitoring Report /06/ and Monitoring Manual /07/ have been updated to reflect weekly calibration in line with the calibration procedures for platform scales and batch weight scale tests /18/.

At beginning of each shift, test weights are placed on the platform scale and confirmed that the defined error margin is not exceeded. If the error margin is exceeded, calibration is undertaken. Otherwise, calibration is undertaken once per week as per the Transalloys CDM Monitoring Manual v6 28 07 2011/07/, MF02WP Calibration of Platform Scale and Pressductor scale/18/ and the Transalloys M4 Monitoring Report V2 28 07 2011/06/.

The supplier indicates that Transalloys should determine the test and calibration frequency of the platform scales./29/.

Verified for Furnace 3, Furnace 5 and Furnace 7 that the maximum permissible error of 2.5% was deducted for the weeks where platform scale calibration records were not available, for weeks starting 24 January, 28 February 2011 and 4 April

2011, in accordance with EB52 Annex 60 /30/.

Verified for Furnace 7 that the maximum permissible error of 2.5% was added (to mass of coke and coal use) for the weeks where batchweight scale calibration records were not available for weeks starting 12 March 2010, 19 March 2010, 3 June 2010, 10 June 2010, 18 June 2010, 25 June 2010, 2 July 2010, 8 July 2010, 30 July 2010, 6 August 2010, 28 August 2010, 17 September 2010, 24 September 2010, 22 October 2010, 29 October 2010, 5 November 2010, 12 November 2010, 19 November 2010, 26 November 2010, 10 December 2010, 17 December 2010, 24 December 2010, 31 December 2010, 28 January 2011, 3 February 2011, 11 March 2011, 18 March 2011, 24 March 2011, 8 April 2011, 15 April 2011, 21 April 2011, in accordance with EB52 Annex 60 /30/.

This is considered conservative and **CAR2** was closed

CAR3	
Date raised	09 June 2011
Comment:	The calculation to sum the total SiMn produced in 2011 at Furnace 3, in worksheet "F3 – daily furnace data" (cell B434) in the CER workbook was incorrect. The CER workbook must be updated to represent this change (the number in this cell is not used in the calculation of ERs and hence this change error does not affect the ER calculation).
Corrective Action Request:	**CAR3**: Please correct the error in the CER workbook related to the sum of the total SiMn produced in 2011 at Furnace 3, in worksheet "F3 – daily furnace data" (cell B434).
PP Response:	The CER workbook has been corrected.

Documentation provided

Updated CER workbook: "Transalloys M4 ER Workbook v10 28 07 2011"

Verification activity

Documents verified by ERM CVS:

Transalloys M4 ER Workbook v10 28 07 2011 /10/

Reason for acceptance / non-acceptance

The formula has been corrected in Transalloys M4 ER Workbook v10 28 07 2011, and correct value is reflected.

CAR3 was closed

CAR4	

Date raised	09 June 2011
Comment:	The monitoring manual contained details of all 'manufacturers requirements' related to the equipment used in monitoring each parameter, except for the 'manufacturers requirements' for the new meters in furnace 3 and furnace 7 (**CAR4**).
Corrective Action Request:	**CAR4**: Please update the monitoring manual with the "manufacturer's requirements" of the new meters in the respective furnaces.
PP Response:	The Monitoring Manual has been updated to include the new electricity meters' manufacturer requirements.
Documentation provided	
Updated Monitoring Manual: "Transalloys CDM Monitoring Manual v6 28 07 2011 [clean]"	
Verification activity	
Documents verified by ERM CVS: Monitoring Manual "Transalloys CDM Monitoring Manual v6 28 07 2011"	
Reason for acceptance / non-acceptance	
Transalloys CDM Monitoring Manual v6 28 07 2011 /07/ has been updated to include new electricity meter specifications as per the manufacturer' requirements. **CAR4** was closed.	

CAR5	
Date raised	09 June 2011
Comment:	The calculation to sum the total MWh of electricity used in 2011 at Furnace 3, in worksheet "F3 – daily furnace data" (cell C434) was incorrect. The CER workbook must be updated to represent this change (the number in this cell is not used in the calculation of CERs and hence this change error does not affect the CER calculation).
Corrective Action Request:	**CAR5**: Please correct the error in the CER workbook related to the total MWh of electricity used in 2011 at Furnace 3, in the worksheet "F3 – daily furnace data" (cell C434).
PP Response:	The CER workbook has been corrected.
Documentation provided	

Updated CER workbook: "TransAlloys M4 ER Workbook v10 28 07 2011"
Verification activity
Documents verified by ERM CVS: Transalloys M4 ER Workbook v10 28 07 2011 /10/
Reason for acceptance / non-acceptance
The formula has been corrected in Transalloys M4 ER Workbook v10 28 07 2011 /10/, and correct value is reflected. **CAR5** was closed.

