MONITORING REPORT FORM (CDM-MR)
Version 01 - in effect as of: 28/05/2010

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MONITORING REPORT
Version 3 - 08/12/2010

Transalloys Manganese Alloy Smelter Energy Efficiency Project
Reference number 1027
Monitoring period number 3 - 01/07/2009 - 28/02/2010

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

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1. Purpose of the project activity and the measures taken to reduce greenhouse gas emissions;

The Transalloys Manganese Alloy Smelter Energy Efficiency Project is an industrial energy efficiency project that reduces the electricity consumption in the production of silicomanganese (SiMn) alloy (a key component in steel making) at its Witbank facility in South Africa.

The project displaces electricity from the South African grid, which is mostly produced from coal. Usage of coal and coke (used as reductants) and paste (mostly made of carbon) used as electrode in the submerged electric arc furnaces are also included in the emission reduction calculation.

2. Brief description of the installed technology and equipments;

The Transalloys facility currently uses 5 submerged electric arc furnaces for SiMn alloy production. Furnaces 1, 3 and 5 are Elkem design, while #6 is a self-built furnace based on that design. Furnace 7 is a Demag design. The electric capacities of the furnaces are 48MVA (#7 and #5), 22MVA (#6) and 21MVA (#1 and #3).

The approach of the project, for the 5 furnaces producing SiMn at the facility, is to retrofit new technology into the existing furnace infrastructure.

3. Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.).

The project is a prompt start project claiming carbon credits since October 2004 for the retrofit of the five furnaces. The retrofit schedule is as per the table below:

Furnace 7	Finished retrofit in September 2004
Furnace 3	Finished retrofit in October 2005
Furnace 5	Finished retrofit in December 2005
Furnace 6	Originally planned to be retrofitted in 2008, it has been delayed due to poor market conditions. It is still not retrofitted to date.
Furnace 1	Originally planned to be retrofitted in 2009, it has been delayed due to poor market conditions. It is still not retrofitted to date.

4. Total emission reductions achieved in this monitoring period.

82,934 tCO2e

A.2. Project Participants

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Host party: South Africa, involved indirectly; Authorized Participants: Transalloys PTY LTD formerly Highveld Steel and Vanadium Corporation Limited.

Other parties involved:

- United Kingdom of Great Britain and Northern Ireland, involved indirectly; Authorized Participants: EcoSecurities Group plc
- Switzerland , involved indirectly; Authorized Participants: EcoSecurities Group plc

A.3. Location of the project activity:

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Clewer Road, Witbank, 1035, Mpumalanga, RSA

A.4. Technical description of the project

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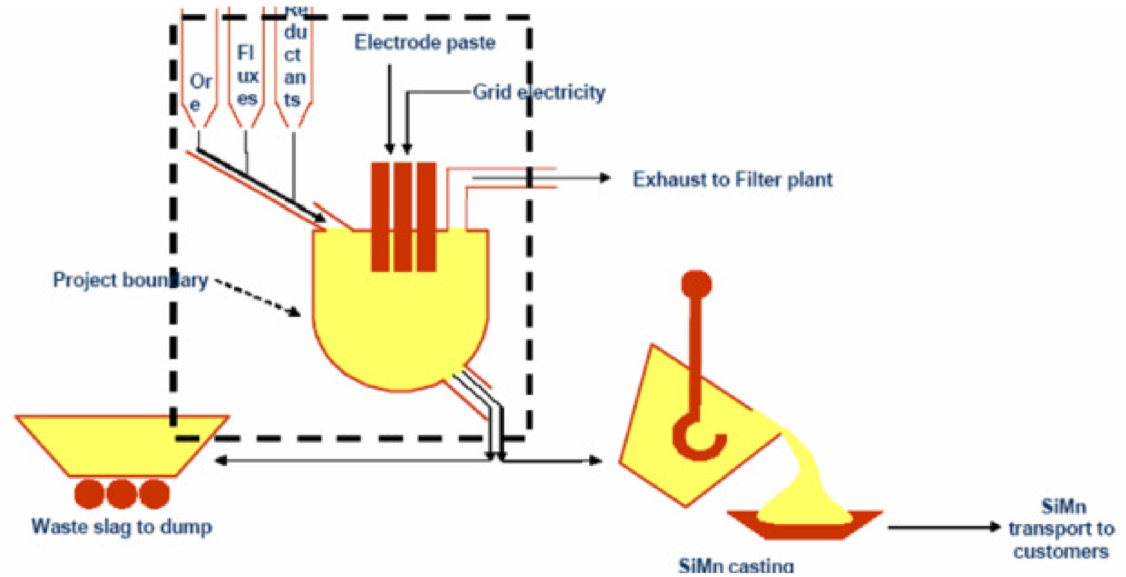
The retrofit of the furnaces consists of the following elements:

- Furnaces 7 and 5: the PCD (pitch centre diameter), which measures the distance between the three electrodes (see figure 3), is optimized in order to reduce electricity consumption. If the PCD is too big, then the furnace requires a higher current density; if the PCD is too small, the outside of the furnaces cools excessively, resulting in operational difficulties. The decision to change this PCD was based on assumptions and mathematical models that still need actual confirmation in practice, as such innovative changes have an important element of uncertainty. Changing this PCD means in particular that all 3 electrode column assemblies as well as the material inlets have to be changed and the existing roofing structure adapted to this new dimensions. For furnace 5, the investment cost is higher as offtake systems (stacks) also have to be changed and new lining and foundations have to be given to the furnace. Pyromet provides the technology for these furnaces, and it is the first time such technology is used for a brownfield project.
- The same principles are applied for furnaces 1, 3, and 6. These units being smaller, the design is a bit different and the elements needed to be changed for the project are not all the same. For instance, #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 – both elements make the scope of this retrofitting unique and challenging. Bateman provide the technology for these furnaces.

