

VERIFICATION REPORT FOR VCS PROJECT 618'S FIFTH MONITORING REPORT



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Summary:

NSF-ISR verified the fifth 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, 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 2012 through 31 December 2012. NSF-ISR 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 2.1.

NSF-ISR performed off-site document review and on-site verification audit activities for this reporting period. NSF-ISR received acceptable responses for all clarification requests issued. No findings of nonconformity were raised. On the basis of work performed, NSF-ISR concluded with reasonable assurance that the Project's asserted 244,098 metric tons of carbon dioxide–equivalent vintage 2012 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 engaged NSF-ISR to verify the fifth 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-ISR determined that the potential for conflict-of-interest was low for NSF-ISR and for the verification team.

1.1 Objective

The objective of the verification of the fifth 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 Design and 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 2012 project reporting year (January 1 through December 31).

Criteria included the Verified Carbon Standard, version 3.3, and the CDM Approved baseline and monitoring methodology AM0065 “Replacement of SF₆ with alternate cover gas in the magnesium industry,” version 2.1.

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 substitutions of Novec[®] 612 and sulfur dioxide cover gases reduce the usage of sulfur hexafluoride and lower total greenhouse gas emissions.

2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

2.1 Validation Process

The verification team reviewed the validation report issued by Det Norske Veritas (DNV) on April 1, 2008. No material discrepancies (corrective actions, clarifications or other findings) raised by the validation team during the validation process were left for later resolution.

2.2 Validation Findings

2.2.1 Gap Validation

2.2.2 Methodology Deviations

2.2.3 Project Description Deviations

2.2.4 New Project Activity Instances

2.3 Validation Conclusion

3 VERIFICATION PROCESS

3.1 Method and Criteria

NSF-ISR developed a sampling plan based on the requirements of AM0065, the Verified Carbon Standard, and data provided to NSF-ISR 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. Verification activities were conducted on-site in Eaton Rapids, MI, and Strathroy, ON, after off-site document review.

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

NSF-ISR 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, four instances of this spreadsheet tab were completed so that the Project emission reduction calculations could be checked at disaggregated levels (i.e. Recycling and Die Casting in Eaton Rapids and Strathroy, respectively).
- A tab to record the results of data checks.

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

3.2 Document Review

The following table lists documents consulted during the document review process:

#	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 Det Norske Veritas
3	"VCS Verification Report: Conversion of SF ₆ to an alternative cover gas in magnesium production in Eaton Rapids, MI and Strathroy, ON, Monitoring Period 01 January to 31 December 2011," revision 1 (June 21, 2012), by Det Norske Veritas
4	Clean Development Mechanism, Approved baseline and monitoring methodology AM0065 "Replacement of SF ₆ with alternate cover gas in the magnesium industry," version 2.1
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 2012 Monitoring Data 3-1-2013.xls," provided to NSF-ISR on March 1, 2013

3.3 Interviews

Throughout the course of verification activities and during the site visit, NSF-ISR interviewed the following project personnel:

Person	Title	Organization
Chuck Woodburn	Facilities Engineer	Meridian Magnesium Products of America
Brian Jones	Consultant	M. J. Bradley, Inc.
Jeanette McGarry	Information Systems Programmer	Meridian Magnesium Products (Eaton Rapids)
Corey Hutchenson	Recycling Supervisor	Meridian Magnesium Products (Eaton Rapids)
Ed Henshaw	Facility Engineer	Meridian Magnesium Products (Strathroy)
Shayne Sibley	Recycling Specialist	Meridian Magnesium Products (Strathroy)
Mark Orphan	Financial Officer	Meridian Magnesium Products (Strathroy)
Scott McLean	President	McLean Scale Co.

3.4 Site Inspections

NSF-ISR Lead Verifier John Shideler visited the Meridian Magnesium Products of America facility in Eaton Rapids, MI, on 5 February 2013, and the principal Meridian Magnesium plant in Strathroy, ON, facility on 6 February 2013. Site tours at both facilities included visiting the metal melting and die casting operations, all of which required the use of cover gas to prevent oxidation

of molten magnesium metal which otherwise occurs upon contact with air. Facility visits included observation of the distribution and usage of cover gas during operations, monitoring systems for the cover gases, and accounting methods for tracking the mass of metal melted and the usage of cover gases. 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 both the Michigan and Ontario plants the Lead Verifier observed physical quantities of Novec[®] 612 (dodecafluoro-2-methyl-3-pentanone), an HFC cover gas produced by 3M. NSF-ISR 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). He witnessed the process for weighing metal ingots and inputting the weights of ingot pallets in the PLEX computer inventory system. In Ontario he observed the usage and storage of the same cover gases and checked the unit weights of randomly selected finished magnesium parts. The tracking of finished part weights was used at Strathroy as a cross-check on the melted metal accounting method used to determine the annual amount of cover gas deployed.

