MONITORING, REPORTING AND VERIFICATION PROTOCOL FOR SF_6 SUBSTITUTION AND C_3F_8 USAGE IN AIR BAGS PROJECT

MRV.NIKE.2006.01

Prepared for
Nike, Inc.
Beaverton, OR

by

Environmental Resources Trust, Inc.
Washington, DC

July 2006

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A. Introduction

The Nike Corporation is a global sports and fitness equipment and apparel company with headquarters in Beaverton, Oregon. Approximately 750 contract factories manufacture Nike products worldwide. Environmental Resources Trust, Inc. is a non-profit environmental organization specializing in market-based solutions to environmental problems.

The Nike Corporation employs a patented "Air" technology in some of its footwear products, which utilizes pressurized gas encapsulated in a polyurethane film to form cushioning components (i.e., airbags) in the shoe's sole. Sulfur hexafluoride (SF_6) gas was used in these bags, primarily due to its high density and inert properties. However, SF_6 is also an extremely potent greenhouse gas due both to its radiative potential and long atmospheric lifetime.

Nike began using SF_6 in 1971. By the end of 2002, Nike ceased producing footwear containing SF_6. In its place they have substituted perfluoropropane (i.e., octafluoropropane, R-218, or C_3F_8). The relevant density and safety-related properties of C_3F_8 are similar to SF_6. The global warming potential (GWP) of C_3F_8; however, is significantly lower (see Table 1). Nike has also instituted measures to improve the efficiency of its gas consumption.

Table 1: Gas properties

Gas	Symbol	Density (g/L) @ 1 atm & 15°C	GWP (SAR)[a]	GWP (TAR)[b]	Atmospheric Lifetime[c]
Perfluoropropane	C_3F_8	8.163	7,000	8,600	2,600
Sulfur Hexafluoride	SF_6	6.261	23,900	22,200	3,200

[a] IPCC Second Assessment Report (1996)
[b] IPCC Third Assessment Report (2001)
[c] Atmospheric "adjustment" time in years.

GWP values from the Intergovernmental Panel on Climate Change's (IPCC) Second Assessment Report are used for all analyses in this document, in keeping with the Kyoto Protocol and the United Nations Framework Convention on Climate Change (UNFCCC).

Nike has commissioned this Monitoring, Reporting, and Verification Guideline (the Guideline) to provide transparency and credibility in the quantification of its greenhouse gas emissions and emission reductions.

The purpose of this document is to assess the baseline emissions SF_6 and C_3F_8 from Nike's production processes and products and develop a monitoring and reporting guideline for emissions tracking. Separate project verification statements accompany this MRV protocol for the purpose of verifying emission reductions relative to a specific baseline.

Guideline Objectives

The primary objectives of this Guideline are to the address methodology, data collection, data quality control, and data preservation issues related to the monitoring, reporting, and verifying of SF_6 and C_3F_8 emissions and emission reductions from Nike's footwear manufacturing operations and products. The ultimate objective is that by following this Guideline will produce a "true and fair" representation of the project's net direct emissions performance, which can be audited.

In order to be verified, emission reductions must meet the following criteria:

- The project must result in a reduction of direct emissions within the project's boundaries and be due to specific and identifiable actions such as changes in equipment, technologies, processes, or operations.
- Emission reductions must be quantifiable by acceptable, transparent, and replicable measurement and calculation methods and techniques. Raw data must be available to verify measurements and calculations and statistical information provided to support the level of certainty/significance of the data. Baseline emissions determination must be explained and specified. The actual reduction beyond the baseline emission level must be specified.
- Emission reductions must be additional (i.e., surplus) to emission reductions that may be required by existing regulatory requirements.
- Ownership of the emission reductions must be clearly demonstrable by contract or written agreement. Owners of the relevant facilities, the entities paying the operational costs of the facility, and the entities that paid for or subsidized the initial and the ongoing costs of the emission reduction action must be identified.

