

VERIFICATION REPORT FOR VCS PROJECT 618'S SIXTH MONITORING REPORT



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Summary:

NSF International (NSF) verified the sixth monitoring period of the “Conversion of SF₆ to an Alternative Cover Gas in Magnesium Production in Eaton Rapids, MI, and Strathroy, ON” project (the “Project”). In this Project alternate cover gases were deployed to substitute for sulfur hexafluoride used to prevent oxidation upon contact with air of molten magnesium metal. The project developer, Climate Change Capital LLC, has implemented this project in the magnesium metal recycling and die casting facilities of Meridian Magnesium Products of America which operates plants in Eaton Rapids, Michigan USA, and in Strathroy, Ontario Canada.

The objective of the verification was to verify the Project's emission reductions during the reporting period 1 January 2013 through 31 October 2014. NSF verified the asserted emission reductions against criteria found in CDM Approved baseline and monitoring methodology AM0065 “Replacement of SF₆ with alternate cover gas in the magnesium industry,” version 1.

NSF performed off-site document review and on-site verification audit activities for this reporting period. NSF received acceptable responses for all clarification requests issued and approved corrective actions for findings of nonconformity. In addition, NSF performed a gap validation for a deviation from the validated Project Description. On the basis of work performed, NSF concluded with reasonable assurance that the Project's asserted 512,982 metric tons of carbon dioxide–equivalent vintage 2013 and vintage 2014 emission reductions were fairly stated. More detail concerning the findings that support this conclusion is provided in Section 4 of this report.

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1 INTRODUCTION

Project developer Climate Change Capital LLC engaged NSF to verify the sixth reporting period of the “Conversion of SF₆ to an Alternative Cover Gas in Magnesium Production in Eaton Rapids, MI, and Strathroy, ON” project. The verification team consisted of John C. Shideler, PhD, lead verifier. An independent review of the verification results was performed by Michael DeBusschere, P.E. After evaluation, NSF determined that the potential for conflict-of-interest was low for NSF, for the verification team, and for the independent reviewer.

1.1 Objective

The objective of the verification of the sixth reporting period of the project was to determine whether the SF₆ cover gas replacement project at two Meridian Magnesium facilities had achieved emission reductions in accordance with the validated Project Description and the 2013 Monitoring Report, and had remained in conformity with applicable VCS requirements.

1.2 Scope and Criteria

The scope of this verification included magnesium metal production facilities in Eaton Rapids, MI, and Strathroy, ON, where magnesium scrap is recycled and die cast products are made. Sources of greenhouse gas emissions included amounts of SF₆ used as a cover gas and HFCs in substitute cover gases. The temporal scope for this verification is the project reporting period from 1 January 2013 through 31 October 2014.

Criteria included the Verified Carbon Standard, version 3.4 (8 October 2013), and the CDM Approved baseline and monitoring methodology AM0065 “Replacement of SF₆ with alternate cover gas in the magnesium industry,” version 1 (1 February 2008).

1.3 Level of Assurance

This verification was conducted at reasonable level of assurance.

1.4 Summary Description of the Project

Two Meridian Magnesium facilities, one in Eaton Rapids, Michigan, USA, the other in Strathroy, Ontario, Canada, produce magnesium ingots by recycling magnesium scrap in a melting process. The facilities remelt the ingots in die cast machines to manufacture parts for the automotive industry. In both the metal recycling and die casting processes a cover gas is used to prevent oxidation of molten metal in the presence of air. The substitution of Novec[®] 612 and sulfur dioxide cover gases reduce the usage of sulfur hexafluoride and lower total greenhouse gas emissions.

2 VERIFICATION PROCESS

NSF developed a sampling plan based on the AM0065 methodology, the Verified Carbon Standard, and data provided to NSF for document review. The method of verification followed ISO 14064-3, Greenhouse gases – Specification with guidance for the validation and verification

of greenhouse gas assertions. The verification process was also informed by the VCS Validation and Verification Manual, version 3.1 (8 October 2013). After off-site document review, verification activities were conducted on-site in Eaton Rapids, MI. Verification activities were performed remotely for the Strathroy, ON, facilities

In accordance with the Verified Carbon Standard, the threshold of materiality for this verification was five percent.

NSF developed a sampling plan for this engagement that addressed the following verification elements:

- A checklist of requirements included in the AM0065 methodology
- A spreadsheet with emission reduction calculations developed to provide a recomputation check for the emission reduction calculations included in the Monitoring Report. In this case, eight instances of this spreadsheet tab were completed so that the Project emission reduction calculations could be checked at disaggregated levels (i.e. for the recycling and die casting activities in Eaton Rapids and Strathroy, respectively).
- A spreadsheet tab to record the results of data checks.

The completed sampling plan is a verification record retained by NSF.

A gap validation was performed by NSF as a result of a change to the Project Description. NSF assessed whether the deviation was appropriately described and justified, and whether the project remained in compliance with VCS rules.

