MONITORING REPORT FORM (F-CDM-MR)
Version 02.0

MONITORING REPORT

Title of the project activity	SF_6 Switch at Dead Sea Magnesium
Reference number of the project activity	2414
Version number of the monitoring report	1
Completion date of the monitoring report	3 October 2012
Registration date of the project activity	15 June 2009
Monitoring period number and duration of this monitoring period	Monitoring Period 5, Duration of 3 months, first and last days included 01/07/2012 – 30/09/2012
Project participant(s)	Dead Sea Magnesium (Project Owner) and Citigroup Global Markets Limited
Host Party(ies)	Israel
Sectoral scope(s) and applied methodology(ies)	Sectoral Scope: 04, 09 and 11. Methodology AM0065: “Replacement of SF_6 with alternate cover gas in the magnesium industry”, version 2.1
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	273,616 /4 =68,404
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	76,813

SECTION A. Description of project activity
A.1. Purpose and general description of project activity

a) Purpose of the project activity and the measures taken for GHG emission reductions or net anthropogenic GHG removals by sinks;

Dead Sea Magnesium (DSM) is located at the Dead Sea in the southern region of Israel. The Dead Sea contains high concentrations of magnesium, the source for the production of the magnesium metal. DSM – who has at present an installed production capacity of 35,000 tonnes of magnesium per year – was introduced to the financial opportunities created by the Clean Development Mechanism (CDM) and decided to initiate the SF_6 abatement action plan.

The project involves the replacement of SF_6 with an alternative gas with a lower Global Warming Potential (GWP) as a cover gas in primary production of magnesium ingots. Without the surface protection provided by such a cover gas, molten magnesium and its alloys - which are volatile substances - may oxidize explosively upon coming into contact with ambient air during casting processes. As indicated in the PDD, the SF_6 was replaced by HFC134a, and in June 2011 these gases were further replaced by Perfoulouro-2-methyl-3-pentanone (Novec612). The project drastically reduces greenhouse gas emissions due to the fact that Novec612 has a GWP of 1 and HFC134a has a GWP of 1,300, compared to a GWP of 23,000 for SF_6.

The project involved several activities, including the construction of a new gas stations to house the HFC134a cylinders and later the NOVEC612 bubblers, upgrading the plant's Foxboro Process Control System, installing gas piping leading from the gas stations to the magnesium casting house, as well as a vast study which included several experiments to acquire the knowledge and skill necessary for the operation of the casting house with the alternate cover gas.

b) Brief description of the installed technology and equipment;

Molten magnesium and its alloys are volatile substances, and may oxidize explosively when they come in contact with ambient air. DSM is a primary producer of magnesium ingots, utilizing an open casting process which leaves the molten magnesium exposed to ambient air. Therefore, during the first stage of the casting process small quantities of SF6 are sprayed over the exposed surface of the magnesium, preventing oxidation and avoiding the formation of the impurities and the contamination of the product.

The technology used in the project activity replaces SF6 with either HFC134a or Novec612 for melt protection in the production of magnesium or magnesium alloys, depending on the gas controller’s mode (the new valves switch allow only one gas of the two to flow at a time). While also greenhouse gases, the GWP of Novec612 and HFC134a are far lower than for SF6.

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

In October 2008, the new gas station required to house the HFC134a cylinders was constructed by Talel Construction and Development Works Ltd. In November and December of 2008, the plant conducted a series of test runs in the casting house in order to determine the proper method of applying HFC134a, by first testing it on individual casting lines and ultimately conducting a test throughout the entire casting house. In early 2009 the plant contracted Peter Industrial Piping Ltd. to install the new cover gas piping, and in March 2009, Afcon Control and Automation Ltd. upgraded the plant's Foxboro Process Control System, so it would be capable of acquiring, storing, and managing data for an additional cover gas.

The plant began working with HFC134a in February 2009 throughout the casting house. In the period of the second monitoring report (2010), only HFC134a was used. During the first half of 2011 the plant installed a new Novec612 Bubbler station and a new piping and valves system to enable the use of the Novec612 cover gas, In June 2011 the plant began using the Novec612 cover gas along with the use of HFC134a.

More on the project can be found in the Project Design Document and associated documents posted on the UNFCCC Web site:

http://cdm.unfccc.int/Projects/DB/TUEV-SUED1235638608.46/view

The SF6 Switch at Dead Sea Magnesium was validated on January 29, 2009, and was registered on 15 Jun 2009. Since the registration the project was monitored according to the approved monitoring plan, three monitoring reports were approved, on December 28th 2010, September 5th 2011, January 15th 2012, and the forth, as of October 2nd 2012, is "**Awaiting scheduling" for publication.**

This is the 5th monitoring report for the SF6 Switch at Dead Sea Magnesium.

d) Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period.

