

VERIFICATION REPORT FOR THE
EIGHTH MONITORING REPORT OF VCS
PROJECT 618,
CONVERSION OF SF₆ TO AN
ALTERNATIVE COVER GAS IN
MAGNESIUM PRODUCTION IN EATON
RAPIDS, MI AND STRATHROY, ON



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Summary:

NSF International (NSF) verified the eighth 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 sulphur hexafluoride used to prevent oxidation of molten magnesium metal upon contact with air. The project developer, Meridian Magnesium Products of America, has implemented this project in its magnesium metal recycling and die casting facilities located in Eaton Rapids, Michigan USA, and in the magnesium metal recycling and die casting facilities of Meridian Lightweight Technologies Inc. in Strathroy, Ontario Canada.

The objective of the verification was to verify the Project's emission reductions during the reporting period 1 January 2016 through 31 December 2016. 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 conducted its verification activities in conformity with ISO 14064-3:2006 and the VCS “Validation and Verification Manual” v. 3.2.

NSF performed off-site document review and on-site verification audit activities for this reporting period. NSF received acceptable responses for four clarification requests issued. NSF did not issue any corrective action requests. No material uncertainties with respect to project monitoring were identified. On the basis of work performed, NSF concluded with reasonable assurance that the Project's asserted 328,436 metric tons of carbon dioxide–equivalent vintage 2016 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

1.1 Objective

Meridian Magnesium Products of America engaged NSF International to verify emission reductions achieved during the eighth reporting period of the “Conversion of SF₆ to an Alternative Cover Gas in Magnesium Production in Eaton Rapids, MI, and Strathroy, ON” project. The objective of the verification 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 2016 Monitoring Report, and had remained in conformity with applicable VCS requirements.

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.

1.2 Scope and Criteria

The scope of this verification included magnesium metal production facilities in Eaton Rapids, MI, and Strathroy, ON, where magnesium scrap was recycled and die cast products were 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 was the project reporting period from 1 January 2016 through 31 December 2016.

Criteria included the Verified Carbon Standard, version 3.6 (19 October 2016), 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 the 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, produced magnesium ingots by recycling magnesium scrap in a melting process. The facilities remelted 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 was used to prevent oxidation of molten metal in the presence of air. The substitution of Novec[®] 612 and dilute sulphur dioxide cover gases for sulphur hexafluoride reduced the usage of sulphur hexafluoride and thereby lowered the facilities' total greenhouse gas emissions.

2 VERIFICATION PROCESS

2.1 Method and Criteria

NSF developed a sampling plan based on the AM0065 methodology, the Verified Carbon Standard, and data provided to NSF for document review. Verification procedures 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 3.2 (19 October 2016). After off-site document review, verification activities were conducted on-site in Eaton Rapids, MI.

In accordance with the Verified Carbon Standard, the threshold of materiality for this verification was one 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, four instances of this spreadsheet tab were completed so that the Project emission reduction calculations could be checked at disaggregated levels (i.e. for both 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.

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, 3Degrees Group, Inc. 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 three previous Project Description deviations, two of which had been approved by Det Norske Veritas (DNV) during earlier verification periods. Another one was approved by NSF International after the sixth reporting period. All Project Description deviations are 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 proponent and his consultant 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 2.1, (29 June 2017), by Nick Facciola of 3Degrees Group, Inc.
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, Seventh Monitoring Period (1 November 2014 through 31 December 2015)" revision 1.0 (17 June 2016), by NSF International
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	"B- Meridian 2016 Monitoring Data 1-30-2017.xlsx"

2.3 Interviews

The lead verifier interviewed key personnel at the Meridian Magnesium Products of America manufacturing site in Eaton Rapids, MI. A list of personnel interviewed follows.

Person	Title	Organization
Chuck Woodburn	Facilities Manager	Meridian Magnesium Products of America
Pahouha Thao	Accounts Receivable	Meridian Magnesium Products of America
Nick Facciola	Project consultant	3Degrees Group, Inc.