2.1 Method and Criteria

The NSF verification team verified Climate Change Capital LLC's assertion of emission reduction offset credits generated against the following criteria: the CDM Approved baseline methodology AM0065 "Replacement of SF₆ with alternate cover gas in the magnesium industry," version 1, and the Verified Carbon Standard version 3.4. The verification process was performed in accordance with ISO 14064-3:2006, "Greenhouse gases – Specification with guidance for the validation and verification of greenhouse gas assertions." The VCS "Validation and Verification Manual, v. 3.1 (8 October 2013), was also used as a reference.

The sampling plan established for this verification included checking for the fulfilment of requirements established in the VCS Standard and ACM methodology, on-site physical inspection of monitoring equipment at Eaton Rapids, MI, confirmation of calibration of instruments, reviewing data logged by the data acquisition and handling system, and recalculation of emission reductions data. Information was gathered from interviews, from personal observation, and from the review of documents and records.

2.2 Document Review

The verification team conducted a document review to inform the planning process in advance of performing verification activities. In response to clarification requests, Climate Change Capital

LLC updated its Monitoring Report and provided additional information for review during verification activities.

NSF cross-checked monitored project parameters against the validated parameters. The final Monitoring Report included detail on two previous Project Description deviations, both of which had been approved by Det Norske Veritas (DNV) during earlier verification periods. As a result of NSF's verification activities, a third Project Description deviation was identified and is described in further detail in section 3 of this report.

NSF reviewed calibration records for installed monitoring equipment at the Michigan and Ontario facilities and reviewed previously issued verification reports. The project host sites provided NSF with extensive records related to project activities, a portion of which are enumerated in the following table:

#	Title
1	"VCS Monitoring Report: Conversion of SF ₆ to an alternative cover gas in magnesium production in Eaton Rapids, MI and Strathroy, ON," version 5, 2012 (March 1, 2013), by Brian Jones
2	"VCS Validation Report: Conversion of SF ₆ to an alternative cover gas in magnesium production in Eaton Rapids, MI and Strathroy, ON," revision 1 (April 1, 2008), by DNV
3	"VCS Verification Report: Conversion of SF ₆ to an alternative cover gas in magnesium production in Eaton Rapids, MI and Strathroy, ON, Fifth Monitoring Period (1 January to 31 December 2012," revision 1 (2 March 2013), by NSF
4	Clean Development Mechanism, Approved baseline and monitoring methodology AM0065 "Replacement of SF ₆ with alternate cover gas in the magnesium industry," version 1
5	"VCS Project Description: Conversion of SF ₆ to an alternative cover gas in magnesium production in Eaton Rapids, MI and Strathroy, ON," version 2 (March 9, 2009)
6	"Meridian 2013 Monitoring Data 11-18-2014.xlsx" (updated on 12-10-2014) and "Meridian 2014 Monitoring Data 11-10-2014.xlsx" (updated on 12-10-2014) provided to NSF on 18 November 2014 and (for the updates) on 10 December 2014
7	"VCS Monitoring Report: Conversion of SF ₆ to an alternative cover gas in magnesium production in Eaton Rapids, MI and Strathroy, ON," version 5, 2013 (February 2, 2015), by Kevin James.

2.3 Interviews

The lead verifier interviewed key personnel at the project host site in Eaton Rapids, MI. Personnel included the plant manager and controller, the facilities manager, accounting staff, and a member of the facilities management team. In addition, a representative of Climate Change Capital LLC, the Project Proponent, was interviewed.

Person	Title	Organization
Walt Aldrich	Plant Manager	Meridian Magnesium Products of America
Mike Sicluna	Controller	Meridian Magnesium Products of America
Chuck Woodburn	Facilities Manager	Meridian Magnesium Products of America
Jeff Oppenneer	Accounting Department	Meridian Magnesium Products of America
Colin Chapman	Remelt Superintendent	Meridian Magnesium Products of America
Sam Sarlak	Building Maintenance	Meridian Magnesium Products of America
Kevin James	Project Proponent	Climate Change Capital LLC

2.4 Site Inspections

NSF Lead Verifier John Shideler visited the Meridian Magnesium Products of America facility in Eaton Rapids, MI, on 11-12 December 2014. Because the Facilities Manager at the Eaton Rapids plant was responsible for consolidating data from both plants, the lead verifier did not, during this reporting period, visit the Strathroy, ON plant. He had visited that plant in 2013 and considered that his familiarity with the operations there were sufficient for reaching reasonable assurance on the documented data that were provided.

The site visit at the Eaton Rapids plant included visiting the metal melting and die casting operations areas, both of which required the use of cover gas to prevent oxidation of molten magnesium metal which otherwise occurs upon contact with air. A key focus of the visit was confirming that the monitoring, distribution and accounting systems for cover gas continued to meet the requirements of the CDM methodology. During the site visit at Eaton Rapids the lead verifier also reviewed aspects of Meridian Magnesium's management system and VCS GHG project management.