CAR6	
Date raised	09 June 2011
Comment:	The calculation to sum the total MWh of electricity used in 2011 at Furnace 7, in worksheet "F7 – daily furnace data" (cell C434) was incorrect. The CER workbook must be updated to represent this change (the number in this cell is not used in the calculation of ERs and hence this change error does not affect the CER calculation).
Corrective Action Request:	**CAR6**: Please correct the error in the CER workbook related to the total MWh of electricity used in 2011 at Furnace 7, in worksheet "F7 – daily furnace data" (cell C434).
PP Response:	The CER workbook has been corrected.
Documentation provided	
Updated CER workbook: "TransAlloys M4 ER Workbook v10 28 07 2011"	
Verification activity	
Documents verified by ERM CVS: Transalloys M4 ER Workbook v10 28 07 2011 /10/	
Reason for acceptance / non-acceptance	
The formula has been corrected in Transalloys M4 ER Workbook v10 28 07 2011 /10/, and correct value is reflected. **CAR6** was closed.	

CAR7	
Date raised	09 June 2011
Comment:	The average of the coke emission factor as calculated in the workbook was not done in accordance with the revised monitoring plan i.e. monthly averages of carbon contents should be used for the calculation of a monthly emission factor and the annual emission factor should be calculated as the average of monthly emission factors and used for the emission calculations.
Corrective Action Request:	**CAR7**: Please correct the EFcoke,y calculation in the CER Workbook, and make the associated changes to the ER calculations.
PP Response:	Calculation of the average coke emission factor in the workbook has been updated to comply with the revised monitoring plan.
Documentation provided	
Updated CER workbook: "TransAlloys M4 ER Workbook v10 28 07 2011"	
Verification activity	
Documents verified by ERM CVS: Transalloys M4 ER Workbook v10 28 07 2011 /10/ Transalloys M4 Monitoring Report V2 28 07 2011 /07/	
Reason for acceptance / non-acceptance	
The M4 CER Workbook /10/ and the Monitoring Report /06/ have been updated to include the correct calculation method, and values to determine the average coke emission factor. **CAR7** was closed.	

CAR8	
Date raised	09 June 2011
Comment:	In the CER Workbook, on the CER Summary tab, cell B6 refers to the monitoring period for which the CER Workbook relates to. This currently refers to the incorrect monitoring period.
Corrective Action	**CAR8**: Please correct the reference to the monitoring period in cell B6 in the CER Summary tab in the

Request:	CER Workbook.
PP Response:	The CER workbook has been corrected.
Documentation provided	
Updated CER workbook: “TransAlloys M4 ER Workbook v10 28 07 2011”	
Verification activity	
Documents verified by ERM CVS: Transalloys M4 ER Workbook v10 28 07 2011 /10/	
Reason for acceptance / non-acceptance	
The CER Workbook has been updated to reflect the correct monitoring period (M4). **CAR8** was closed.	

7.3. Forward Action Requests

There are no Forward Action Requests

Annex 1: Reference Documents

<table>
<tr><th>#</th><th>Project related documents</th><th>Date/Version/Status</th></tr>
<tr><td>1</td><td>Project registration information on the UNFCCC website</td><td>Accessed on 26 May 2011</td></tr>
<tr><td>2</td><td>Project Design Document for CDM project “Transalloys Manganese Alloy Smelter Energy Efficiency Project”</td><td>Version 6, 02 March 2007</td></tr>
<tr><td>3</td><td>AM0038 - methodology for improved electrical energy efficiency of an existing submerged electric arc furnace used for the production of SiMn</td><td>29 September 2006.Version 01</td></tr>
<tr><td>4</td><td>ACM0002 – Consolidated methodology for grid connected electricity generation from renewable sources - used for grid emission factor calculation</td><td>19 May 2006. Version 06</td></tr>
<tr><td>5</td><td>Revised Monitoring Plan for Transalloys Manganese Alloy Smelter Energy Efficiency Project – reference 1027</td><td>Approved 25 October 2009</td></tr>
<tr><td>6</td><td>Monitoring Report of Transalloys Manganese Alloy Smelter Energy Efficiency Project (1027): Monitoring period No. 4: 01 March 2010 – 30 April 2011</td><td>16 May 2011 Version 1