Below is a schematic of one furnace, representing input and output of products and energy:



A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

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- AM0038 version 1 - Methodology for improved electrical energy efficiency of an existing submerged electric arc furnace used for the production of SiMn ;
- ACM0002 ver. 6 - Consolidated methodology for grid-connected electricity generation from renewable sources.

A.6. Registration date of the project activity:

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19 October 2007. Prompt start project with crediting period starting 1 October 2004.

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

>>

01 Oct 04 - 30 Sep 14 (Fixed).
There was no post-registration change to the start date of the crediting period.

A.8. Name of responsible person(s)/entity(ies):

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The monitoring report is compiled by EcoSecurities International Ltd.

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SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

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1. The starting date of operation of the project activity.

The project is with phased implementation as it covers 5 furnaces on the project site. The project started operation on 1 October 2004. The retrofit schedule is as per the table below:

Furnace 7	Finished retrofit in September 2004. Operation started on 1 October 2004.
Furnace 3	Finished retrofit in October 2005. Operation started 30 November 2005.
Furnace 5	Finished retrofit in December 2005. Operation started 4 December 2005.
Furnace 6	Originally planned to be retrofitted in 2008, it has been delayed due to poor market conditions. It is still not retrofitted to date.
Furnace 1	Originally planned to be retrofitted in 2009, it has been delayed due to poor market conditions. It is still not retrofitted to date.

2. The information regarding the actual operation of the project activity during this monitoring period

Furnace 3 ran throughout this monitoring period.

Furnace 5 was restarted on 27 July 2009 after a downtime, and after that ran until the end of the monitoring period.

Furnace 7 was restarted on 23 September 2009 after a downtime and after that ran until the end of the monitoring period.

The downtimes for Furnaces 5 and 7 at the beginning of the monitoring period are due to unfavourable market conditions.

3. Events or situations affecting the applicability of the methodology.

No events occurred that affected the applicability of the methodology.

B.2. Revision of the monitoring plan

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The monitoring plan was revised and approved on the 25th October 2009. No other revision is pending.

B.3. Request for deviation applied to this monitoring period

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No request for deviation was applied during this monitoring period.

B.4. Notification or request of approval of changes

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No notification or request of approval of changes has been made.

SECTION C. Description of the monitoring system

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Data collection procedures

The monitored data is collected at different stages of the process and in different parts of the plant, as explained below:

- Amount of SiMn produced and electricity, paste, coke and coal used at the project furnaces is collected from the meters through a DCS system - apart for the paste cylinders that are counted as they are placed into the casings – and displayed on an interface in the control room directly.

The values are entered in the furnace logsheet by the furnace operator. After being checked by the production engineer, the total of the day is then summed and entered in the CDM workbook. To obtain the monthly average weight of the paste cylinders (used to calculate the amount of paste as per monitoring plan) the reading from the weighbridge at the entrance of the facility is recorded into a spreadsheet by the weighbridge personnel every time a new batch arrives at the facility. The monthly total weight and number of cylinders weighed is then entered in the CDM workbook, where the monthly average weight of the paste cylinders is calculated.

- Quality of coal, coke (used to calculate emission factor for coke in the CDM workbook), SiMn, ore and fluxes are obtained through the composition analysis carried out at the laboratory. The results from the laboratory are entered into the CDM workbook.
- Quality of paste is obtained from the supplier. This is then used to calculate emission factor for paste in the CDM workbook.
- Values for grid emission factor and coal emission factor are directly taken from the PDD and entered in the CDM workbook, as specified in the monitoring plan.

Refer to sections D.2 and E for detail of emission reduction calculation.

The monitored parameters data is taken from the CDM workbook and reported in the CDM-MR before verification.