In the Michigan plant the Lead Verifier observed physical quantities of Novec[®] 612 (dodecafluoro-2-methyl-3-pentanone), an HFC cover gas produced by 3M. NSF has accepted the conclusion of DNV in its validation report that Novec[®] 612 is equivalent to perfluoro-2-methyl-3-pentanone with respect to its global warming potential of 1. The lead verifier also saw bottles of sulfur hexafluoride (SF₆) and sulfur dioxide (SO₂).

2.5 Resolution of Findings

NSF issued fourteen Clarification Requests and three Nonconformities during the course of this verification engagement. Meridian Magnesium provided satisfactory information to close out the Clarification Requests and the Nonconformities. Two of the findings of Nonconformity related to errors in quantification. A third nonconformity related to an incomplete listing of monitored parameters in the Monitoring Report. A fourth nonconformity related to the omission of an uncertainty factor for the measurement of SF₆. NSF approved the corrective actions which resulted in modifications to the Monitoring Report and a small downward revision of asserted emission reductions.

A complete list of all findings with responses from the Project Proponent and the lead verifier's conclusions are provided in Appendix A.

2.5.1 Forward Action Requests

One Forward Action Request was issued during this verification. It relates to the planned installation during 2015 of two new die casting cells at the Eaton Rapids facility and one new die casting cell at the Strathroy facility.

2.6 Eligibility for Validation Activities

NSF performed gap validation activities to account for a change in the validated Project Description. NSF holds validation scopes for the livestock and waste management sectors. It has validated two registered projects, both in the waste management validation scope. It also submitted a negative validation conclusion for a livestock project. NSF was three registered projects short of meeting the requirement to have validated five registered projects, a rule that applies when a validation body performs a gap validation in a sector for which its accreditation body has not yet granted a validation scope. For this reason, NSF requested an exemption from the VCS rule so that it could perform the gap validation required by this project's Monitoring Report. On 19 December 2014 VCS granted NSF a one-time exemption to the rules stated in section 5.1 of the VCS Program Guide version 3.5. This exemption permits NSF to complete the gap validation for the period covered by the Project Proponent's current Monitoring Report.

Following are the names and reference numbers for the two registered projects that NSF has previously validated:

- Tower Mine Abandoned Mine Methane Utilization Project, VCS648
- Flathead Electric Cooperative Landfill Gas to Energy Project, Kalispell, MT, VCS640.

3 VALIDATION FINDINGS

Two previous deviations to the Project Description had been approved by DNV, the validation/verification body that performed the project's validation and first four Monitoring Report verifications. During this verification, NSF observed that the Project Description stated that the project was "a grouped project," and asked the project proponent to explain why it was so characterized. As a result of the inquiry, the project proponent concluded that the Project

Description had mischaracterized the nature of the project and that this error had not been detected and corrected during the validation process. See Section 3.2 of this report.

3.1 Participation under Other GHG Programs

This project does not seek registration under VCS and another approved GHG program.

3.2 Methodology Deviations

No methodology deviations have previously been approved for this project.

3.3 Project Description Deviations

NSF assessed one new Project Description change in accordance with the requirements of the CDM Guidelines on assessment of different types of changes from the project activity as described in the registered PDD and the VCS guidance provided in the Validation and Verification Manual, v 3.1 (8 October 2013).

The project was initially validated in April 2008 in accordance with criteria in the Voluntary Carbon Standard 2007.1. This version of the VCS standard defined a grouped project as “A number of projects and their related methodologies included in a single VCS Project Description (VCS PD) at the time of the validation.” By contrast, the VCS document Program Definitions v. 3.5 currently defines a grouped project as “A project to which additional instances of the project activity, which meet pre-established eligibility criteria, may be added subsequent to project validation.” The Program Guidelines 2007 provided two options for validation and verification. The first option defined individual validation and verification of a GHG project as “Any single GHG Project that meets the VCS 2007 requirements can be registered.”

A grouped project under the VCS 2007 Program Guidelines was “Any combination of GHG projects or project categories that meets the requirements of the VCS 2007 can be registered as a grouped project.” Missing from the program guidance description of 2007 was the distinction between “instances of project activity” and a “grouped project” where the intention to permit the project proponent to “allow for the expansion of project activities over time and over a geographically dispersed area” (VCS Validation and Verification Manual, v. 3.1, p. 27). Under the different definitions prevailing at the time of project validation and now, it is understandable that the project proponent may have confused two multiple instances of project activity for a “combination of two projects”.

Were the validation taking place under VCS guidance now in effect, the validation body would have to consider whether “multiple project instances are merely separate projects” (VCS Validation and Verification Manual, v. 3.1, p. 26). In such a case, it would be necessary to determine whether baseline and additionality characteristics for the multiple instances were different, taking into consideration variances in common practice, local laws and other characteristics.