76,813 tonnes

A.2. Location of project activity

a) Host Party(ies);

Israel

b) Region/ State/ Province, etc.;

Dead Sea Region

c) City/ Town/ Community, etc.;

Sdom

d) Physical/ Geographical location.

The project activity is located at Sdom on the southern part of the Dead Sea. The factory is located approximately 31 km from the town of Dimona (population 34,000) and 28 km from the town of Arad (population 28,000). The plant's co-ordinates are 31°02N and 35°22E

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Israel (host)	Dead Sea Magnesium	No
United Kingdom of Great Britain and Northern Ireland (Annex I Party)	Citigroup Global Markets Limited	No

A.4. Reference of applied methodology

The baseline and monitoring methodology chosen for the project is AM0065 “Replacement of SF_6 with alternate cover gas in the magnesium industry”, version 2.1.

The project was originally developed using AM0065 version 1, however during the validation process a new version of the methodology AM0065 was approved by the EB. The new version was accepted after the Global Stakeholders Process was complete. The new version (AM0065 version 2.1) has significant implications for the project in terms of CER calculations, and therefore the validation process was continued using the revised version

2.1.

The methodology requires that the most recent version of the "Combined tool to identify the baseline scenario and demonstrate additionality" be used. The most recent version was Version 02.2 from the 28th meeting of the Executive Board.

A.5. Crediting period of project activity

The starting date of the crediting period is June 15, 2009. The requested crediting period was 10 years.

SECTION B. Implementation of project activity
B.1. Description of implemented registered project activity

1. The official start date of the project was June 15, 2009.

2. During the current verification period, the project operated using both HFC134a and Novec612.

3. There were no events during the current monitoring period which may impact the applicability of the methodology.

B.2. Post registration changes
B.2.1. Temporary deviations from registered monitoring plan or applied methodology

No temporary deviation has been applied during this monitoring period.

B.2.2. Corrections

No correction has been applied during this monitoring period.

B.2.3. Permanent changes from registered monitoring plan or applied methodology

No permanent change to the monitoring plan has been applied during this monitoring period.

B.2.4. Changes to project design of registered project activity

No change to project design has been applied during this monitoring period.

B.2.5. Changes to start date of crediting period

No change to the start date of crediting period has been applied during this monitoring period.

B.2.6. Types of changes specific to afforestation or reforestation project activity

Not applicable, since afforestation and reforestation are not part of the project activity.

SECTION C. Description of monitoring system

The requirements of the monitoring plan in the approved PDD have been implemented in the SF6 Switch at Dead Sea Magnesium project through internal procedures for data collection, maintenance, troubleshooting and calibrations. These procedures define the roles and responsibilities of all personnel involved in project monitoring and define the required timetables for routine operations and maintenance as well as calibrations.

DSM is the sole agency responsible for implementation and monitoring of the CDM project. It is assisted in this task, however, by personnel from Elysium Carbon Trade & Investment, greenhouse gas consultant. All DSM personnel involved in monitoring undergo an annual training course, designed to familiarize them with the monitoring, maintenance, and troubleshooting procedures relevant to the project.

All data is recorded as required by the approved monitoring plan by DSM personnel, and examined on a monthly basis by the Elysium project manager in order to ensure data accuracy and consistency.

In the event of an equipment or system failure, the relevant personnel follow a detailed procedure set forth in the project’s internal work procedures.

All records will be kept for the duration of the crediting period + 2 years.

Monitoring Responsibilities

DSM personnel in charge of monitoring:

Dr. Efim Kitaigorodsky, Head of Magnesium Production Technology Development

Mr. Meir Berger, Finance Manager

Elysium Carbon Trade & Investment personnel in charge of monitoring:

Ms. Dorin Yael, Project Manager

Mr. Ofer Ben-Dov, CTO

Data: Magnesium

DSM's financial statements are based on the quantity of magnesium produced. Therefore, the reliability of the production figures (measured in terms of weight) is very important.