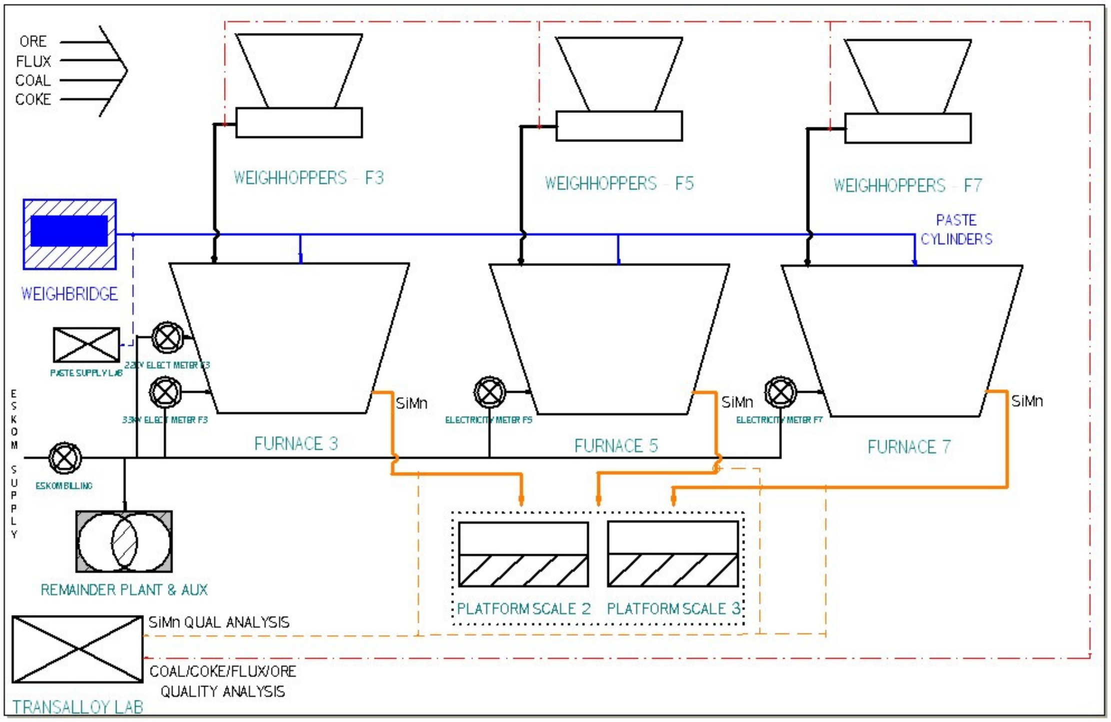
Organizational structure, roles and responsibilities

A CDM manager on site is responsible for organising the monitoring team and making sure that the monitoring system is as per monitoring plan. The furnace operators who collect monitored data report to the production engineer who checks the production data (including CDM monitored data). Laboratory staff who carry out the analyses are organised under a laboratory manager. Maintenance teams are in place at the plant to make sure that the monitoring equipment is maintained and calibrated as per monitoring plan. Roles and responsibilities are clearly defined in the site's procedures that are part of the ISO9001 certified quality management system.

Emergency procedures for the monitoring system

Because all measurements and analysis used for the CDM monitoring of the project are also used for internal reporting, emergency procedures are in place on site to face possible equipment failures.

The metering system is represented in the Line Diagram below:



SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	**QPi**
Data unit:	Tonnes of SiMn/year
Description:	Annual SiMn production for 7 years preceding the project activity
Source of data used:	Project proponent
Value(s) :	see table below
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Additional comment:	Measurement methods are the same as the ones used for QPy,monitored

QPi (tSiMn/y)

Furnace	1	3	5	6	7
1997	21,685	21,930	38,847	22,571	40,685
1998	7,506	9,518	42,005	24,188	42,399
1999	21,779	17,680	35,788	8,238	44,477
2000	18,641	19,731	35,877	21,269	34,862
2001	21,809	22,660	34,843	21,846	31,933
2002	23,349	22,159	41,898	22,618	43,700
2003	21,321	21,601	35,108	21,632	37,717
Total 97-03	136,090	135,279	264,366	142,362	275,773

	(see section D.2)

Data / Parameter:	**ECi**
Data unit:	MWh/year
Description:	Annual grid electricity consumption by the submerged electric arc furnace for 7 years preceding the project activity
Source of data used:	Project proponent
Value(s) :	see table below
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Additional comment:	Measurement methods are the same as the ones used for ECy (see section D.2)

ECi (MWh/y)					
Furnace	**1**	**3**	**5**	**6**	**7**
1997	115,511	115,381	224,774	130,113	231,635
1998	41,735	51,814	248,046	136,458	256,158
1999	111,837	93,474	205,295	44,755	260,410
2000	97,656	100,458	214,388	120,804	208,377
2001	107,293	111,287	168,826	107,474	173,106
2002	109,409	104,833	200,136	119,525	216,880
2003	99,142	99,678	172,039	110,109	192,187
Total 97-03	682,583	676,925	1,433,504	769,238	1,538,753

Data / Parameter:	**Qbcoal,i**
Data unit:	Tonnes of coal/year
Description:	Annual consumption of coal used as reductant in the submerged electric arc furnace for 7 years preceding the project activity
Source of data used:	Project proponent
Value(s) :	see table below
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Additional comment:	Measurement methods are the same as the ones used for Qpcoal,i (see section D.2)

Qbcoal,i (tcoal/y)					
Furnace	**1**	**3**	**5**	**6**	**7**
1997	14,538	15,064	28,939	17,345	31,098
1998	4,494	5,862	33,313	16,586	31,741
1999	13,005	11,529	31,738	5,764	37,165
2000	13,426	13,055	33,574	17,146	31,216
2001	16,304	17,863	31,619	19,936	26,698
2002	16,704	16,871	35,932	20,993	37,788
2003	18,501	19,475	32,739	20,195	33,883
Total 97-03	96,972	99,719	227,854	117,965	229,589