In the case of Meridian Magnesium, the project is implemented identically at two facilities. One facility is located in the state of Michigan, USA, the other in the province of Ontario, Canada. The implementation of the projects at both sites is identical, and in both cases regulatory bodies do not require reductions of SF₆ emissions or place any more stringent limits on sulphur dioxide emissions than the AM0065 methodology does. Common practice is not a factor as at the date of validation the two magnesium facilities were only the second and third magnesium facilities in North America to have adopted Novec-612[®] as an SF₆ reduction gas.

Additionality is not affected by the implementation of the project in two similar magnesium remelting and die casting facilities. These two sister plants are functionally equivalent, and have implemented the project in an identical way. In both cases capital costs of installing the necessary piping and equipment for SF₆ replacement gas posed a financial barrier to implementation.

NSF summarizes its gap validation conclusions in the table below:

Condition	Consequence	Validation Conclusion
Does the deviation impact the applicability of the methodology, additionality or appropriateness of the baseline scenario?	The project proponent must describe and justify the deviation in a revised version of the Project Description. The requirement for a revised project description is in recognition of the deviation being a substantial change to the project.	The project proponent never intended this project to be a "grouped project", as this term is now understood as a "program of activities". Instead, the project proponent appears to have initially mistaken a project with more than one site for implementation as falling in the category of "grouped." For this reason, there is no "substantial change" to the project and it is not necessary for the project proponent to revise the Project Description.
Where the deviation does not impact the applicability of the methodology, additionality or appropriateness of the baseline scenario, does the project remain in compliance with the applied methodology?	The project proponent must describe and justify the deviation in the Monitoring Report. The deviation is documented in the Monitoring Report in recognition of the deviation being a more limited change to the project.	In reality there is no change to the project. This is only a correction of a mistake in the validated Project Description. Nonetheless, NSF has reviewed the validation report's conclusions concerning the investment barrier that made the choice of implementing the project unlikely absent carbon credits, and has concluded that identifying the project as a single project with two instances of implementation does not affect impact the applicability of the methodology, additionality or appropriateness of the baseline scenario.
Validator Obligation		Validator Conclusion
Assess whether the deviation is appropriately described and justified.		The Monitoring Report appropriately describes the deviation as a mistake in the initial Project Description. As such, it requires no further justification.
Determine whether the project remains in compliance with VCS rules.		The project has always followed the rules for a non-grouped project that is implemented in two locations.
Report findings and conclusions in the verification report and report the deviation in all subsequent verification reports.		This deviation is described in this verification of the sixth Monitoring Report period, and will be documented in subsequent periods verified by NSF International.

Where the assessment results in a negative conclusion, the verification report, and either the monitoring report or revised project description, must be provided to the VCSA, as set out in the VCS Standard.	Not applicable.
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In addition to the new deviation to the Project Description identified above, DNV previously approved two other Project Description deviations.

According to the validated Project Description, the Global Warming Potential (GWP) of SF₆ was reported to be 22,800. This value was obtained from the Intergovernmental Panel on Climate Change's Assessment Report 4. In its Monitoring Report for the 2010 calendar year of emission reductions, the project proponent proposed, and DNV agreed, that the GWP of SF₆ should be changed to 23,900, which was IPCC's estimate published with the Second Assessment Report (SAR). The change was agreed to because the CDM Executive Board approved the use of SAR GWPs for CDM projects.

DNV also approved a Project Description deviation to allow the use of the mass balance weight method for quantifying the use of SF₆, SO₂ or Novec gases. The mass balance weight method is one of two approaches approved in the AM0065 methodology. The deviation was necessary because the validated Project Description stated that flow of gases would be determined by using mass flow controller readings. However, upon implementation, the project realized that the mass balance weight method was more accurate and better aligned with their operational methods.

3.4 Grouped Project

This is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

4.1.1 Project Activity

NSF found that the conversion of SF₆ to an alternate cover gas project continued to be implemented during the period covered in the Monitoring Report in Meridian facilities in Eaton Rapids, MI, and Strathroy, ON in accordance with VCS and AM0065 methodology requirements.

4.1.1 Project Implementation Material Discrepancies

Except as described above in section 3.4, NSF found no material discrepancies between project implementation and the validated Project Description.

4.1.2 Implementation Status of the Monitoring Plan

The verification team visited the Michigan plant where the Lead Verifier observed the arrangement of alternate cover gas in gas cabinets with mixing and delivery systems. Mass gas flow controllers were installed to control the flow of cover gas to pots in recycling and moulds in die casting. Monitoring of consumption of SF₆ and alternate cover gases was achieved by using the weight difference method described in the methodology. Production of metal was measured by weighing ingots produced in the recycling area and by calculating the weight of parts produced in the die casting area. In addition, the die casting area returned metal not incorporated into finished parts to recycling for refabrication as ingots. This input stream to recycling amounted to approximately fifty percent of the weight of metal sent to die cast. Both the Michigan and the Ontario plants tracked the weight of metal produced and moved from recycling using the PLEX computer inventory system.