2.4 Site Inspections

NSF Lead Verifier John Shideler visited the Meridian Magnesium Products of America facility in Eaton Rapids, MI, on 25 May 2017. The objective for the visit was to confirm 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 reassessed Meridian Magnesium's management controls and VCS GHG project management.

Facility personnel identified no significant changes or additions to the installed set of die cast machines at either the Eaton Rapids or Strathroy facilities since the last visit of the NSF verifier in 2016.

2.5 Resolution of Findings

NSF issued four Clarification Requests and one Corrective Action Request during the course of this verification engagement. Meridian Magnesium provided satisfactory information to close out all findings.

CL – 1: Please clarify in § 1.2 of the Monitoring Report whether the project is a grouped project.

Response 1: As this is not a Grouped Project, 3Degrees has clarified this fact in §1.2 of Version 2 of the Monitoring Report.

Resolution 1: The Monitoring Report was updated. The clarification had no bearing on the calculation of emissions reductions.

CL – 2: Please clarify why the US EPA's F-Gas Partnership with the magnesium industry should not be described in § 1.10 of the Monitoring Report.

Response – 2: §1.10 has been filled out in Version 2 of the Monitoring Report to include details on the F-Gas Partnership Program.

Resolution – 2: The Monitoring Report was updated. The clarification had no bearing on the calculation of emissions reductions.

CL – 3: Please clarify whether 3Degrees Inc. has completed "Proof of Right" documentation with the VCS Registry with respect to this project.

Response – 3: Proof of Right now uploaded to the VCS Registry project documents. This includes the Emission Reductions Purchase Agreement between Meridian Magnesium and Origin Climate, as well as the Certificate of Merger between Origin Climate and 3Degrees Group Inc.

Resolution – 3: The Monitoring Report was updated. The clarification had no bearing on the calculation of emissions reductions.

CL – 4: Please clarify why there is a difference in calculated project emissions between the detailed spreadsheet from MPA and the summary spreadsheet prepared by 3Degrees for Strathroy Die Casting.

Response – 4: Application of the Data Integrity conservative factor had been omitted from MPA's initial calculations but was reflected in the final calculations prepared by 3Degrees for the project proponent.

Resolution – 4: The Monitoring Report calculations agree with the verifier's recalculation from MPA data.

CAR – 5: Final aggregated emissions reductions were not rounded down to the closest metric ton.

Response – 5: The Monitoring Report has been reissued with one less VCU claimed.

Resolution – 5: The verifier's recalculations now coincide with the project proponent assertion.

2.5.1 Forward Action Requests

There were no forward action requests from the verification in 2016 to resolve during this verification, and no forward action requests were issued during 2017.

2.6 Eligibility for Validation Activities

NSF did not perform any gap validation activities during this validation.

3 VALIDATION FINDINGS

No validation findings were made during this verification.

3.1 Participation under Other GHG Programs

This project has not sought registration under any other GHG program.

3.2 Methodology Deviations

No methodology deviations have been approved for this project.

3.3 Project Description Deviations

During its verification of the sixth reporting period, NSF assessed one 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 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.

In addition to the 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 was not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

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.

Except for the deviations previously approved and noted in section 3.3, NSF found no material discrepancies between project implementation and the validated Project Description.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

This project reduced emissions into the atmosphere of sulphur hexafluoride (SF₆) by substituting lower global warming potential cover gases for SF₆. The key parameters monitored were the amount of magnesium metal melted and the amounts of cover gases actually used to prevent the oxidation of molten metal which would occur if no cover gas prevented contact of magnesium with air.