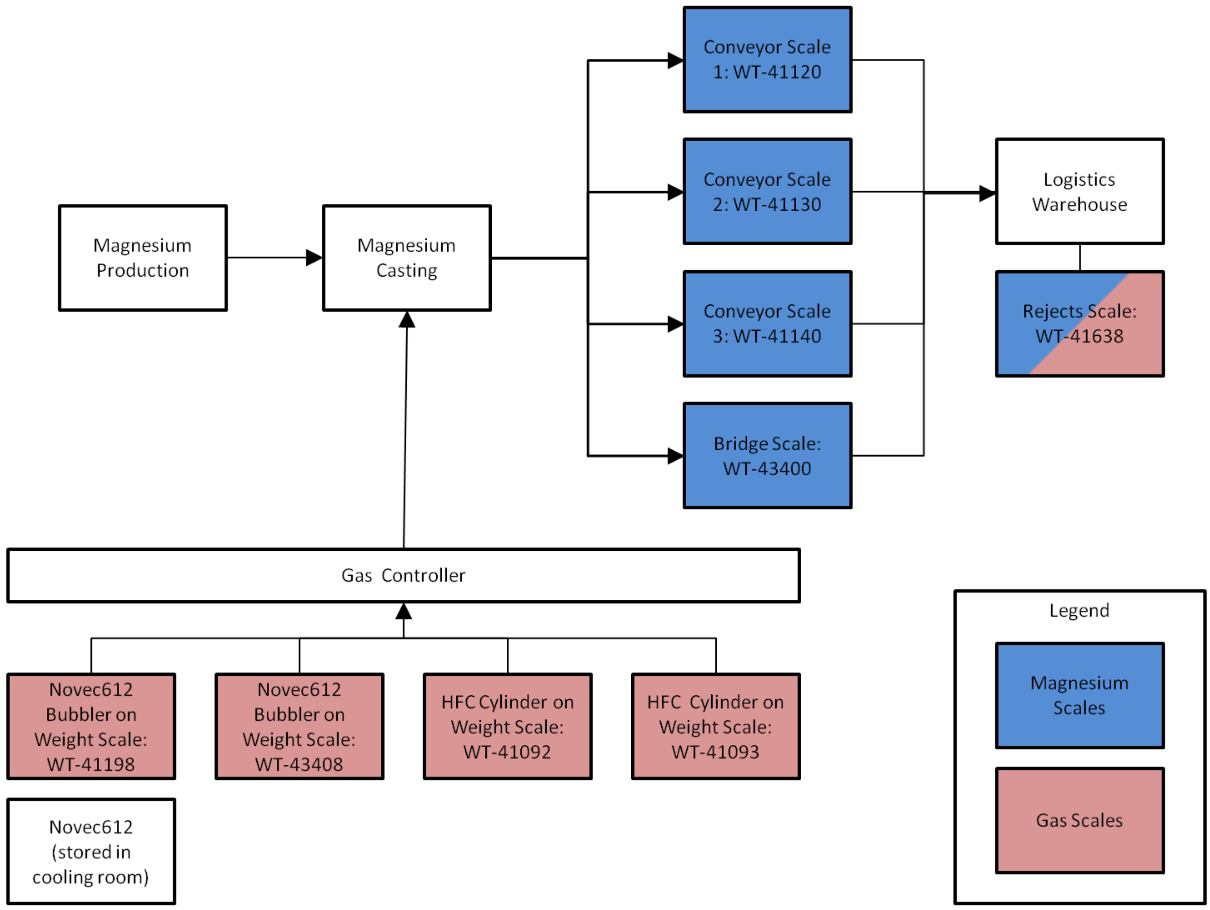
At the end of the casting process, the product is weighed by calibrated scales. The scales are calibrated at least once a year, according to the plant's operating procedures.

The quantity of magnesium produced is recorded by the Foxboro Process Control System and then transferred to the plant's Magic logistics system. The production figures are later cross-checked with internal sales and stock reports.

<u>Data: Consumption of alternate cover gas</u>

The consumption of the alternate cover gas is measured by recording delivered purchases and inventory changes (accounting method). This method is already in use at DSM and has been used to set the baseline consumption of SF6. DSM relies on this method for various materials that are purchased for magnesium production in order to keep track of its costs, and therefore this method has proven to be accurate.

Line diagram



SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data/Parameter	GWP_{SF_6}
Unit	tonnes CO_2e /tonne SF_6
Description	Global Warming Potential of SF_6
Source of data	CDM EB (IPCC guidelines)
Value(s) applied	23,900
Purpose of data	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment	As the methodology states, this value is taken from the CDM EB. Prior to the renewal of each crediting period SF_6's GWP will be checked to ensure that the correct value is used.

Data/Parameter	DF_{SF6}
Unit	Fraction
Description	Degradation Factor of SF_6 in the production process
Source of data	DF given in the methodology (AM0065 Version 2.1)
Value(s) applied	0.5
Purpose of data	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment	The methodology states that a default factor of 50% shall be applied. Prior to the renewal of a crediting period it should be assessed if SF_6 degradation factor has changed.

Data/Parameter	GWP_{ALTGAS} (HFC134a)
Unit	tonnes CO_2e/ tonne HFC134a
Description	Global Warming Potential of alternate gas (HFC134a)
Source of data	CDM EB (IPCC guidelines)
Value(s) applied	1,300
Purpose of data	Calculation of project emissions or actual net GHG removals by sinks
Additional comment	In case the plant converts to advance "dilute" SO_2 the value applied shall be 0, as per the methodology. Prior to the renewal of each crediting period the GWP will be checked to ensure that the correct value is used.