Given those criteria, this MRV Guideline shall:

- Define organizational and operation boundaries
- Clearly establish ownership of the credits by clearly demonstrable by contract or written agreement. Identify the owners of the relevant facility, the entities paying the operational costs of the facility, and the entities that paid for or subsidized the initial and the ongoing costs of the emission reduction action.
- Identify emissions sources
- Address issues of additionality and leakage
- Specify a project baseline against which emission reductions will be determined
- Specify monitoring and data collection techniques and procedures
- Specify emission factors & calculation methods, where applicable
- Identify supporting data for emissions quantification
- Describe data management and quality control procedures
- Specify reporting and documentation requirements, including frequency
- Address uncertainty
- Describe procedures for verification and registration of emission reductions
- Specify an attestation statement by project operators

Applicability

This guideline is specifically applicable to SF_6 and C_3F_8 gas emission reductions from the footwear manufacturing process and from the product life of footwear airbags where:

- The gas is not captured and destroyed,
- All gas is assumed to eventually be released to the atmosphere, and
- No regulatory restrictions limit the use of SF_6 and C_3F_8 in manufacturing or products.

Periodic Reviews and Revisions

Environmental Resources Trust, Inc. (ERT) may require revisions to this Guideline to ensure that the monitoring, reporting, and verification system adequately addresses changes in the project's activities.

An annual emissions report should be submitted by Nike to ERT and will be subject to an annual review. As a part of this review, ERT will:

- Review the report and prepare adjustments or corrections
- Verify the data by applying audit-sampling methods
- Register verified emission reductions

This MRV Guideline also specifies the frequency of other MRV activities.

B. General description of project

[NOTE: The following description of the project accurately described the process used from 1995 until 2005 when the phase out was completed and nitrogen use replaced use of global warming gases.] Nike's on-site manufacturing facility is located in Beaverton, Oregon. Nike began using SF_6 in footwear airbags in 1971. SF_6 and C_3F_8 are synthetic (i.e., manufactured) fluorine containing gases with no significant natural sources.[1] Nike purchases all the SF_6 and C_3F_8 it consumes from gas suppliers. The gas is delivered in compressed gas cylinders and stored on-site as a liquid under pressure.

Cylinders of C_3F_8 have been shipped from Illinois, although some is also purchased from a supplier in Russia. All airbags used in Nike products are inflated at Nike's Beaverton, Oregon facility.

[1] See Harnisch, J., and A. Eisenhauer, 1998, Natural CF_4 and SF_6 on Earth, Geophys. Res. Lett., 25:2401-2404.

Gas is piped from storage cylinders to production lines where it is injected into airbags. There are multiple airbag designs that are each associated with different footwear product lines. Different gas injection equipment designs are used for these different airbags. In addition, gas injection is a manual process and operator techniques vary. A small percentage of airbags are also damaged or destroyed in the manufacturing process, which typically involves fugitive emissions of airbag gas.

Although the majority of the gas ends up within usable airbags, some emissions occur due to fugitive releases. The primary pathways include:

- Leakage during gas cylinder handling or airbag manufacturing processes,
- Leakage during footwear manufacturing from damaged airbags,
- Leakage from airbags in current stock of footwear,
- Leakage from airbags during or after disposal.

In November 1998, Nike implemented process changes in their airbag production process to reduce SF_6 emissions, including moving from single to multiple airbag inflation procedures. Nike also installed a gas flow meter to more accurately monitor their gas usage.

In the fall of 2002, Nike ceased using SF_6 in airbags, and therefore, in all of its product lines. In its place, Nike substituted C_3F_8. Nike's remaining SF_6 cylinders were resold to a supplier and the remaining gas in these cylinders was accounted for in their net purchase records. New cylinders were delivered and used to supply C_3F_8. In 2005, Nike then phased out the use of C_3F_8 and substituted it with nitrogen gas (N_2), thereby eliminating greenhouse gas emissions from this process.
The reductions from this project activity relate both to improvements in efficiency in gas consumption and to the substitution of C_3F_8 for SF_6 in all Nike products. The GWP value of C_3F_8 is only 29 percent of that for SF_6, thereby leading to a GWP-weighted reduction in greenhouse gas emissions.