The project relied on calibrated scales to measure accurately the mass of magnesium melted and the mass of cover gases used in recycling and die cast operations. Measured results were entered into a spreadsheet that tracked production data and cover gas usage. These entries were quality controlled to ensure data integrity. Consistent with its operational reporting, melting of metal and mass of cover gases used were reported in U.S. pounds. Conversion to metric units was accomplished after data had been aggregated using valid conversion factors (pounds divided by 2.20462 to yield kilograms, then multiplied by 0.001 to convert to metric tons).

Baseline emissions for this project reporting period 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 Rapids and Strathroy. Emissions factors were provided in the “parameters not monitored” section of the Monitoring Report. Data used to establish baseline emission factors were monitored in 2005, 2006, and 2007, and represented the specific operational results for metal melted during recycling and die cast operations in Eaton Rapids and in Strathroy. Hence, a unique baseline emission factor was applied depending on the location and the type of operation. NSF verified that the correct baseline emissions factor was used in each of the four instances of metal melting (recycling and die cast in Eaton Rapids, and recycling and die cast in Strathroy).

As stated in section II of AM0065 v. 1, no leakage was expected to apply to this project, and NSF did not detect any indications to suggest that such secondary effects were occurring.

Except for those defined in the approved methodology, the project proponent did not use any default values in the monitoring report. All values associated with calculation of emissions reductions were the result of measured mass of metal melted and cover gases utilized.

Meridian Magnesium has implemented quality control procedures to minimize manual transposition errors. Ingots of magnesium produced in recycle were weighed on pallets and the values electronically recorded. Data from production reports of “ingot moves” were copied into the project reporting spreadsheet in order to avoid the introduction of manual transposition errors. Similar precautions were applied to monthly summaries of cover gas use. These data were transferred using “paste values” to ensure that no significant decimal digits were lost in the copying process.

The demonstrated quality control procedures implemented by the project developer provided high confidence in the underlying data that were used to quantify GHG emission reductions. In addition, these data were also reviewed by the project’s consultant who provided a further check on the application of all necessary equations associated with calculation of emission reductions in accordance with the project description and AM0065 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 calibrated or verified annually. The use of cover gas also was tracked through an inventory accounting system with monthly weighing of cylinders and totes.

NSF made inquiries with the project proponent to assess the reliability of the system for tracking metal production and cover gas use. NSF found that the project proponent had improved quality control procedures since the previous reporting period and that the opportunity for manual

transcription errors had been substantially reduced. NSF selectively checked entries for the weights of metal melted and cover gas container weights and found no errors in the project developer's spreadsheets.

Calibration records demonstrated high reliability of recorded values at scales used at the Eaton Rapids and Strathroy plants. These scales were calibrated annually in conformity with the requirements of AM0065. During the 2016 monitoring period the scale used at Eaton Rapids for weighing metal moves and cover gases was replaced with a new one.

NSF checked the amount of total product sold during the period covered by the Monitoring Report. This check was performed 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.

After performing data checks on the accuracy of the data, NSF recalculated the emissions reductions from Eaton Rapids and Strathroy facilities using its own spreadsheets that incorporated the equations from AM0065. NSF arrived at the same results as the project proponent.

NSF concluded overall that the project proponent's data management and record keeping practices provided sufficient and appropriate evidence for the calculation of baseline emissions, project emissions and emission reductions during the monitoring period.

4.4 Non-Permanence Risk Analysis

Not applicable to this methodology.

5 SAFEGUARDS

5.1 No Net Harm

The project proponent was not aware of any potential negative environmental and socio-economic impacts associated with this project. NSF concurs with this assessment.

5.2 Local Stakeholder Consultation

NSF agrees with the project proponent that stakeholder consultation was not relevant to this project.

6 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 Meridian Magnesium Products of America 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 2016 through 31 December 2016:

1. are, in all material respects, fairly stated;
2. are reported in conformity with the Verified Carbon Standard 3.6; 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 deviations described 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 2016 to 31 December 2016

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)
2016				
– Michigan	257,607	39,548	0	218,059
– Ontario	141,400	31,023	0	110,377
Total	399,007	70,571	0	328,436