Data/Parameter	GWP_{ALTGAS} (Novec612)
Unit	tonnes CO_2e/ tonne Novec612
Description	Global Warming Potential of alternate gas (Novec612)
Source of data	CDM EB (IPCC guidelines)
Value(s) applied	1
Purpose of data	Calculation of project emissions or actual net GHG removals by sinks
Additional comment	In case the plant converts to advance "dilute" SO_2 the value applied shall be 0, as per the methodology. Prior to the renewal of each crediting period the GWP will be checked to ensure that the correct value is used.

Data/Parameter	$DI_{SF6,CON,BL}$
Unit	Fraction
Description	A conservative factor portraying the Data Integrity of measured consumption of SF6 in each equipment k in each segment j ($C_{SF6,EST,BL,k,j}$) and measured total consumption of SF6 in the facility ($C_{SF6,TOT,BL}$). Default= 0.95.
Source of data	CDM EB (IPCC guidelines)
Value(s) applied	0.95 (default)
Purpose of data	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment	Default value as explained in section II of the methodology. This value shall account for the uncertainty in SF_6 consumption. IPCC guidelines state that direct reporting has a 5% uncertainty level. 0.95 shall be used as the default factor unless the project proponent can demonstrate to the DOE that their estimates of measured consumption of SF6 in each equipment k in each segment j ($C_{SF6,EST,BL,k,j}$) or measured total consumption of SF6 in the facility ($C_{SF6,EST,BL,k,j}$) are more than 95% accurate. Project proponents that submit monitoring data for measured consumption of SF6 in each equipment k in each segment j ($C_{SF6,EST,BL,k,j}$) or measured total consumption of SF6 ($C_{SF6,TOT,BL}$) using two or more of measurement procedures listed in the monitoring section (e.g., both the weight difference and accounting method), and can consistently demonstrate a difference of less than 5% between these two estimates over the time series should then be allowed to multiply their SF_6 consumptions by a factor greater than 0.95. In no case should a factor of 100% be used. Prior to the renewal of a crediting period it shall be assessed if the Conservative Factor default should be changed.

Data/Parameter	$DI_{SF6,CON,PJ,k,j,y}$
Unit	Fraction
Description	A conservative factor portraying the Data Integrity of $C_{SF6,CON,PJ,k,j,y}$ in each segment, per year.
Source of data	CDM EB (IPCC guidelines)
Value(s) applied	1.05 (default)
Purpose of data	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment	Default value as explained in section II of the methodology. This value shall account for the uncertainty in SF_6 consumption. IPCC guidelines state that direct reporting has a 5% uncertainty level. 1.05 shall be used as the default factor unless the project proponent can demonstrate to the DOE that their estimates of $C_{SF6,CON,PJ,k,j,y}$ are more than 95% accurate. Project proponents that submit monitoring data for $C_{SF6,CON,PJ,k,j,y}$ using two or more of measurement procedures listed in the monitoring section (e.g., both the weight difference and accounting method), and can consistently demonstrate a difference of less than 5% between these two estimates over the time series should then be allowed to multiply their SF_6 consumptions by a factor smaller than 1.05. In no case should a factor of 100% be used. Prior to the renewal of a crediting period it shall be assessed if the Conservative Factor default should be changed.

Data/Parameter	CF (HFC134a)
Unit	N/a
Description	Conservative Factor. To compensate for the uncertainty in the global warming potential of the byproducts emitted after the degradation of HFC134a.
Source of data	Based on the test results provided in EPA, "Characterization of Cover Gas Emissions from U.S. Magnesium Die Casting", Office of Air and Radiation, May 2004.
Value(s) applied	1.26
Purpose of data	Calculation of project emissions or actual net GHG removals by sinks
Additional comment	As per AM0065. Prior to renewal of a crediting period it should be assessed if the Conservative Factor should be changed, due to the publication of new experiment results or GWP values.

Data/Parameter	CF (Novec612)
Unit	N/a
Description	Conservative Factor. To compensate for the uncertainty in the global warming potential of the byproducts emitted after the degradation of Novec612.
Source of data	Based on the test results provided in EPA, "Characterization of Cover Gas Emissions from U.S. Magnesium Die Casting", Office of Air and Radiation, May 2004.
Value(s) applied	2,830
Purpose of data	Calculation of project emissions or actual net GHG removals by sinks
Additional comment	As per AM0065. Prior to renewal of a crediting period it should be assessed if the Conservative Factor should be changed, due to the publication of new experiment results or GWP values.