28 July 2011 Version 2

21 December 2011, Version 3(difference(s) between versions 2 and 3 solely editorial)

26 March 2012, Version 4 (updated due to incompleteness)</td></tr>
<tr><td>7</td><td>Monitoring Manual: Transalloys Manganese Alloy Smelter Energy Efficiency Project CDM Monitoring Manual</td><td>01 July 2010 Version 5

28 July 2011 Version 6</td></tr>
<tr><td>8</td><td>Equipment maintenance schedules and Calibration certificates:

Electricity meters:

<table>
<tr><td>Furnace</td><td>Serial number</td><td>Calibration date</td><td>Valid until</td></tr>
<tr><td>F3 – 22KV</td><td>06470035</td><td>24 November 2006</td><td>23 November 2011</td></tr>
<tr><td>F3 – 33KV#</td><td>00061498</td><td>25 April 2008</td><td>24 April 2013</td></tr>
<tr><td>F3 – 22KV*</td><td>95679335</td><td>02 June 2009</td><td>01 June 2014</td></tr>
<tr><td>F5</td><td>06460054</td><td>22 November 2006</td><td>21 November 2011</td></tr>
<tr><td>F7</td><td>06390018</td><td>28 September 2006</td><td>27 September 2011</td></tr>
<tr><td>F7**</td><td>96505392</td><td>11 March 2010</td><td>10 March 2015</td></tr>
</table>
meter not used during this monitoring period – meter used for a portion of the 3rd monitoring period but removed and replaced with meter no. 06470035 during that monitoring period – it’s calibration certificate is still valid if used again in the future hence included here.
* meter used since 23 October 2010
** meter used since 19 September 2010

Main gate weigh bridge:

<table>
<tr><th>Serial number</th><th>Calibration date</th><th>Valid until</th></tr>
<tr><td>991019*</td><td>28 January 2010</td><td>27 January 2012</td></tr>
<tr><td>TA19072010</td><td>30 July 2010</td><td>29 July 2012</td></tr>
</table></td><td>Various dates as shown per document</td></tr>
</table>

#	Project related documents	Date/Version/Status
	(incorrectly labeled on certificate as "Trans002" | | | **TA19072010 | 12 January 2011 | 11 January 2013 * ended use 30 July 2010 ** started use 30 July 2010.	
9	**Verification Reports** for Transalloys Manganese Alloy Smelter Energy Efficiency Project – First monitoring period (01 October 2004 – 31 March 2008): 06 October 2008 Second monitoring period (01 April 2008 – 30 June 2009): 01 December 2009 Third monitoring period (01 July 2009 – 28 February 2010): 795V1 EcoSecurities Transalloys 3rd FVR 15Dec2010c uploaded.pdf	06 October 2008, Version 01 01 December 2009, Version 02 15 December 2010, Version 02
10	**TransAlloys CER workbook**	17 July 2011 Version 8 28 July 2011 Version 10 21 December 2011 version 11 (difference(s) between versions 10 and 11 solely editorial) 26 March 2012 version 12 (updated due to incompleteness)
11	**Transalloys furnace monthly logsheets -incorporating daily data (including equipment printouts for these months).** 1003_F7_LOGSHEET Fce 7_March_2010 AB CHECK 1007_F7_LOGSHEET Fce 7_July_2010 1012_F7_LOGSHEET Fce 7_ December_2010 AB CHECK 1101_F7_LOGSHEET Fce 7_ January_2011 AB CHECK	1003_F7_LOGSHEET Fce 7_March_2010 AB CHECK 1007_F7_LOGSHEET Fce 7_July_2010 1012_F7_LOGSHEET Fce 7_ December_2010 AB CHECK 1101_F7_LOGSHEET Fce 7_ January_2011 AB CHECK
12	**Product Sales Record (for the monitoring period):** Electricity and SiMn Crosscheck	01 March 2010 – 30 April 2011
13	**Eskom electricity invoices (for the monitoring period):** Electricity and SiMn Crosscheck	March 2010 – April 2011
14	Platform scales and Batchweigh system calibration equipment printouts Platform 2 3 calibration tests for ERM 28 07 2011.pdf (tests dated 09/03/2010, 28/04/2010, 16/08/2010, 18/10/2010, 02/11/2010, 17/11/2010, 17/01/2011, 11/03/2011, 31/03/2011, 14/04/2011 provided via email)	Weekly for the monitoring period
15	SHEQ internal management system	Current version
16	Validation Report for Transalloys Manganese Alloy Smelter Energy Efficiency Project	29 August 2007 Version 2