Data / Parameter:	**Qbcoke,i**
Data unit:	Tonnes of coke/year
Description:	Annual consumption of coke used as reductant in the submerged electric arc furnace for 7 years preceding the project activity
Source of data used:	Project proponent
Value(s) :	see table below
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Additional comment:	Measurement methods are the same as the ones used for Qpcoke,i (see section D.2)

Qbcoke,i (tcoke/y)					
Furnace	**1**	**3**	**5**	**6**	**7**
1997	1,480	1,718	3,644	1,734	3,702
1998	554	803	3,361	2,245	4,172
1999	1,652	1,479	2,986	788	3,517
2000	1,234	1,409	2,656	1,687	2,085
2001	1,163	1,234	1,151	1,002	1,964
2002	563	836	2,247	823	1,880
2003	1,011	973	1,507	1,118	1,689
Total 97-03	7,657	8,452	17,552	9,397	19,009

Data / Parameter:	**Qbpaste,i**
Data unit:	Tonnes of paste/year
Description:	Annual consumption of electrode paste used as electrode in the submerged electric arc furnace for 7 years preceding the project activity
Source of data used:	Project proponent
Value(s) :	see table below
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Additional comment:	Measurement methods are the same as the ones used for Qppaste,i (see section D.2)

Qbpaste,i (tpaste/y)					
Furnace	**1**	**3**	**5**	**6**	**7**
1997	1,127	1,136	2,123	1,175	2,023
1998	350	487	2,344	1,275	2,045
1999	1,086	946	1,763	417	2,123
2000	1,032	104	2,045	1,143	2,009
2001	1,141	1,147	2,031	958	1,543
2002	1,029	1,025	1,968	975	1,739
2003	1,097	956	1,690	1,028	1,721
Total 97-03	6,862	5,801	13,964	6,971	13,203

Data / Parameter:	**EFbcoal,i**
Data unit:	tCO2/tcoal

Description:	Emission factor applied for the coal consumed as reductant based on carbon content
Source of data used:	IPCC (2006) – Vol3, Ch4, section 4.3.3.2, table 4.6 page 4.37
Value(s) :	**EFbcoal,i (tCO2/tcoal)** 3.1 | tCO2/tcoal *Source: IPCC (2006) Vol3, Ch4, p4.37, Table 4.6*
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Additional comment:	Project specific values cannot be used because previous coal carbon contents monitoring didn't enable a calculation of EFbcoal (several coal types have been used and no weighed average can be done).

Data / Parameter:	**EFbcoke,i**
Data unit:	tCO2/tcoke
Description:	Emission factor applied for the coke consumed as reductant based on carbon content
Source of data used:	Project proponent
Value(s) :	see table below
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Additional comment:	Measurement methods are the same as the ones that will be used for EFpcoke,y (see section D.2)

EFbcoke,i (tCO2/tcoke)	
Year	**EF**
1997	3.09
1998	3.13
1999	3.10
2000	3.12
2001	3.15
2002	3.17
2003	3.19
Average 97-03	3.13

Data / Parameter:	**EFbpaste,i**
Data unit:	tCO2/t of carbon paste
Description:	Emission factor applied for the electrode paste consumed as electrode based on carbon content
Source of data used:	Paste supplier
Value(s) :	3.32
Indicate what the data are	Baseline emission calculations

<table>
<tr><td>used for (Baseline/ Project/ Leakage emission calculations)</td><td></td></tr>
<tr><td>Additional comment:</td><td>
The paste supplier supplied the following information on the composition of the paste:
<table>
<tr><th>PROPERTY</th><th>UNIT</th><th>STANDARD</th><th>TYPICAL</th></tr>
<tr><td>Ash Content</td><td>%</td><td><6 - 7</td><td>6.4</td></tr>
<tr><td>Volatile Matter</td><td>%</td><td>13 - 15</td><td>13.6</td></tr>
<tr><td>Fixed Carbon Content</td><td>%</td><td>> 79</td><td>79.8</td></tr>
</table>

The emission factor is then calculated using equation 4.19, p4.33 of IPCC (2006):

EQUATION 4.19
CARBON CONTENT OF FERROALLOY REDUCING AGENTS
Total C-content in reducing agent i = Fix C in i + Content of volatiles in i • Cv

Where:
Cv = Carbon content in volatiles. Unless other information is available, Cv = 0.65 is used for coal and 0.80 for coke.

We take for Cv the same value as for coke (0.80), given that the characteristics of the paste are similar to that of the coke:
- 78.5% of the paste is anthracite, which is a form of coal with high calorific value and carbon content (like coke)
- 21.5% or the paste is the binder, which itself is composed of a minimum of 45% of coking-value.