Data/Parameter	$C_{SF6,TOT,BL}$
Unit	tonnes SF_6
Description	Minimum of annual TOTAL consumption of SF_6 in the facility for the last three years prior to validation.
Source of data	Production reports from DSM and SAP system.
Value(s) applied	2005: 32.47 2006: 27.39 2007: 52.75 Minimum: 27.39
Purpose of data	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment	As stated by AM0065 Version 2.1, the IPCC recommends that "direct reporting of SF_6 consumption can be measured in the following ways: • Recording delivered purchases and inventory changes (accounting method) • Measuring the difference in cylinder weight for gas used/ returned (weight difference method) • Measuring flow rates and integrating over time (flow measurement method) Data was obtained using the accounting method. As stated by the IPCC the first two methods are more accurate because they are both based on total weight used. Historical data is from the last 3 year prior to validation, as stipulated in the methodology

Data/Parameter	$P_{Mg,BL,TOTAL}$
Unit	tonnes Mg / year
Description	Amount of Mg products manufactured in baseline scenario in the facility
Source of data	Foxboro Process Control System
Value(s) applied	2005: 27,853.15 2006: 24,581.44 2007: 29,629.65 Minimum: 24,581.44
Purpose of data	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment	Measured by calibrated scales according to on site ISO9001 certification. Scales are calibrated at least every 12 months, since this parameter is essential to the core business of the plant. As per the methodology, the minimum of the last three years prior to validation is used.

D.2. Data and parameters monitored

<table>
<tr><td>Data/Parameter</td><td>$P_{Mg,PJ,k,j,y}$</td></tr>
<tr><td>Unit</td><td>tonnes Mg/ year</td></tr>
<tr><td>Description</td><td>Production output: annual amount of Mg products manufactured in project scenario in each equipment k in each segment j per year y.</td></tr>
<tr><td>Measured/Calculated /Default</td><td>Measured</td></tr>
<tr><td>Source of data</td><td>Magic System</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>6,972</td></tr>
<tr><td>Monitoring equipment</td><td>
<table>
<tr><th>Scale</th><th>Calibration Procedure</th><th>Last Calibration (mm/dd/yr)</th></tr>
<tr><td>Conveyor Scale 1: W-41120</td><td rowspan="3">Internal calibration conducted annually by certified technicians using standard 500 kg weights, as per the Monitoring Plan. When the conveyor is in use, in practice the calibration is generally conducted monthly as per the plant's internal work procedures.</td><td>09/09/12* (last calibration prior to monitoring period 10/06/12**)</td></tr>
<tr><td>Conveyor Scale 2: W-41130</td><td>09/09/12 * (last calibration prior to monitoring period 10/06/12 **)</td></tr>
<tr><td>Conveyor Scale 3: W-41140</td><td>09/09/12 * (last calibration prior to monitoring period 10/06/12**)</td></tr>
<tr><td>Bridge Scale: W-43400</td><td>Calibrated on an annual basis by an external certified company.</td><td>04/04/12 * (last calibration prior to monitoring period 20/06/11**)</td></tr>
<tr><td>Rejects and Backup Scale: W-41638</td><td>Internal calibration conducted annually by certified technicians using standard 500 kg weights, as per the Monitoring Plan. In practice the calibration is generally conducted monthly as per the plant's internal work procedures</td><td>10/09/12 * (last calibration prior to monitoring period 10/06/12**)</td></tr>
</table>

Validity: This data is used to compile monthly production reports, which are the official production figures submitted to DSM's upper management and used for all major managerial financial and strategic decisions.
</td></tr>
</table>

Measuring/Reading/ Recording frequency	Monthly
Calculation method (if applicable)	Not applicable.
QA/QC procedures	In order to ensure accuracy, the production figures are cross-checked on a monthly basis with the magnesium production calculated using magnesium sales and stock figures reported in the plant's “Monthly Financial Statements”. As DSM is owned by publicly-traded companies, it is required to adhere to strict financial reporting standards. These Monthly Financial Statements serve as the basis of the plant's quarterly and annual financial reports, which are reviewed and audited respectively by the internationally-renowned accounting firm KPMG.
Purpose of data	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment	* Last calibration date refers to last calibration completed in 2012 for this monitoring period. ** Last monthly calibration prior to monitoring period included to demonstrate that scales were calibrated for entire monitoring period, in accordance with methodology and monitoring plan that requires annual calibration of scales.