3.5 Resolution of Any Material Discrepancy

NSF-ISR issued nine Clarification Requests and four Nonconformities during the course of this verification engagement. Meridian Magnesium provided satisfactory information to close out the Clarification Requests. Two of the findings of Nonconformity related to errors in quantification. Sampling of records at Eaton Rapids revealed small errors in the reporting of SF₆ gas used by Recycling. An error pertaining to Strathroy's mass of melted metal was traced to a spreadsheet data entry error. Two other nonconformities related to the use of data parameters in the CDM methodology. NSF-ISR approved the corrective actions which resulted in modifications to the Monitoring Report and a small downward revision of asserted emission reductions.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

NSF-ISR found the conversion of SF₆ to an alternate cover gas project as implemented at Meridian Magnesium Products of America facilities in Eaton Rapids, MI, and Strathroy, ON, to meet VCS and methodology requirements. The Project remained in conformity with the validated Project Description.

The Project continued to meet eligibility criteria. The alternative cover gas systems were installed in existing, rather than new facilities. It was implemented in facilities belonging to the metal casting industry in the subcategories of die casting and production of secondary magnesium through recycling of magnesium or its alloys. It substituted an inert gas to avoid oxidation of molten magnesium in die casting and metal recycling processes. The project replaced sulfur hexafluoride with either a cover gas of a lower global warming potential (Novec[®] 612) or a dilute sulfur dioxide.

The application of dilute sulfur dioxide met applicability requirements. Mass flow controllers were installed and operational. The gas was precisely mixed and delivered at controlled flow rates at an acceptably low concentration. Due to its low concentration, regulatory permitting was not required in the Michigan plant. In the Ontario plant, regulatory approval had been obtained in the plant's certificate of approval. Gas cabinets included leak detection systems and an emergency ventilation system. Both plants had emergency response plans and procedures and back-up power generation to ensure the functioning of the cover gas application systems in the case of power outages. In case of operational difficulties, sulfur hexafluoride was available as a back-up cover gas. Equipment related to the cover gas delivery systems was covered by Preventive Maintenance inspection and servicing schedules.

Meridian Magnesium met the monitoring requirements defined in the AM0065 methodology. The quantity of cover gas used was determined by the inventory accounting method. The mass of melted metal was determined on the basis of weighed ingots in the recycling facilities and by the amount of metal delivered to each machine in die casting. NSF-ISR verified the metal melted numbers by checking samples of shift operator recorded entries against spreadsheets of data that listed each pallet of metal ingots produced in recycling or delivered to die casting. Cover gas inventory records were checked against purchase records.

In Ontario, the Project was not able for a portion of 2012 to use dilute sulfur dioxide as a cover gas because the plant was completing a production run of parts made with a magnesium alloy that was not part of the original validated Project Description. In the previous reporting period, Det Norske Veritas, the Project's validation body and verification body through the fourth reporting period, accepted Meridian Magnesium's explanation that its use of sulfur hexafluoride was unavoidable because the plant experienced operational problems with a particular magnesium alloy it was running to meet a customer demand. DNV and the project developer agreed that the MRI alloy used was not part of the project activity as defined in the Project Description. For this reason, the Ontario plant used its back-up sulfur hexafluoride cover gas for the first two quarters of 2012. It then experienced operational difficulties with the dilute sulfur dioxide cover gas system that required returning parts to the manufacturer for repair. The dilute sulfur dioxide cover gas system returned to operation during the third quarter of 2012.

The project met the requirement to sell at least 70% of magnesium produced. This parameter was met because Meridian Magnesium's ratio of unsold parts to produced parts in 2012 did not exceed 30%.