Therefore the total carbon content of the paste is 79.8 + 13.6 * 0.80 = 90.68tC/tpaste, and EFbpaste=3.32tCO2/tpaste. This value is still lower than the IPCC value of 3.4.
</td></tr>
</table>

D.2. Data and parameters monitored

Data / Parameter:	**QPy,monitored**
Data unit:	Tonnes of SiMn
Description:	Quantity of SiMn production
Measured /Calculated /Default:	Measured
Source of data:	Weighing platforms 2 and 3
Value(s) of monitored parameter:	F3 = 15,669 F5 = 25,645 F7 = 19,989
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline and Project emission calculations
Monitoring equipment (type,	Weighing platforms 2 and 3, calibrated daily following the internal

accuracy class, serial number, calibration frequency, date of last calibration, validity)	procedure SOP:SiMn161, as per manufacturer's requirements. The accuracy of the weighing platforms is 2.5%.
Measuring/ Reading/ Recording frequency:	The data is recorded at every tapping of the furnaces. Daily total is recorded daily.
Calculation method (if applicable):	Daily total is obtained by summing data from all tappings that occurred on that day.
QA/QC procedures applied:	The measured data correlates satisfactorily with the product sales record during this Monitoring Period. Product sales plus stock accounts for 72,126t, a further 16,720t of Total Furnace Production is accounted for by fines generated during processing (these fines cannot be sold). Thus product sales + stock + fines is within 3% of Total Furnace production during this period (which is 86,017t – that includes the project furnaces plus Furnaces 1 and 6 that also produce SiMn).

Data / Parameter:	**ECy**
Data unit:	MWh
Description:	Grid electricity consumption by the submerged electric arc furnace
Measured /Calculated /Default:	Measured
Source of data:	Electricity meter
Value(s) of monitored parameter:	F3 = 65,720 F5 = 117,976 F7 = 83,350
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The electricity meters are calibrated every 5 years to ensure optimal accuracy, in line with manufacturer's requirements and national standards.
Measuring/ Reading/ Recording frequency:	An electricity meter per project furnace measures continuously the electricity consumed. The value is recorded daily.
Calculation method (if applicable):	
QA/QC procedures applied:	Values reported are cross-checked with electricity metered monthly by the grid company ESKOM. The two values correlate satisfactorily during this Monitoring Period wherein the two monitoring sources demonstrate a correlation coefficient of 99.7% The total difference over the period was 10,051MWh, or 2.4%, which was due to a malfunction in Eskom's metering equipment.

Furnace	Serial number	Accuracy class	Calibration date	Valid until
F3 – 22kV	06470035	0.5	24/11/2006	23/11/2011
F3 – 33kV	00061498	1	25/04/2008	24/04/2013
F5	06460054	0.5	22/11/2006	21/11/2011
F7	06390018	0.5	28/09/2006	27/09/2011

Data / Parameter:	**Qpcoal,y**
Data unit:	Tonnes of coal
Description:	Consumption of coal used as reductant in the submerged electric arc furnace
Measured /Calculated /Default:	Measured
Source of data:	Load cells based weigh hoppers
Value(s) of monitored parameter:	F3 = 11,922 F5 = 19,917 F7 = 15,688
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The load cells based weigh hoppers are maintained regularly and tested weekly for accuracy according to internal procedure TAOP230 in line with the manufacturer's requirements.
Measuring/ Reading/ Recording frequency:	The amount of coal used in the project furnaces is metered by weigh hoppers and is automatically summed and recorded daily per furnace.
Calculation method (if applicable):	
QA/QC procedures applied:	In addition Procedure SiMn300 is applied to all logsheets which stipulates the procedure for Supervisors to ensure data has been captured correctly.

Data / Parameter:	**Qpcoke,y**
Data unit:	Tonnes of coke
Description:	Consumption of coke used as reductant in the submerged electric arc furnace
Measured /Calculated /Default:	Measured
Source of data:	Load cells based weigh hoppers
Value(s) of monitored parameter:	F3 = 78 F5 = 1,205 F7 = 986
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The load cells based weigh hoppers are maintained regularly and tested weekly for accuracy according to internal procedure TAOP230 in line with the manufacturer's requirements.
Measuring/ Reading/	The amount of coke used in the project furnaces is metered by weigh

Recording frequency:	hoppers and is automatically summed and recorded daily per furnace.
Calculation method (if applicable):	
QA/QC procedures applied:	In addition Procedure SiMn300 is applied to all logsheets which stipulates the procedure for Supervisors to ensure data has been captured correctly.