Project boundaries and emission sources

The project and system boundaries comprise all elements of the airbag manufacturing facility as well as the full lifecycle of the airbags themselves. Specifically, the project includes direct on-site SF_6 and C_3F_8 emissions associated with leakage from tanks, piping, airbag production, and damaged airbags. It also includes emissions from airbags (i.e., leaks) after they have left the facility and have been incorporated in footwear products. It does not include other direct or indirect emissions (e.g., electricity consumption or mobile source fuel combustion) of gases other than SF_6 or C_3F_8 from activities that are associated with the manufacturing facility or the sale, distribution, use or disposal of airbags or footwear.

Neither the process changes related to improved efficiency of gas consumption nor the substitution from SF_6 to C_3F_8 materially effected other direct or indirect greenhouse gas emissions from the facility. Specifically, the changes associated with this project have not materially changed the amount on-site energy consumed. Nike's on-site nitrogen generation

equipment (leased) now provides nitrogen gas for bag inflation. The energy use requirements for this process have not yet been quantified. Although the resulting emissions are orders of magnitude smaller than the achieved reductions, ERT will provide a de minimus analysis for completion of this effort.

Starting date of the project activity

Nike began tracking its SF_6 usage and emissions in 1995. In 1998 Nike implemented measures to minimize leakage and consumption of SF_6. Then in 2002 the company completely substituted the use of SF_6 in all products (i.e., footwear airbags) for C_3F_8.

The baseline year, and therefore starting date, for the project is 1995. The specific time periods for which emission reductions are verified and registered are addressed in Project Verification Statements that reference this MRV protocol.

C. Ownership

The Nike Corporation owns the Beaverton manufacturing facility. Nike purchases SF_6 and C_3F_8 from gas suppliers, which do not possess any contractual agreement with Nike regarding rights to emission reductions. Companies that are subcontracted for footwear manufacturing are provided airbags by Nike's Beaverton facility and were not apart of the decision or measures taken to reduce gas usage or substitute gases, which all occurred at the Beaverton facility. The operational practices of subcontractors or gas suppliers do not effect emissions or reduction estimates. The decision to improve the efficiency of gas usage and substitute a lower GWP gas was solely that of Nike management.

Owners of Nike footwear that contain airbags could potentially claim emission reductions associated with the gas contained in footwear products they own if they could verify that they have captured and destroyed the gas before it is released to the atmosphere. Although it is unlikely that individuals would take such measures, it is possible that a third party could collect used shoes and extract and destroy the gas before it is released to the atmosphere. Such a scenario, though, would not create a double-counting problem for the reductions claimed by Nike. The reductions claimed by such a third party would legitimately be additional to the reductions already claimed by Nike.

D. Additionality and leakage

The primary test as to whether a project leads to additional (i.e., surplus) emission reductions relates to the existing federal, state, or local regulatory requirements on the manufacturer to phase-out the use of, capture and/or destroy SF_6 or C_3F_8 at any point. Nike has not been required, pursuant to any environmental law or regulation, to cease using, destroy, or otherwise control emissions of SF_6 or C_3F_8. At such time that Nike is required under any environmental law or any state government law or rule to do so, Nike will advise ERT of such changes in writing.

In terms of financial differences between the baseline and Nike's current practices, the price of SF_6 paid at the time of phase-out was in the range of $5.25/lb. The price for C_3F_8 paid by Nike has been in the range of $9.25/lb. The physical properties of C_3F_8 are equal or superior to those of SF_6 when used for airbags in footwear. The primary property of concern is the size of the respective molecules. Overall, neither the performance or cost of C_3F_8 relative to that of SF_6 justify Nike's switch to the use of the former gas. Both the evidence and Nike's own statements indicate that the primary reason for switching gases was to produce a net environmental benefit.