The verification team concluded that the system in place accurately monitored the parameters described in the Project Description, taking into account the previously accepted deviations. The primary controls for ensuring accuracy consisted of regular calibration of scales for weighing ingots and gas cylinders and an accounting system for tracking the number of parts produced. Information from operational records were then transferred to spreadsheet for the calculation of project emission reduction data taking into account the equations used in the AM0065 methodology. After review of inputs and comparison to operational records, NSF found no material discrepancies in the execution of these processes during this sixth Monitoring Report period.

4.1.3 Inclusion of Project Emission Reductions in Any Emissions Trading Program

The project locations in Michigan and Ontario are not subject to any emissions trading programs. Emission reduction credits from this project type are therefore strictly voluntary.

4.1.4 Other Forms of Environmental Credit / Rejection under Any Other Programs

NSF made inquiries to the project proponent concerning its participation in any greenhouse gas program other than VCS. NSF has accepted its response that the project locations report emission reductions only to the Verified Carbon Standard program and to none other. NSF is not aware of any other GHG program (other than CDM, for which the project locations are ineligible) that has published a replacement of SF₆ with alternate cover gas methodology for the magnesium industry.

NSF further inquired whether the project proponent had sought recognition of emission reductions under any other GHG programs since validation or the previous verification. NSF has accepted the project proponent's answer that it had not sought recognition of its emission reductions outside of the Verified Carbon Standard program.

4.1.5 Previously Validated Methodology Deviations

There have been no previously validated methodology deviations for this project.

4.1.6 Overall Conclusion with Respect to Project Implementation

NSF has concluded that the project has been implemented as described in the Project Description, taking into account subsequent Project Description deviations approved in this and previous verification reports.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

The project provided project spreadsheets that provided all the required data to complete the equations in the AM0065 methodology. The project tracked data for total metal melted, with subtotals for metal melted with the use of SF₆, Novec, and SO₂ cover gases. The mass of each cover gas used per month was reported separately for each area (recycling and die casting) and each plant (Eaton Rapids and Strathroy). These data permitted the calculations of baseline, project emissions, and emission reductions on a monthly basis.

4.2.1 Accuracy of Emissions Reductions Calculations

The verification team found that the reporting of monitored data were consistent with the requirements of the approved methodology. NSF checked spreadsheet formulae which converted pounds into kilograms and metric tons. During the site visit, the verification team compared source document data to the data included on the consolidated spreadsheet used for calculating emission reductions and found two immaterial transcription errors that were corrected (see Findings 16 and 17).

The verification process also resulted in the identification of a missing parameter in the calculation of emission reductions. The final version of the Monitoring Report appropriately took into account the uncertainty factor $DI_{SF_6, CON, PJ, k, j, y}$ to account for uncertainty in direct reporting of SF₆ consumption (see Finding 13).

4.2.2 Calculation of Baseline, Project Emissions, and Leakage Per the Project Description

NSF recalculated baseline emissions, project emissions, and emission reductions using its own formulae taken from the methodology equations. The verification checked these against the parameters monitored data provided in the Monitoring Report. A summary of the principal data inputs for calculating baseline emissions, project emissions, and emission reductions appears in the following table.

REF.	PARAMETERS MONITORED / EMISSION REDUCTIONS	VALUE	UNITS
1	Metal melted, Michigan plant		
	--Recycling, 2013	20,393.347	t
	--Recycling, 2014	17,753.608	t
	--Die casting, 2013	26,093.156	t
	--Die casting, 2014	23,284.984	t
	Sub-Total, Michigan	87,333.267	t
2	Quantity of Novec® cover gas used in Michigan:		
	--Recycling, 2013	5.272	t
	--Recycling, 2014	1.682	t

	--Die casting, 2013	3.180	t
	--Die casting, 2014	2.571	t
	Sub-Total, Michigan	12.705	t
3	Quantity of SF ₆ cover gas used in Michigan:		
	--Recycling, 2013	3.232	t
	--Recycling, 2014	1.930	t
	--Die casting, 2013	0.301	t
	--Die casting, 2014	0	t
	Sub-Total, Michigan	5.463	t
4	Metal melted, Ontario plant		
	--Recycling, 2013	5,236.087	t
	--Recycling, 2014	4,905.390	t
	--Die casting, 2013	26,770.390	t
	--Die casting, 2014	25,735.525	t
	Sub-Total, Ontario	62,647.392	t
5	Quantity of Novec [®] cover gas used in Ontario:		
	--Recycling, 2013	0	t
	--Recycling, 2014	0	t
	--Die casting, 2013	5.584	t
	--Die casting, 2014	5.327	t
	Sub-Total, Ontario	10.911	t
6	Quantity of SF ₆ cover gas used in Ontario:		
	--Recycling, 2013	1.434	t
	--Recycling, 2014	0.538	t
	--Die casting, 2013	0.574	t
	--Die casting, 2014	1.773	t
	Sub-Total, Ontario	4.319	t