<table>
<tr><th>Data / Parameter:</th><th>Qppaste,y</th></tr>
<tr><td>Data unit:</td><td>Tonnes of paste</td></tr>
<tr><td>Description:</td><td>Consumption of electrode paste used as electrode in the submerged electric arc furnace</td></tr>
<tr><td>Measured /Calculated /Default:</td><td>Measured and calculated</td></tr>
<tr><td>Source of data:</td><td>Weighbridge (for the weight of the cylinders) and production log (for the number of cylinders)</td></tr>
<tr><td>Value(s) of monitored parameter:</td><td>F3 = 515
F5 = 1,053
F7 = 818</td></tr>
<tr><td>Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)</td><td>Project emission calculations</td></tr>
<tr><td>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</td><td>The weighbridge is calibrated in line with the manufacturer's requirements as detailed in the table below:
<table>
<tr><th>Serial number</th><th>Accuracy</th><th>Calibration date</th><th>Valid until</th></tr>
<tr><td rowspan="2">991019</td><td rowspan="2">0.2%</td><td>20/01/2009</td><td>19/01/2011</td></tr>
<tr><td>28/01/2010</td><td>27/01/2012</td></tr>
</table></td></tr>
<tr><td>Measuring/ Reading/ Recording frequency:</td><td>The number of paste cylinders put into the electrode is logged each time a new cylinder is used.
The weight of the cylinders is obtained by 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.
The annual figure is obtained by summing the daily product of number of cylinders used and monthly average weight.</td></tr>
<tr><td>Calculation method (if applicable):</td><td>The annual figure is obtained by summing the daily product of number of cylinders used and monthly average weight.</td></tr>
<tr><td>QA/QC procedures applied:</td><td>Average weight of each cylinder is compared to indications of the supplier. The figures match the supplier's indications within 0.12%for the 700mm cylinders used in furnaces 7 and 5 and 0.08% for the 500mm cylinders used in furnace 3. The result of this cross check is satisfactory as measurements are made by two different weighbridges once the paste has been loaded onto the delivery truck.</td></tr>
</table>

Data / Parameter:	**EFpcoal,y**

Data unit:	tCO2/t coal
Description:	Emission factor applied for the coal consumed as reductant in year y
Measured /Calculated /Default:	Default
Source of data:	IPCC (2006) – Vol3, Ch4, section 4.3.3.2, table 4.6 page 4.37
Value(s) of monitored parameter:	3.1
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	The 2006 IPCC value of 3.1tCO2/t coal is used in the project. If new IPCC guidelines are released, this value may be updated according to latest relevant EB guidance.
Calculation method (if applicable):	
QA/QC procedures applied:	IPCC data is used to ensure consistency with the emission factor used in the baseline.

Data / Parameter:	**EFpcoke,y**
Data unit:	tCO2/t coke
Description:	Emission factor applied for the coke consumed as reductant in year y
Measured /Calculated /Default:	Calculated
Source of data:	Calculated based on: - Carbon content and volatiles proportion sourced from laboratory analyses. - Carbon content of volatiles from IPCC (2006).
Value(s) of monitored parameter:	**2009**: 3.01; **2010**: 2.97
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if	Coke samples are prepared at Transalloys and sent to the laboratory

applicable):	for analysis of volatile and fix carbon content. 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): EQUATION 4.19 CARBON CONTENT OF FERROALLOY REDUCTING AGENTS Total C-content in reducing agent i = Fix C in i + Content of volatiles in i • Cv Where: Cv = Carbon content in volatiles. Unless other information is available, Cv = 0.65 is used for coal and 0.80 for coke. The annual emission factor is calculated as the average of monthly emission factors and used for emission calculations.
QA/QC procedures applied:	Lab analyses are done according to national SABS standards. When values are missing or inconsistent for some months, the average of previous and next 3 months are used.

Data / Parameter:	**EFppaste,y**
Data unit:	tCO2/t of carbon paste
Description:	Emission factor applied for the electrode paste consumed as electrode in year y
Measured /Calculated /Default:	Calculated
Source of data:	Calculated from supplier's analyses and/or IPCC.
Value(s) of monitored parameter:	**2009**: 3.33 **2010**: 3.43
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	This emission factor is calculated using equation 4.19, p4.33 of IPCC (2006): EQUATION 4.19 CARBON CONTENT OF FERROALLOY REDUCTING AGENTS Total C-content in reducing agent i = Fix C in i + Content of volatiles in i • Cv Where: Cv = Carbon content in volatiles. Unless other information is available, Cv = 0.65 is used for coal and 0.80 for coke.

	Fix carbon and volatiles content analyses are obtained from the supplier. Carbon content in the volatiles (Cv) is not available in these analyses hence in accordance with the monitoring plan the same value as for the coke of 80% is used. For the months when supplier analysis reports are not available, the conservative value of 3.67 tCO2/t suggested by the methodology AM0038 v1 is used.
QA/QC procedures applied:	The annual emission factor obtained is compared to $EF_{bpaste,y}$ (3.32 tCO2/t) and the maximum between the two values is taken for $EF_{ppaste,y}$. In case a monthly analysis is not available the conservative value 3.67 tCO2/t is used for that month.

Data / Parameter:	**Quality of coalp**
Data unit:	Mass fraction of each component (%m/m)
Description:	Quality of coal based on elementary analysis and other relevant properties
Measured /Calculated /Default:	Calculated
Source of data:	Analysis report from internal laboratory
Value(s) of monitored parameter:	N/A
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	N/A
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	Laboratory analyses are carried out at least monthly and fixed carbon, volatiles, S and P contents are reported.
QA/QC procedures applied:	Lab analyses are done according to national SABS standards.