#	Project related documents	Date/Version/Status
17	Validation Report of Revised Monitoring Plan for Transalloys Manganese Alloy Smelter Energy Efficiency Project	03 August 2009
18	**Transalloys standard operating procedures**	
	SiMn300 (QA/QC procedure)	January 2011, Revision 2
	SOP SiMn161	24 April 2010 Revision 1
	TAOP 230 Carrying Out Batch Weigh Scale Tests (2).pdf	November 2004, Revision 2.0
	MF02WP Calibration of platform scale and press ductor	10 February 2009, no rev number
	CLWI 02 Calibration and testing of weighing balances and scales	17 February 2009, Rev 0.0
19	MICL-02: Proximate analysis for Coal and Coke	18 August 2006 revision 2
20	Proximate Analysis Raw Material Data Sheet (01/12/2010)	01 and 02 December 2010
	Proximate Analysis Raw Material Data Sheet (02/12/2010)	01 and 02 February 2011
	Proximate Analysis Raw Material Data Sheet (01/02/2011)	
	Proximate Analysis Raw Material Data Sheet (02/02/2011)	02 and 03 April 2011
	Proximate Analysis Raw Material Data Sheet (02/04/2011)	
	Proximate Analysis Raw Material Data Sheet (03/04/2011)	
21	Laboratory Analysis Calculation Sheet (01/12/2010)	01 and 02 December 2010
	Laboratory Analysis Calculation Sheet (02/12/2010)	01 and 02 February 2011
	Laboratory Analysis Calculation Sheet (01/02/2011)	
	Laboratory Analysis Calculation Sheet (02/02/2011)	02 and 03 April 2011
	Laboratory Analysis Calculation Sheet (02/04/2011)	
	Laboratory Analysis Calculation Sheet (03/04/2011)	
22	ISO9000 Certificate number 01 100 928008 – TUV Rheinland Inspection Services	Valid until 11 June 2012
	ISO 14001:2004 Certificate number 01 104 031496 - TUV Rheinland Cert GmbH	Valid until 30 June 2012
	BS OHSAS 18001:2007 Certificate number 01 113 060056 - TUV Rheinland Cert GmbH	Valid until 06 May 2013
23	Coal supply contract as signed July 2009	Valid until 31 July 2014
24	Elkem Ferroveld – Electrode paste specifications	Current data specification sheet applicable during the 4th monitoring period.
25	SiMn reference material certification.pdf issued by Dillinger Hutter Laboratory	11 August 2004
26	CDM Validation and Verification Manual (VVM)	Version 01.2 (EB55 Annex 1)
27	Electrode column Layout & Measurements TA F1-7	22 July 2010

#	Project related documents	Date/Version/Status
28	Logbook for daily balance calibration checklist	01 March 2010 – 30 April 2011
29	JCS Scales calibration recommendation 21 07 2011.pdf	21 July 2011
30	UNFCCC Guideline for Assessing Compliance with the Calibration Frequency Requirements.	EB52 Annex 60, Version 1
31	Transalloys spreadsheet CL3 – Table 1- Energy Savings	16 November 2011
32	IPCC: Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories Reference Manual.	2006
33	Leco Calibration certificate for material used for Carbon/Sulphur Determinator	28 February 2011

Annex 2: Persons interviewed

#	Name	Organisation	Role
1	Lou Jacobs	Transalloys	Services manager / CDM program manager
2	Johan Gous	Transalloys	Production superintendent / CDM QA/QC manager
3	Mark Ghorayeb	EcoSecurities	Project manager
4	Amin Bekai	EcoSecurities	Project manager
5	Blessing Buthelezi	Transalloys	Laboratory manager
6	Godfrey Matjie	Transalloys	Furnace operator
7	Simon Lusenga	Transalloys	Furnace operator
8	Francois Halgryn	Transalloys	Electrical engineer