Baseline Emissions. Baseline emission were calculated by multiplying the amount of metal melted by the specific emissions factor developed for the recycling and die cast operations in both Eaton River and Strathroy. These emissions factors are provided in the “parameters not monitored section of the Monitoring Report. They give the following results:

Eaton Rapids, Recycling: $38,146.95 \text{ tMg} \times \text{GWP } 23,900 \times \text{EF } 0.000385 = 351,009.2 \text{ tCO}_2\text{-e}$
Eaton Rapids, Die casting: $49,378.14 \text{ tMg} \times \text{GWP } 23,900 \times \text{EF } 0.0000914 = 107,864.58 \text{ tCO}_2\text{-e}$
Strathroy, Recycling: $10,141 \text{ tMg} \times \text{GWP } 23,900 \times \text{EF } 0.000684 = 165,788.82 \text{ tCO}_2\text{-e}$
Strathroy, Die casting: $52,506 \text{ tMg} \times \text{GWP } 23,900 \times \text{EF } 0.0000549 = 68,893.54 \text{ tCO}_2\text{-e}$

Project Emissions. Project emissions were calculated by multiplying separately the amounts of Novec[®] and SF₆ used as alternate cover gases. Usage of dilute SO₂ was also tracked, but since this gas does not have a GWP, it is not included here. The formulae for project emissions for SF₆ and for Novec[®] are provided separately as their calculations differ. The formula for calculating project emissions from Novec[®] is: $\sum \sum C_{\text{ALTGAS},\text{PJ},\text{k},\text{j},\text{y}} * \text{GWP}_{\text{ALTGAS}} * \text{CF}$.

Novec®

Eaton Rapids: $12.507\text{t GWP}=1 \times \text{CF } 2830 = 35,395 \text{ tCO}_2\text{-e}$

Strathroy: $10.911\text{t GWP}=1 \times \text{CF } 2830 = 30,878 \text{ tCO}_2\text{-e}$

Project emissions from the use of SF_6 are calculated using the following formula: $\text{PE}_{\text{SF}_6,y} = \sum \text{C}_{\text{SF}_6,\text{EM},\text{PJ},\text{K},\text{J},y} * \text{GWP}_{\text{SF}_6}$. Per the methodology SF_6 emitted is reduced by a degradation factor of 50% and adjusted by a conservative factor of 105% to account for uncertainty of measurement.

SF_6

Eaton Rapids: $5.463\text{t} \times 0.5 = 2.7315\text{t} \times 1.05 = 2.868 \times 23,900 = 68,547 \text{ tCO}_2\text{-e}$

Strathroy: $4.319\text{t} \times 0.5 = 2.16\text{t} \times 1.05 = 2.268 \times 23,900 = 54,193 \text{ tCO}_2\text{-e}$

The results of the summary of calculation of baseline emissions and project emissions are found in the table in section 5 of this report.

From its recalculation of baseline emissions and project emissions, NSF has concluded that the project proponent has fairly stated its emission reductions in accordance with the relevant equations provided in the methodology.

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

The project proponent maintained records for tracking the amount of magnesium metal melted for operational and quality reasons, and utilized an automated software system called Plex for tracking all movements of metal by scanning bar codes on pallets once these had been weighed. Scales were regularly calibrated. The use of cover gas also was tracked through an inventory accounting system with monthly weighing of cylinders and totes.

The system for tracking was reliable. The greatest opportunity for error was the manual transcription process for entering the weights of metal melted and cover gas container weights into the spreadsheet maintained for project calculation purposes. NSF doubled checked transcribed amounts and found a small number of errors that were corrected as a result.

NSF also checked the amount of total product sold during the period covered by the Monitoring Report. This check was to ensure that the plant did not produce 30% or more metal than it sold as products. NSF found that sales nearly matched the amount of metal melted. Because the Meridian facilities were not primary producers of magnesium metal, the amounts of scrap metal returned to recycling from die casting for remelting were considered to be internal sales.

NSF concluded overall that record keeping provided highly accurate data and that calculated baseline emissions, project emissions and emission reductions were reliable.

4.4 Non-Permanence Risk Analysis

Not applicable to this methodology.

5 VERIFICATION CONCLUSION

Based upon the verification work described above, which was performed in accordance with ISO

14064-3:2006 and the requirements of the Verified Carbon Standard, NSF has concluded with reasonable assurance and without qualification that the CO₂-e emission reductions reported by Climate Change Capital LLC for the “Conversion of SF₆ to an Alternative Cover Gas in Magnesium Production in Eaton Rapids, MI, and Strathroy, ON” project for the reporting period 1 January 2013 through 31 October 2014:

1. are, in all material respects, fairly stated;
2. are reported in conformity with the Verified Carbon Standard 3.4; and
3. are reported in conformity with the CDM Approved baseline and monitoring methodology AM0065 “Replacement of SF₆ with alternate cover gas in the magnesium industry”, version 1.