Data / Parameter:	**Quality of cokep**
Data unit:	Mass fraction of each component (%m/m)
Description:	Quality of coke based on elementary analysis and other relevant properties
Measured /Calculated /Default:	Calculated
Source of data:	Analysis report from internal laboratory
Value(s) of monitored parameter:	N/A
Indicate what the data are used for (Baseline/ Project/	N/A

Leakage emission calculations)	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	Laboratory analyses are carried out at least monthly and fixed carbon, volatiles, S and P contents are reported.
QA/QC procedures applied:	Lab analyses are done according to national SABS standards.

Data / Parameter:	**Quality of electrode pastep**
Data unit:	Mass fraction of each component (%m/m)
Description:	Quality of electrode paste based on elementary analyses and other relevant properties
Measured /Calculated /Default:	Calculated
Source of data:	Supplier
Value(s) of monitored parameter:	N/A
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	N/A
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	N/A
Calculation method (if applicable):	This is based on supplier's laboratory analyses reports.
QA/QC procedures applied:	The IPCC 2006 Volume 3 p.4.38 Table 4.6 "CO2 Emission Factors for Ferroalloy Production" gives a typical emission factor of $3.4tCO2/t_{paste}$. When new paste analyses are received it is checked that the characteristics measured correspond reasonably to this value. As a result it was found over this monitoring period that the paste analysis corresponds within 2.1%(2009 value, 0.9% for 2010) to this IPCC value. This is reasonable as these are project specific measurements and any measurement uncertainty is covered conservatively by the 9% reduction on overall onsite emission reduction.

Data / Parameter:	**EFy,offsite**
Data unit:	tCO2/MWh
Description:	Grid emission factor

Measured /Calculated /Default:	Calculated
Source of data:	Registered PDD
Value(s) of monitored parameter:	The factor of 1.221tCO2/MWh is used during the whole crediting period.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline and project emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Once for the crediting period
Calculation method (if applicable):	The Grid electricity emission factor (EFy,offsite in tCO2e/MWh) for South Africa is established ex ante according to ACM0002 v6.
QA/QC procedures applied:	

Data / Parameter:	**Quality of SiMnp**
Data unit:	Mass fraction of each component (%m/m)
Description:	Quality of SiMn produced during the project activity
Measured /Calculated /Default:	Calculated
Source of data:	Analysis report from internal laboratory
Value(s) of monitored parameter:	N/A
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	N/A
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Daily
Calculation method (if applicable):	A sample is lab analysed daily to ensure that the quality remains between pre-determined specifications for Mn, C, Si, P and S.
QA/QC procedures applied:	Lab analyses are undertaken to national SABS standards to ensure accuracy. Results are reviewed and anomalous results investigated.

Data / Parameter:	**Quality of ore**
Data unit:	Mass fraction of each component (%m/m)
Description:	Quality of ore
Measured /Calculated	Calculated

/Default:	
Source of data:	Analysis report from internal laboratory
Value(s) of monitored parameter:	N/A
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	N/A
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	A sample is lab analysed monthly to determine the composition of the ore (e.g. contents in Mn, Fe, SiO_2, CaO)
QA/QC procedures applied:	Lab analyses are undertaken to national SABS standards to ensure accuracy. Results are reviewed and anomalous results investigated.

Data / Parameter:	**Quality of fluxes**
Data unit:	Mass fraction of each component (%m/m)
Description:	Quality of fluxes
Measured /Calculated /Default:	Calculated
Source of data:	Analysis report from internal laboratory
Value(s) of monitored parameter:	N/A
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	N/A
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	A sample of each type of flux is lab analysed at least monthly when new batches are used. During this monitoring period only pellets are considered as flux, slag not being re-introduced in the furnace any more during this monitoring period.
QA/QC procedures applied:	Lab analyses are undertaken to national SABS standards to ensure accuracy. Results are reviewed and anomalous results investigated.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>
The calculation of baseline emissions applying actual values and including formulae used is included in the spreadsheet provided.

E.2. Project emissions calculation

>>
The calculation of project emissions applying actual values and including formulae used is included in the spreadsheet provided.

E.3. Leakage calculation

>>
The calculation of leakage emissions applying actual values and including formulae used is included in the spreadsheet provided.