Leakage is related to emissions of greenhouse gases that occur due to the project activity but are outside the project boundaries. There are no material sources of leakage associated with this project. Specifically, reductions in SF_6 emissions were not compensated by increased emissions from other related products or processes. It is assumed that energy consumption and greenhouse gas emissions related to the manufacturing of SF_6 and C_3F_8 are similar and do not constitute a significant portion of the overall GWP-weighted lifecycle emissions associated with the use of either gas.[2]

The Beaverton, Oregon facility receives, on average, five deliveries of gas cylinders each year. The size of these deliveries has decreased following the conservation measures instituted by Nike in 1998. The difference in emissions associated with shipping of each gas is not appreciably different and the overall trucking load contributed by Nike's consumption has decreased since 1998.

Nike joined with the World Wildlife's Climate Savers program and committed to reduce its corporate carbon dioxide emissions 13 percent below 1998 levels by the end of 2005 from Nike-owned facilities and business travel activities. Nike achieved this goal by pursuing energy conservation projects, purchasing green power and investing in community energy efficiency projects. In addition, the company has committed to measure the emissions of its major subcontracted footwear and apparel manufacturing facilities, with the ultimate intent to determine a greenhouse gas emissions reduction strategy for these facilities. Nike is also looking at the greenhouse gas emissions of other aspects of its supply chain, from packaging systems to mode of transportation, and for opportunities to improve logistics efficiency and reduce greenhouse gases. Nike is also proceeding with a greenhouse gas reduction strategy for its supply chain and logistical operations. Nike's reduction in SF_6 emissions from footwear airbags is not included in its commitment with the Climate Savers program, and therefore can be assessed separately.

[2] Typical energy intensities for the gas products manufacturing industry are around 1 ton of CO_2 per ton of product. For CO_2 emissions from energy consumption to account for even 1 percent of the GWP-weighted contribution of SF_6, it would mean that over 200 tons of CO_2 would have to be emitted for every ton of gas produced.

E. Baseline determination

Traditionally, a project baseline takes into account historic trends, technology developments, regulatory requirements, and investments/divestures/other structural adjustments in the operational control of an entity. In the case of SF_6 emissions from Nike's Beaverton facility, the applicable baseline scenario is the continued uncontrolled release of SF_6 gas to the atmosphere, as this site does not fall under any regulatory requirements to control the release of the gas. A static baseline has been used, specified by the base-year emissions in 1995 of SF_6. The year 1995 is also an option for the base-year under the Kyoto Protocol for emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and SF_6.

As can be seen in Figure 1, relative to 1996 through 1998, 1995 is a more conservative baseline year. Figure 2 presents annual emissions relative to the 1995 baseline as well as net (i.e., cumulative) emissions over the period 1995 to 2005.