<table>
<tr><td>Data/Parameter</td><td>$C_{,ALTGAS,PJ,k,j,y}$ (HFC134a)</td></tr>
<tr><td>Unit</td><td>tonnes /year</td></tr>
<tr><td>Description</td><td>Consumption of alternate gas (HFC134a) in project scenario for each equipment k in each segment j per time period.</td></tr>
<tr><td>Measured/Calculated /Default</td><td>Calculated</td></tr>
<tr><td>Source of data</td><td>Purchase and inventory reports from DSM and SAP system.</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>0.23</td></tr>
<tr><td>Monitoring equipment</td><td>SAP system and scales.
<table>
<tr><td>Scale</td><td>Calibration Procedure</td><td>Last Calibration (mm/dd/yr)</td></tr>
<tr><td>Weight Scale 1: W-41092</td><td rowspan="2">Internal calibration conducted annually by certified technicians using standard 500 kg weights. In practice, the calibration is generally conducted semi-annually as per the plant’s internal work procedures.</td><td>11/04/12* (previous calibrations**: 11/10/11, 11/04/11,)</td></tr>
<tr><td>Weight Scale 2: W-41093</td><td>11/04/12* (previous calibrations**: 11/10/11, 11/04/11,)</td></tr>
</table></td></tr>
<tr><td>Measuring/Reading/ Recording frequency</td><td>Monthly</td></tr>
<tr><td>Calculation method (if applicable)</td><td>The quantity of HFC134a consumed by the plant is calculated on a monthly basis by subtracting the end-of-month inventory from the beginning-of-month inventory, adding any purchases that occurred during the month, and subtracting leftover gas in used cylinders that have been sent back to the HFC134a supplier.</td></tr>
<tr><td>QA/QC procedures</td><td>The only consumer of HFC134a in the plant is the casting house, where it is used as a cover gas in the context of the project activity. Unopened cylinders are stored either in the main warehouse or at the HFC134a station.

The inventory is inspected once a month by the warehouse manager, by counting the number of unopened HFC134a cylinders in the warehouse, adding the quantities from used cylinders that haven’t yet been returned to HFC134a supplier, and reading the scale measurements from the HFC134a cylinders in use. This data is then recorded in the SAP system.

The quantity of HFC134a consumed by the plant is calculated on a monthly basis by subtracting the end-of-month inventory from the beginning-of-month inventory, adding any purchases that occurred during the month, and subtracting leftover gas in used cylinders that have been sent back to the HFC134a supplier.</td></tr>
<tr><td>Purpose of data</td><td>Calculation of project emissions or actual net GHG removals by sinks</td></tr>
</table>

Additional comment	* Last calibration date refers to last semiannual calibration completed in 2012. **Previous semiannual calibration included to demonstrate that scales were calibrated for entire monitoring period, in accordance with methodology and monitoring plan that requires annual calibration of scales.

<table>
<tr><td>Data/Parameter</td><td>$C_{,ALTGAS,PJ,k,\ j,y}$ (Novec612)</td></tr>
<tr><td>Unit</td><td>tonnes /year</td></tr>
<tr><td>Description</td><td>Consumption of alternate gas (Novec612) in project scenario for each equipment k in each segment j per time period.</td></tr>
<tr><td>Measured/Calculated /Default</td><td>Calculated</td></tr>
<tr><td>Source of data</td><td>Purchase and inventory reports from DSM and SAP system.</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>2.16</td></tr>
<tr><td></td><td>Monthly inspection by warehouse manager, SAP system.
<table>
<tr><th>Scale</th><th>Calibration Procedure</th><th>Last Calibration (mm/dd/yr)</th></tr>
<tr><td>Weight Scale 1: W-41198</td><td rowspan="2">Internal calibration conducted annually by certified technicians using standard 500 kg weights. In practice, when in use the calibration is generally conducted semi-annually as per the plant’s internal work procedures.</td><td>30/08/12* (previous calibration: 01/03/2012**)</td></tr>
<tr><td>Weight Scale 2: W-43408</td><td>30/08/12* (previous calibration: 01/03/2012**)</td></tr>
<tr><td>Rejects and Backup Scale: W-41638</td><td>Internal calibration conducted annually by certified technicians using standard 500 kg weights, as per the Monitoring Plan. In practice the calibration is generally conducted monthly as per the plant's internal work procedures</td><td>10/09/12* (last calibration prior to monitoring period 10/06/12**)</td></tr>
</table>
</td></tr>
<tr><td>Measuring/Reading/ Recording frequency</td><td>Monthly</td></tr>
<tr><td>Calculation method (if applicable)</td><td>The quantity of Novec612 consumed by the plant is calculated on a monthly basis by subtracting the end-of-month inventory from the beginning-of-month inventory, adding any purchases that occurred during the month.

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</table>

QA/QC procedures	The only consumer of Novec612 in the plant is the casting house, where it is used as a cover gas in the context of the project activity. The inventory is inspected once a month by the warehouse manager, by reading the scale measurements from the Novec612 bubblers located close to the production line and reading the quantities of gas of the Novec612 tanks stored in cooling room. The Novec612 tanks are weighted before and after each refill of the bubblers using scale W-41638. This data is then recorded in the SAP system. The quantity of Novec612 consumed by the plant is calculated on a monthly basis by subtracting the end-of-month inventory from the beginning-of-month inventory, adding any purchases that occurred during the month.
Purpose of data	Calculation of project emissions or actual net GHG removals by sinks
Additional comment	* Last calibration date refers to last semiannual calibration completed in 2012. **Previous semiannual calibration included to demonstrate that scales were calibrated for entire monitoring period, in accordance with methodology and monitoring plan that requires annual calibration of scales.

