

**CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006**

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B.7 Application of the monitoring methodology and description of the monitoring plan:

B.7.1. Data and parameters monitored:

Preliminary note:

As mentioned in section B.6.3, expected emission reductions are calculated by assuming the following:

- $QP_{y,monitored} = QP_{historic}$
- $EF_{y,onsite} = EF_{b,onsite}$ (tCO₂e/SiMn)
- $EF_{y,offsite} = EF_{b,offsite}$ (tCO₂/MWh)
- $sec_{p,y} = sec_b - 0.4$ (MWh/tSiMn) i.e. savings of 0.4MWh/tSiMn in the project.

The value of $QP_{historic}$, $EF_{b,onsite}$, $EF_{b,offsite}$ and sec_b –are given in table 9.

This means that:

- Activity data (EC_y , $Q_{pcoal,y}$, Q_{pcoke} , Q_{ppaste}) are based on the same specific consumptions as in the baseline (except EC_y which is adjusted by the electricity savings of the project) and multiplied by $QP_{historic}$.
- Emission factors (EF_{pcoal} , EF_{pcoke} , EF_{ppaste}) are equal to the average emission factors in the baseline and Grid emission factor ($EF_{y,offsite}$) is the same as in the baseline

Data / Parameter:	$QP_{y,monitored}$
Data unit:	Tonnes of SiMn/year
Description:	Quantity of SiMn production in year y during the project activity
Source of data to be used:	Project proponent
Value of data applied for the purpose of calculating expected emission reductions in section B.5	We assume that $QP_{y,monitored} = QP_{historic}$ (see preliminary note above).
Description of measurement methods and procedures to be applied:	Data will be monitored at each tapping of the furnace i.e. at each “production run” by weighing metal ladles on a weighing platform and aggregated daily. The weighing platform will be maintained and calibrated regularly in line with the manufacturer’s requirements.
QA/QC procedures to be applied:	Measured data will be cross-checked with product sales records.
Any comment:	

Data / Parameter:	EC_y
Data unit:	MWh/year
Description:	Annual grid electricity consumption by the submerged electric arc furnace
Source of data to be used:	Project proponent
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See preliminary note above.

Description of measurement methods and procedures to be applied:	Electricity consumption will be metered continuously on individual furnaces by an electricity meter and recorded monthly. The meters will be maintained and calibrated regularly in line with the manufacturer's requirements.
QA/QC procedures to be applied:	Consumption of each furnace will be cross-checked monthly with total electricity bills.
Any comment:	

Data / Parameter:	Q_{pcoal,y}
Data unit:	Tonnes of coal/year
Description:	Annual consumption of coal used as reductant in the submerged electric arc furnace
Source of data to be used:	Project proponent
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See preliminary note above.
Description of measurement methods and procedures to be applied:	The amount of coal put in each batch is weighed in hoppers with load cells, and recorded daily. The load cells will be maintained and calibrated regularly in line with the manufacturer's requirements.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	Q_{pcoke,y}
Data unit:	Tonnes of coke/year
Description:	Annual consumption of coke used as reductant in the submerged electric arc furnace
Source of data to be used:	Project proponent
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See preliminary note above.
Description of measurement methods and procedures to be applied:	The amount of coke put in each batch is weighed in hoppers with load cells, and recorded daily. The load cells will be maintained and calibrated regularly in line with the manufacturer's requirements.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	Q_{ppaste,y}
Data unit:	Tonnes of paste/year

Description:	Annual consumption of electrode paste used as electrode in the submerged electric arc furnace
Source of data to be used:	Project proponent
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See preliminary note above.
Description of measurement methods and procedures to be applied:	<p>The number of paste cylinders put into the electrode is logged each time a new cylinder is used.</p> <p>The average weight of each cylinder is calculated based on weighing paste trucks (arriving at the facility) on a weighbridge and dividing on a monthly basis the total weight by number of cylinders delivered to the facility.</p> <p>The annual figure is obtained by summing the daily product of number of cylinders used and monthly average weight.</p>
QA/QC procedures to be applied:	The weighbridge will be maintained and calibrated regularly in line with the manufacturer's requirements to ensure its accuracy. Average weight of each cylinder will be compared to indications of the supplier.
Any comment:	