The Validation Report did not identify any methodology deviations. However, the fourth verification report noted that DNV had observed a deviation from the validation Project Description's monitoring methodology. According to the Project Description, the primary method for determining the quantity of cover gas delivered was through the flow measurement method, with the accounting method used as a cross-check. DNV noted, in fact, that the accounting method was employed from the beginning of the Project as the primary method for determining the amount of cover gas used. There was no deviation from the implemented methodology because the accounting method is an approved cover gas delivery measurement method according to AM0065.

4.2 Accuracy of GHG Emission Reduction or Removal Calculations

Meridian Magnesium calculated the amount of metal it melted in recycling and die casting, in pounds. It also calculated the amounts of cover gases used (in pounds) through an inventory accounting method, with mass flow controllers used as a cross check. Conversions from the US weights and measures system used in operations to the metric system of measurement used for Project reporting were checked and found to be accurate. Scale calibrations were checked and found to be within tolerances during the reporting period. During the verification process two errors were discovered in the monitored data and corrected. One related to incomplete consolidation of accounting information about the number of bottles and total weight of sulfur hexafluoride used as a cover gas. The other related to inaccurate metal melted data entry in a spreadsheet used to calculate emission reductions. Correcting these two issues resulted in a decrease of 0.8% in total reported emission reductions from the first version of the Monitoring Report submitted for verification to the final version. After the Monitoring Report was further corrected to account for the conservative factor $DI_{SF6,CON,PJ,k,j,y}$ in Equation 12, the effect of all revisions was -1.73%. With the corrections made, NSF-ISR concluded that the overall emission reduction calculations were accurately stated within the threshold of materiality of 5%.

4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

NSF-ISR found a reliable tracking system for monitoring the mass of metal melted and the quantity of cover gas used, and for quantifying greenhouse gas emission reductions. The lead verifier observed the weighing of metal ingots and saw how the weights were entered into the Plex system on a per pallet basis. Operators scanned a barcode when loading metal into die cast machines to reliably track metal melted in the machines. The inventory accounting system for cover gas was cross-checked on a sampling basis against purchase records. In this protocol, the key parameters for baseline emission calculation is the total mass of metal melted and the amount of cover gas used. The evidence therefore came from both internal and external sources. Overall, NSF-ISR found the evidence supporting the project developer's numbers to be highly reliable.

4.4 Management and Operational System

NSF-ISR found a mature management system in place and a highly reliable tracking system and monitoring methodology for quantification of greenhouse gas emission reductions. Meridian Magnesium Products is certified to ISO 14001 in both its Michigan and Ontario plants, and has ethical standards and a culture in place conducive to accurate reporting. NSF-ISR found a highly qualified workforce in charge of facility management and project monitoring, and an engaged upper management.

5 VERIFICATION CONCLUSION

Based upon the above verification work, performed in accordance with ISO 14064-3:2006 and the requirements of the Verified Carbon Standard, NSF-ISR has concluded with reasonable assurance that the CO₂-e emission reductions reported by Climate Change Capital for the Conversion of SF₆ to an Alternative Cover Gas in Magnesium Production in Eaton Rapids, MI, and Strathroy, ON for the reporting period 1 January 2012 through 31 December 2012:

1. are, in all material respects, fairly stated;
2. are reported in conformity with the Verified Carbon Standard 3.3; and
3. are reported in conformity with the methodological requirements of the CDM Approved baseline and monitoring methodology AM0065 "Replacement of SF₆ with alternate cover gas in the magnesium industry," version 2.1.

NSF-ISR has further concluded that there were no material changes to how the project was carried out compared to the description of the Project in the validated Project Description.

This Project reported 2012 emission reductions from plants in two locations, Eaton Rapids, MI, and Strathroy, ON. The first table below presents the emission reductions separately from each Project location. The second table sums the emission reductions from both Project locations.

Vintage 2012 GHG Emission Reductions or Removals, in tCO ₂ e	Plant located in Eaton Rapids, MI	Plants located in Strathroy, ON
Baseline Emissions	256,330	68,757
Project Emissions	40,372	40,617
Leakage	Not applicable	
GHG emission reductions or removals, per Project location	215,958	28,140

GHG Emission Reductions or Removals	tCO ₂ e Vintage 2012
Baseline Emissions	325,087
Project Emissions	80,989
Leakage	Not applicable
Net GHG emission reductions or removals	244,098