NSF has further concluded that, except for the Project Description deviation approved in section 3.3 of this report, there were no material changes to how the project was carried out compared to the description of the project in the validated Project Description.

Verification period: From 1 January 2013 through 31 October 2014.

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2013				
--Michigan	244,648	59,240	0	185,408
--Ontario	120,723	40,996	0	79,727
Sub-total	365,371	100,236	0	265,135
Year 2014				
--Michigan	214,225	36,260	0	177,965
--Ontario	113,959	44,077	0	69,882
Sub-total	328,184	80,337	0	247,847
Total	693,555	180,573	0	512,982

APPENDIX A: LIST OF FINDINGS

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NSF SF6 Replacement Project (AM0065) Project Workbook: Findings

Client: Meridian Magnesium Products FRS: C0147887
 Lead V.: John Shideler Job #: J0598268
 Reporting Year/Period: ↓ Last Revision Date: 2-Feb-2015
 1-Jan-2013 through 31-Oct-2014

Instructions to Verifiers

The Lead Verifier shall record findings of **Nonconformity (NC)** and **Clarification Requests (CR)** on this form. Findings of **Immaterial Nonconformity (INC)** may be listed (or, where a GHG program requires their reporting, shall be listed). **Forward Action Requests (FAR)** and **Recommendations (R)** may also be included as items on this form.

Finding/Clarification: State the requirement that was not met, or ask for clarification of information related to audit objectives.

Reference (Ref.): Cite a relevant requirement in a protocol, standard or procedure; or cite information provided by the Responsible Party in a monitoring plan, report or other document.

Audit Evidence: Cite evidence that supports the finding of nonconformity, or (optionally) a reason for requesting clarification.

Responsible Party Action: Summarize the response provided by the Responsible Party with respect to the Finding or Clarification Request.

Lead V/V Conclusion: State if the response has been accepted, and the disposition of the finding (closed, rewritten as a new NC, etc.).

#	Type	Finding/Clarification	Ref.	Audit Evidence	Responsible Party Action	Lead V/V Conclusion
1	CR	Please provide a more detailed description of "the relevant implementation dates" of the project.	VCS Monitoring Report template, v. 3.3, section 1.1 2nd bullet	Template instructions call for "e.g. dates of construction, commissioning, and continued operation periods."	Dates of commissioning of the project at both sites for both die casting and recycling have been added to the Monitoring Report.	The clarification is accepted. The issue is closed.
2	CR	Please list all the relevant sectoral scopes for the AM0065 methodology in section 1.2 of the Monitoring Report.	VCS Monitoring Report template, v. 3.3, section 1.2	ACM0065 lists three sectoral scopes; only one is listed.	The two additional scopes have been added.	The clarification is accepted. The issue is closed.

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3	CR	Please clarify the proper name of the "project host."	VCS Monitoring Report template, v. 3.3, section 1.4	The validation report dated 2008-04-01 stated that "Meridian Magnesium Products" was the "owner and operator" of the project. Per C. Woodburn, the common parent of the Eaton Rapids and Strathroy plants is Meridian Light Weight Holdings, Inc.	The project proponent has confirmed that the Michigan plant, Meridian Magnesium Products, is the project host.	The clarification is accepted. The issue is closed.
4	CR	Please correct the starting and ending dates of the project crediting period.	VCS Monitoring Report template, v. 3.3, section 1.6	It appears that the project reporting period was entered instead of the project crediting period. NOTE 1: The start date for the Crediting Period is given differently in the Project Description and in the Validation Report. NOTE 2: The VCS 2007.1 standard states that the project start date is the "Date on which the project began reducing or removing GHG emissions."	The project crediting period has been restated as 1 January 2007 through 31 December 2016.	The clarification is accepted. The issue is closed.
5	CR	Please confirm the name of the Strathroy subsidiary of Meridian Lightweight Technologies Holdings, Inc.	VCS Monitoring Report template, v. 3.3, section 1.7	The Meridian website provides different names for the two plants in Strathroy.	The current name of "Meridian Lightweight Technologies Inc." has been provided for "Site 2" in Section 1.7 of the Monitoring Report.	The clarification is accepted. The issue is closed.