Data / Parameter:	EF_{pcoal,y}
Data unit:	tCO ₂ /t coal
Description:	Emission factor applied for the coal consumed as reductant in year y
Source of data to be used:	IPCC (2006) – Vol3, Ch4, section 4.3.3.2, table 4.6 page 4.37
Value of data applied for the purpose of calculating expected emission reductions in section B.5	<p>3.1</p> <p>See preliminary note above.</p>
Description of measurement methods and procedures to be applied:	<p>The 2006 IPCC value of 3.1tCO₂/t coal will be used in the project.</p> <p>If new IPCC guidelines are released, this value may be updated according to latest relevant EB guidance.</p>
QA/QC procedures to be applied:	
Any comment:	IPCC data will be used to ensure consistency with the emission factor used in the baseline. Note that each coal type used has a historically measured emission factor that is lower than IPCC values, and therefore taking project-specific values for EF _{pcoal,y} would not be conservative. Moreover, a correct project value for EF _{pcoal,y} is not available because the amount of each type of coal used in the project is not monitored at the entrance of each project furnace hence a weighted average of EF _{pcoal,y} is impossible to obtain.

Data / Parameter:	EF_{pcoke,y}
Data unit:	tCO ₂ /t coke
Description:	Emission factor applied for the coke consumed as reductant in year y
Source of data to be	Carbon content provided by laboratory analyses

used:	Carbon content of volatiles from IPCC (2006)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See preliminary note above.
Description of measurement methods and procedures to be applied:	<p>Coke samples are prepared at Transalloys and sent to the laboratory (at the moment from neighbouring facility at Highveld) for analysis of volatile and fix carbon content. Monthly averages of carbon contents are used for the calculation of a monthly emission factor.</p> <p>This emission factor is calculated using equation 4.19, p4.33 of IPCC (2006):</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;">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</p> </div> <p>Where: Cv = Carbon content in volatiles. Unless other information is available, Cv = 0.65 is used for coal and 0.80 for coke.</p> <p>The annual emission factor is calculated as the average of monthly emission factors and used for emission calculations.</p>
QA/QC procedures to be applied:	<p>Lab analyses are done according to applicable national and international standards.</p> <p>If values are missing or inconsistent for some months, the average of previous and next 3 months will be used.</p>
Any comment:	This project-specific approach is preferred to IPCC values

Data / Parameter:	EF_{ppaste,y}
Data unit:	tCO ₂ /t of carbon paste
Description:	Emission factor applied for the electrode paste consumed as electrode in year y
Source of data to be used:	Supplier or independent laboratory (and IPCC/external literature reference)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	<p>3.32</p> <p>See preliminary note above</p>
Description of measurement methods and procedures to be applied:	<p>This emission factor will be calculated using equation 4.19, p4.33 of IPCC (2006):</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;">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</p> </div> <p>Where: Cv = Carbon content in volatiles. Unless other information is available, Cv = 0.65 is used for coal and 0.80 for coke.</p> <p>Fix carbon and volatiles content will be taken from the supplier. Carbon content in the volatiles (Cv) will be taken from supplier if available; if not available, the same Cv as for coke will be taken (see the justification in the table of EF_{bpaste}).</p>
QA/QC procedures to	This project-specific value will be compared to EF _{bpaste,y} and the maximum

be applied:	between the two values will be taken for $EF_{ppaste,y}$.
Any comment:	An analysis on the paste used will be carried out monthly hence this parameter will be updated monthly. In case a monthly analysis is not available the conservative value 3.67 tCO ₂ /t will be 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
Source of data to be used:	Project proponent
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable
Description of measurement methods and procedures to be applied:	Fixed carbon, volatiles, S and P contents will be monitored at the start of the project activity. This will be done by lab analyses according to applicable national and international standards.
QA/QC procedures to be applied:	Project proponent's lab analyses are preferred to supplier's data and are used to determine the emission factor of the coal $EF_{pcoal,y}$.
Any comment:	This will be monitored on a monthly basis.

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
Source of data to be used:	Project proponent
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable
Description of measurement methods and procedures to be applied:	Fixed carbon, volatiles, S and P contents will be monitored monthly. This will be done by lab analyses according to applicable national and international standards.
QA/QC procedures to be applied:	Project proponent's lab analyses are preferred to supplier's data and are used to determine the emission factor of the coal $EF_{pcoal,y}$.
Any comment:	

Data / Parameter:	Quality of electrode pastep
Data unit:	Text
Description:	Quality of electrode paste based on elementary analyses and other relevant properties
Source of data to be used:	Supplier
Value of data applied	Not applicable

for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	The quality of the paste will be taken from supplier's data at the time of purchase
QA/QC procedures to be applied:	Results will be compared to factors supplied by IPCC or other suppliers
Any comment:	