E.4. Emission reductions calculation / table

>>

Monitoring Period 3	UNIT	2009	2010	TOTAL	Formulas involved
Furnace 3					
Baseline emissions BE_{F3}	tCO_2e	84,386	28,129	112,514	1
Project emissions PE_{F3}	tCO_2e	72,500	25,622	98,122	2
Leakage L_{F3}	tCO_2e	0	0	0	3
Emission reduction ER_{F3}	**tCO_2e**	**11,886**	**2,506**	**14,392**	4
Onsite Emission reduction (for uncertainty) $ER_{y,onsite,F3}$	tCO_2e	1,471	308	1,779	5
Furnace 5					
Baseline emissions BE_{F5}	tCO_2e	180,002	60,905	240,907	1
Project emissions PE_{F5}	tCO_2e	153,133	53,460	206,593	2
Leakage L_{F5}	tCO_2e	0	0	0	3
Emission reduction ER_{F5}	**tCO_2e**	**26,869**	**7,445**	**34,314**	4
Onsite Emission reduction (for uncertainty) $ER_{y,onsite,F5}$	tCO_2e	7,558	1,699	9,257	5
Furnace 7					
Baseline emissions BE_{F7}	tCO_2e	116,163	64,141	180,304	1
Project emissions PE_{F7}	tCO_2e	95,862	48,858	144,720	2
Leakage LE_{F7}	tCO_2e	0	0	0	3
Emission reduction ER_{F7}	**tCO_2e**	**20,301**	**15,284**	**35,585**	4
Onsite Emission reduction (for uncertainty) $ER_{y,onsite,F7}$	tCO_2e	1034	3002	4,035	5
TOTAL					
Baseline Emissions BE	tCO2	380,550	153,175	**533,725**	6
Project Emissions PE	tCO2	321,495	127,940	**449,435**	7
Leakage L	tCO2	0	0	**0**	8
Emission Reductions (without uncertainty adjustment component)	**tCO2**	**59,055**	**25,235**	**84,291**	9
Onsite Emission reduction (for uncertainty adjutment) $ER_{onsite,y}$	tCO2	10,062	5,009	**15,071**	10
Uncertainty adjustment component (emissions to be deducted for uncertainty if $ER_{onsite,y}$>0	tCO2	906	451	**1,356**	11
Emission Reductions (with uncertainty adjustment component)	**tCO2**	**58,150**	**24,785**	**82,934**	12

Formulas involved:

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

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

>>

This section shall include a comparison of actual values of the emission reductions achieved during the monitoring period with the estimations in the registered CDM-PDD.

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	**66,553**[1]	**82,934**[2]

E.6. Remarks on difference from estimated value in the PDD

>>

The forecasted emission reduction in the PDD for the period 2009-2010 is 66,553tCO2e/year. When this is reduced to the current length of monitoring period of 8 months the forecast comes to 44,368tCO2e. During this monitoring period the emission reductions amount to 82,934tCO2e, which exceeds the forecast by 87%. The reasons for this difference are detailed below.

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[1] Per annum

[2] For the 8 months covering the monitoring period

1. **On-site emission reductions.** On-site emission reductions (due to consumption of coal, coke and paste) are 13,715tCO_2[3], due to a specific emission factor of 2.65 tCO_2/tSiMn in the project, which is lower than the 2.93 tCO_2/SiMn factor in the baseline. The methodology requires including on-site emissions in the project boundary although it was assumed in the PDD that they would not be affected. This methodology requirement reduces the difference from 87% to 56%.

2. **Higher electricity savings during the monitoring period than 0.4 MWh/tSiMn originally forecasted in the PDD estimates.**

    a. **Methodology effect on baseline electricity consumption**. PDD estimates of reductions in specific electricity consumption assumed a value of 0.4 MWh/tSiMn. The methodology established a baseline consumption of 5.4 MWh/tSiMn (based on data from 1997-2003) however when the electricity saving of 0.4 MWh/tSiMn was estimated at time of decision making (2003) by the project developer the specific consumption was 4.91 MWh/tSiMn. When validation started in November 2006 it was appropriate to keep the 0.4 MWh/tSiMn savings compared to the 7 years baseline level of 5.4 MWh/tSiMn in view of the monitoring data available at the time. If the estimated saving of 0.4 MWh/tSiMn had been increased by the difference between the specific consumption level of 2003 alone (4.91 MWh/tSiMn) and the one obtained by the methodology required longer baseline of 7 years (5.4 MWh/tSiMn) the saving would have been estimated at 0.4 + 0.49 = 0.89 MWh/tSiMn. Or, seen from the other end, if the baseline used for this monitoring period was based on the 2003 specific electricity consumption of 4.91 MWh/tSiMn instead of the 7 years baseline the difference between emission reductions claimed and PDD estimates would change from 56% to -18% as shown in the table below.

    b. **Higher electricity savings during the monitoring period**. Compared to PDD estimates of 0.4MWh/t electricity savings, the project achieved 0.55MWh/t (compared to the 2003 baseline). This effect changes the difference from -18% to -38% as shown in the table below.

3. **Delay of Furnace 1 & 6 retrofit**. In the PDD we 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). This narrows the gap between the estimated and reported emission reductions from -38% to -13%.

4. **Lower SiMn production during the monitoring period**. The PDD estimates are based on an annual SiMn production of 96,488 t which corresponds to 64,326tSiMn over a period equal to the length of this monitoring period. However, only 61,303 tSiMn have been produced during this monitoring period, hence reducing CERs and bringing the difference from -13% to 0%.

[3] 15,071 tCO_2 minus 9% discount for uncertainty

	All furnaces			
	PDD forecast	Monitoring report value	Difference	%
Start assumptions	44,368	82,934	38,566	87%
After adjustment for on-site emissions	44,368	69,219	24,851	56%
After adjustment for baseline electricity consumption factor	44,368	36,306	- 8,062	-18%
After adjustment for project electrical efficiency	44,368	27,467	- 16,901	-38%
After adjustment for furnace 1 & 6 retrofit being delayed	31,416	27,467	- 3,949	-13%
After adjustment for difference in production	31,416	31,416	- 0	0.0%

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History of the document

Version	Date	Nature of revision
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory **Document Type**: Guideline, Form **Business Function**: Issuance		