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6	CR	Please address, in the negative if applicable, the three subjects of information specified for this section of the template.	VCS Monitoring Report template, v. 3.3, section 1.9 --- Emissions trading programs and other binding limits; --- Other forms of environmental credit; --- Participation under other GHG programs.	The Monitoring Report template requests information on the following topics: --- Emissions trading programs and other binding limits; --- Other forms of environmental credit; --- Participation under other GHG programs.	Three new sentences have been added to section 1.9 to address the topics listed in the template.	The clarification is accepted. The issue is closed.
7	CR	Please clarify the change of ownership at the corporate level during the project reporting period and explain its impacts on the project, if any.	VCS Monitoring Report template, v. 3.3, section 2.1	The Monitoring Report template requests information on the following additional topic: --- Any other changes (e.g. to project proponent or other entities)	A statement concerning the sale of a controlling interest in Meridian Lightweight Technologies Holdings Inc. has been added to section 2.1	The clarification is accepted. The issue is closed.
8	CR	Please include in the Monitoring Report <i>all</i> previously approved Project Description deviations.	VCS Monitoring Report template, v. 3.3, section 2.2.2	For example, in its verification report dated 2012-06-21, DNV mentioned two deviations: --- the approval of a change in GWP for SF6 from 22,200 to 23,900, and --- change in measuring the consumption of alternate gas in the project scenario from measuring by the flow meters, to measuring by weight of the gas consumed.	Two paragraphs have been added to section 2.2.2 addressing the two Project Description deviations cited at left.	The clarification is accepted. The issue is closed.

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9	CR	Please clarify whether the project is or is not a "grouped project".	VCS Monitoring Report template, v. 3.3, section 2.3	Note is taken that the validated Project Description states that the project is a "Grouped Project".	A statement has been added to section 2.3 that this project is not a grouped project. VCS was consulted and approval was given for NSF to evaluate the impact of this Project Description change.	The clarification is accepted. Information has been added to Section 2.2.2 to describe this as a deviation from the Project Description. The issue is closed.
10	CR	Please clarify the values for the parameters not measured 5 and 9 (GWP _{ALT GAS} and C _{SF6, TOT, BU})	VCS Monitoring Report template, v. 3.3, section 2.3	All data parameters should be reflected in the Monitoring Report.	The emissions factors for the baseline period have been added to the Monitoring Report (v. 3).	The clarification is accepted. The issue is closed.
11	CR	Please convert the data units in the monitored parameters to SI units.	VCS Monitoring Report template, v. 3.3, section 3.2	VCS now requires Verification Bodies to demonstrate in their publicly available reports how they have recalculated emission reductions. The units reported in the Monitoring Report and Verification Report should be consistent with the units in the methodology.	The project proponent has changed units in the parameter tables and quantification section of the Monitoring Report to SI.	The clarification is accepted. The issue is closed.
12	CR	Please include the monitored parameter 'Magnesium sales reports' from the methodology.	VCS Monitoring Report template, v. 3.3, section 3.2	This data parameter is required by the methodology.	The parameter of total sales for both sites has been included. There was not any over production. Typically about 50% of the metal melted is used in parts and the other 50% is scrap.	The clarification is accepted. The issue is closed.

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13	NC	The calculation of SF6 project emissions did not take into account the conservative factor $DI_{SF_6,CON,0.1,k,l,y}$.	AM0065, Eq. 12	The default factor is found in the "Parameters not monitored" section of the methodology.	The variable has been added to the "Parameters not monitored" section of the Monitoring Report (v. 3).	The corrective action is accepted. The issue is closed.
14	CR	Please consolidate the information provided in section 2.2.1 with that provided in section 2.2.2.	VCS 3.5.1	The information about the change from monitoring with flow meters the quantity of cover gas used to monitoring with the mass-balance approach is not a deviation from the methodology, as both methods are accepted.	The information formerly in section 2.2.1 has been consolidated in section 2.2.2.	The clarification is accepted. The issue is closed.
15	CR	Please revise the information provided in section 2.2.2 concerning the change of GWP for SF6 used in the project.	Monitoring Report, 2.2.2	In 2007 the IPCC's Assessment Report 4 (AR4) revised to 22,800 the 100-year GWP of SF6 from 23,900 in the Second Assessment Report (SAR). The approved Project Description deviation did not therefore update the GWP, but rather it acknowledged that the CDM Executive Board had approved for use the values in the SAR for initial crediting periods.	Information has been included in the Monitoring Report, section 2.2.2.	The clarification is accepted, the issue is closed.
16	NC	Not all bottles of Eaton Rapids used SF6 were included in the inventory accounting.	SF6 bottle record recycling 2013.xlsx' table.	Three Eaton Rapids bottles were omitted from the table when manually transferring information from inventory records, resulting in a 339 lb. understatement of SF6 used.	The omitted SF6 bottles were added into the table and accounted for in revised calculations.	The corrective action is accepted. The issue is closed.

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17	NC	Not all SF6 used data were recorded for the Strathroy facility.	Meridian 2013 Monitoring Data 11-18-2014.xlsx	ON Die Cast and ON Recycling did not record SF6 usage numbers for the month of October 2013.	The omitted SF6 data were added into the table and accounted for in revised calculations.	The corrective action is accepted. The issue is closed.
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18	FAR	Eaton Rapids will gain two new die casting cells and Strathroy one additional cell in 2015.
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