Data/Parameter	$C_{SF6,CON,PJ,k,j,y}$
Unit	tonnes SF_6 / year
Description	The total consumption of SF_6 in the industrial facility in the project scenario for each segment per time period
Measured/Calculated /Default	Calculated
Source of data	Purchase and inventory reports from DSM and SAP system.
Value(s) of monitored parameter	0
Monitoring equipment	SAP system.
Measuring/Reading/ Recording frequency	Monthly
Calculation method (if applicable)	Since the conversion to NOVEC there is no use or inventory of SF_6 at Dead Sea Magnesium. This data can be verified thought the SAP system.
QA/QC procedures	Since the conversion to NOVEC there is no use or inventory of SF_6 at Dead Sea Magnesium. This data can be verified thought the SAP system.
Purpose of data	Calculation of project emissions or actual net GHG removals by sinks
Additional comment	

Data/Parameter	SO_2 emissions
Unit	mg/m3
Description	SO_2 emissions
Measured/Calculated /Default	N/A
Source of data	N/A
Value(s) of monitored parameter	0 – The project activity involves replacing the use of SF_6 with HFC134a or Novec612, not advanced “dilute SO_2.”
Monitoring equipment	N/A
Measuring/Reading/ Recording frequency	N/A
Calculation method (if applicable)	N/A
QA/QC procedures	Should DSM opt to convert to advanced “dilute SO_2,” emissions from the facility to the ambient air shall comply with the local standards of the country.
Purpose of data	Calculation of project emissions or actual net GHG removals by sinks
Additional comment	

Data/Parameter	Magnesium sales reports
Unit	tonnes Mg/year
Description	In order to dispel concerns that a company increases production levels just to gain CERs, proof of magnesium sales will be provided.
Measured/Calculated /Default	Calculated
Source of data	Sales reports from DSM and SAP system.
Value(s) of monitored parameter	7525
Monitoring equipment	SAP system
Measuring/Reading/ Recording frequency	Monthly
Calculation method (if applicable)	N/A
QA/QC procedures	Magnesium sales for time period y shall be compared to $P_{Mg,PJ,j,y}$, Magnesium produced and changes in inventory.
Purpose of data	Calculation of project emissions or actual net GHG removals by sinks
Additional comment	

D.3. Implementation of sampling plan

NA. None of above monitored parameters is based on a sampling approach.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

<u>Baseline Emissions</u>

$$BE_y = \sum_j \sum_k P_{Mg,PJ,j,k,y} \times GWP_{SF6} \times EF_{SF6,Mg}$$

Where:

BE_y = Baseline emissions in year *y* (tonnes CO_2e /year)
$P_{Mg,PJ,j,k,y}$ = Annual amount of Mg products manufactured in project scenario in each equipment *k* in each segment *j* per year *y* (tonnes Mg/year)
GWP_{SF6} = Global Warming Potential of SF_6 (tonnes CO_2e / tonne SF_6)
$EF_{SF6,Mg}$ = Baseline emission factor for the facility (tonnes SF_6 / tonne Mg)

Date *(Yr-Mon.)*	**BEy** *(tonne CO2e)*	**$P_{Mg,PJ,j,k,y}$** *(tonnes Mg)*	**GWP_{SF6}** *(tonne CO2e/ tonne SF6)*	**$EF_{SF6,Mg}$** *(tonne SF6/ tonne Mg)*
12-07	27,353	2,289	23,900	0.0005
12-08	28,467	2,382	23,900	0.0005
12-09	27,489	2,300	23,900	0.0005
Toal	83,310	6,972	-	-

All monitored data and detailed emission reduction calculations have been submitted along with this monitoring report in monthly electronic spreadsheet: “DSM Magnesium ERs Calculations 2012B 04-09-2012”.

E.2. Calculation of project emissions or actual net GHG removals by sinks

<u>Project Emissions</u>

$$PE_y = PE_{ALTGAS,y} + PE_{SF6,y}$$

Where:

PE_y = Project emissions in year *y* (tonnes CO_2e/year)
$PE_{ALTGAS,y}$ = Project emissions from the use of HFC134a or Perfluoro-2-methyl-3-pentanone (Novec612), if it is used as a cover gas in project scenario – summing of all segments *j* – in year *y* (tonnes CO_2e/year)
$PE_{SF6,y}$ = Project emissions from the use of SF_6 - summing of all segments *j* – in year *y* (tonnes CO_2e/year)

Application of formulae:

Date	PEy	$PE_{ALTGAS,y}$	$PE_{SF6,y}$
(Yr-Mon.)	*(tonnes CO2e)*	*(tonnes CO2e)*	*(tonnes CO2e)*
12-07	1,945	1,945	0
12-08	2,212	2,212	0
12-09	2,340	2,340	0
Total	6,496	6,496	0

$$PE_{ALTGAS,y} = \sum_j \sum_k C_{ALTGAS,Pj,k,j,y} \times GWP_{ALTGAS} \times CF$$

Where:

$PE_{ALTGAS,y}$ = Project emissions from the use of alternate gas – summing of all segments *j* - in year *y* (tonnes CO_2e/ year)

$C_{ALTGAS,PJ,k,j,y}$ = Consumption of alternate gas in the project scenario per year (tonnes/ year)

GWP_{ALTGAS} = Global Warming Potential of alternate gas (tonnes CO_2e / tonne ALTGAS)

CF = Conservative Factor. To compensate for the uncertainty in the global warming potential of the by-products emitted after the degradation of the alternate gas

Application of formulae:

Date	$PE_{ALTGAS,y}$	$C_{ALTGAS,PJ,i,y}$ (HFC)	$GWP_{ALTGAS\ (HFC)}$	CF (HFC)	$C_{ALTGAS,PJ,i,y}$ (NOVEC)*	GWP_{ALTGAS} (NOVEC)	CF (NOVEC)
(Yr-Mon.)	*(tonnes CO2e)*	*(tonnes)*	*(tonnes CO2e/ tonne HFC)*	*(factor)*	*(tonnes)*	*(tonnes CO2e/ tonne NOVEC)*	*(factor)*
12-07	1,945	0.12	1,300	1.26	0.62	1	2,830
12-08	2,212	0.01	1,300	1.26	0.77	1	2,830
12-09	2,340	0.09	1,300	1.26	0.78	1	2,830
Total	6,496	0.23	-	-	2.16	-	-

$$PE_{SF6,y} = \sum_j \sum_k C_{SF6,EM,PJ,k,j,y} \times GWP_{SF6}$$

Where:

$PE_{SF6,y}$ = Project emissions from the use of SF_6 - summing of all segments *j* in year *y* (tonnes CO_2e/year)

$C_{SF6,EM,PJ,k,j,y}$ = SF_6 actually emitted in the project scenario in each equipment *k* of each segment *j*, per year *y* (tonnes SF_6/year)

GWP_{SF6} = Global Warming Potential of SF_6 (tonnes CO_2e / tonne SF_6)

Application of formulae:

Date	$PE_{SF6,y}$	$C_{SF6,EM,PJ,k,j,y}$	GWP_{SF6}
(Yr-Mon.)	*(tonnes CO2e)*	*(tonnes SF6)*	*(tonnes CO2e/ tonne SF6)*
12-07	0	0	23,900
12-08	0	0	23,900
12-09	0	0	23,900
Total	0	0	-

$$C_{SF6,EM,PJ,k,j,y} = C_{SF6,CON,PJ,k,j,y} \times DF_{SF6} \times DI_{SF6,CON,PJ,k,j,y}$$

Where:

$C_{SF6,EM,PJ,k,j,y}$ — SF_6 actually emitted in the project scenario in each equipment *k* of each segment *j*, per year *y* (tonnes SF_6/year)

$C_{SF6,CON,PJ,k,j,y}$ — Total consumption of SF_6 in the project scenario in each equipment k for each segment j, per year y (tonnes SF_6/year)

DF_{SF6} — Degradation Factor of SF_6 that reacts with the magnesium in the production process (fraction)

$DI_{SF6,CON,PJ,k,j,y}$ — A conservative factor portraying the Data Integrity of $C_{SF6,CON,PJ,k,j,y}$ in each segment, per year (fraction)

Application of formulae:

Date	$C_{SF6,EM,PJ,k,j,y}$	$C_{SF6,CON,PJ,k,j,y}$	DF_{SF6}	$DI_{SF6,CON,PJ,k,j,y}$
(Yr-Mon.)	*(tonnes SF6)*	*(tonnes SF6)*	*(fraction)*	*(fraction)*
12-07	0	0	0.5	1.05
12-08	0	0	0.5	1.05
12-09	0	0	0.5	1.05
Total	0	0	-	-

E.3. Calculation of leakage

No leakage is expected from the project activity, as stated in methodology.

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO_2e)	Project emissions or actual net GHG removals by sinks (tCO_{2e})	Leakage (tCO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO_2e)
Total	83,310	6,496	0	76,813

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (tCO_2e)	273,616/year equivalent to 68,404/3 months	76,813

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

The conversion to NOVEC which has a lower GHG value compared to HFC134a caused the emission reduction to be slightly higher than the emission reductions that were calculated in the registered CDM-PDD that were based on the conversion from SF6 to HFC134a.

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History of the document

Version	Date	Nature of revision
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory **Document Type**: Form **Business Function**: Issuance		