Data / Parameter:	EF_{y,offsite}										
Data unit:	tCO ₂ /MWh										
Description:	Grid emission factor										
Source of data to be used:											
Value of data applied for the purpose of calculating expected emission reductions in section B.5	<p>The following table gives the results of the calculation of Operating margin, Build margin and Combined margin:</p> <p>Table 8: Grid electricity emission factor calculations</p> <table border="1"> <thead> <tr> <th colspan="2">Results</th></tr> <tr> <th>EF</th><th>tCO₂/MWh</th></tr> </thead> <tbody> <tr> <td>OM</td><td>1.195</td></tr> <tr> <td>BM</td><td>1.248</td></tr> <tr> <td>CM</td><td>1.221</td></tr> </tbody> </table> <p>The factor of 1.221tCO₂/MWh will be used during the whole crediting period.</p>	Results		EF	tCO ₂ /MWh	OM	1.195	BM	1.248	CM	1.221
Results											
EF	tCO ₂ /MWh										
OM	1.195										
BM	1.248										
CM	1.221										
Description of measurement methods and procedures to be applied:	The Grid electricity emission factor (EF _{y,offsite} in tCO _{2e} /MWh) for South Africa is established ex ante according to ACM0002. Methodological choices are described in section B.6.1 and detail of the data and assumptions used is provided in Annex 3.										
QA/QC procedures to be applied:	Transparent data is available and referenced. For some parameters where no data is available, conservative assumptions are made.										
Any comment:											

Data / Parameter:	Quality of SiMnp
Data unit:	Text
Description:	Quality of SiMn
Source of data to be used:	Project proponent
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable
Description of	A sample will be lab analysed daily to ensure that the quality remains between

measurement methods and procedures to be applied:	pre-determined specifications for Mn, C, Si, P and S.
QA/QC procedures to be applied:	Lab analyses will be undertaken to national or international standards to ensure accuracy
Any comment:	

Data / Parameter:	Quality of ore
Data unit:	Text
Description:	Quality of ore
Source of data to be used:	Project proponent
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable
Description of measurement methods and procedures to be applied:	A sample will be lab analysed at least monthly to determine the composition of the ore (e.g. contents in Mn, Fe, SiO ₂ , CaO)
QA/QC procedures to be applied:	Lab analyses will be undertaken to national or international standards to ensure accuracy
Any comment:	

Data / Parameter:	Quality of fluxes
Data unit:	Text
Description:	Quality of fluxes
Source of data to be used:	Project proponent
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable
Description of measurement methods and procedures to be applied:	A sample will be lab analysed at least monthly to determine the composition of the ore (e.g. contents in Mn, Fe, SiO ₂ , CaO)
QA/QC procedures to be applied:	Lab analyses will be undertaken to national or international standards to ensure accuracy
Any comment:	

B.7.2 Description of the monitoring plan:
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The monitoring plan gives the actions necessary to record all the variables and factors required by methodology AM0038, version 1, 30 September 2006 (no monitoring is required for the grid emission factor calculation according to ACM0002).

The plan is based on the detailed information contained in section B.7.1 above. Most of the monitoring requirements of the methodology are in line with the kind of information routinely collected by Transalloys, so internalising the procedures should be simple and straightforward. The ISO 14001 management system implemented by Transalloys and its parent company Highveld will also help ensure that quality procedures are in place.

All data will be archived electronically, and backed up regularly. It will be kept for the full crediting period, plus two years after the end of the crediting period or the last issuance of CERs for this project activity (whichever occurs later).

Project staff will be trained regularly in order to satisfactorily fulfill their monitoring obligations. The authority and responsibility for project management, monitoring, measurement and reporting will be agreed between the project participants and formalised. Detailed procedures for calibration of monitoring equipment, maintenance of monitoring equipment and installations, and for record handling will be established. Specific procedures for CDM monitoring, GHG internal auditing and reporting will be agreed between Transalloys and EcoSecurities and incorporated into the existing Quality assurance system.

The table below indicates the main responsibilities of the persons involved in the monitoring:

Table 14: Overview of persons responsible for implementing the monitoring plan

Task	On-site technicians	Laboratory	QC manager	CDM Programme Manager	Management (Project Developer)	EcoSecurities
Collect Data and Send samples to lab	E		R	I		
Perform lab analyses		E	R	I		
Enter data into Spreadsheet	I		E	R		
Make monitoring report				R	I	E
Archive data & reports	I		E	R		

Calibration/ Maintenance	E		R	I		
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E = responsible for executing data collection
R = responsible for overseeing and assuring quality
I = to be informed