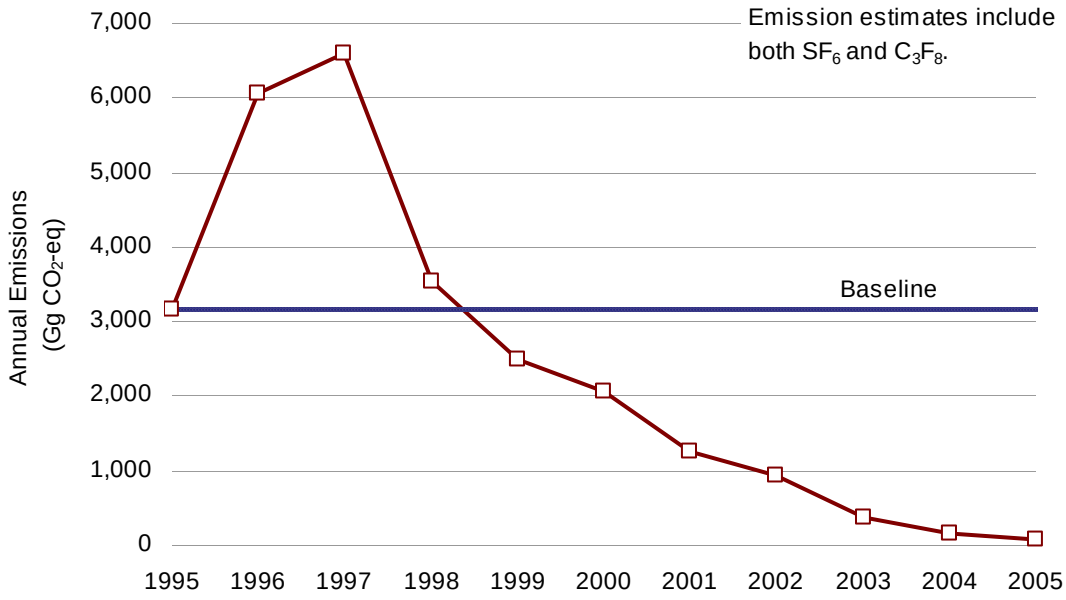

Figure 1: This chart includes emissions of both SF_6 and C_3F_8. Estimates assume all gas is emitted in the year gas is filled into product or delivered to the manufacturing facility.

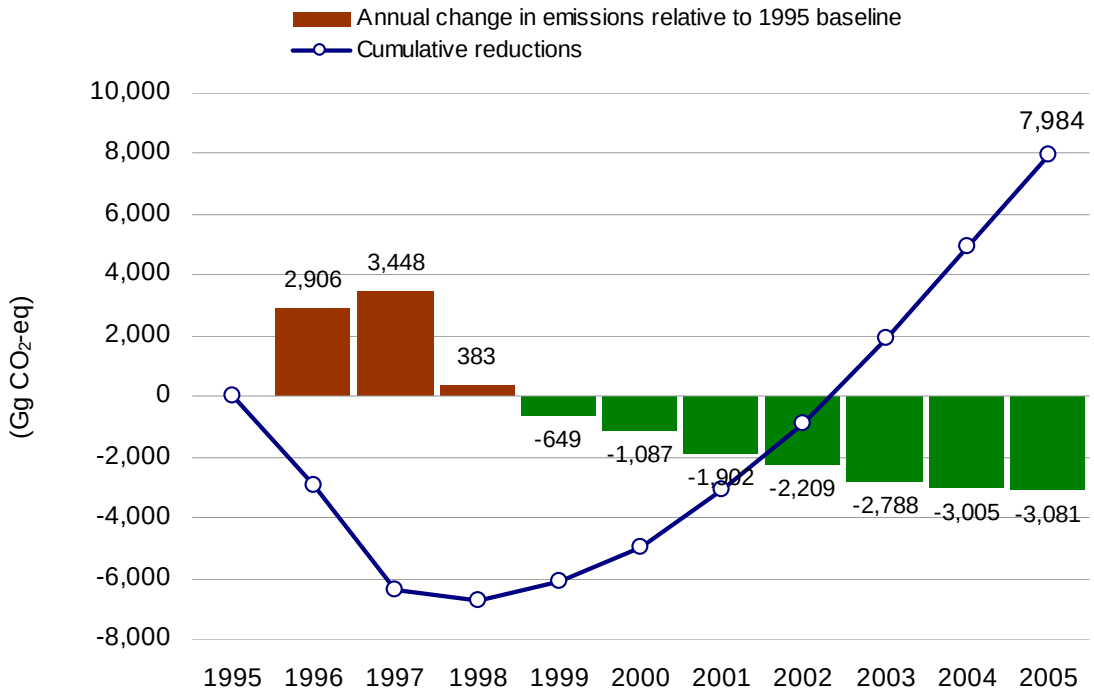

Figure 2: The point of this chart is to illustrate the cumulative emission reductions of both SF_6 and C_3F_8 relative to an assumed static 1995 baseline. This chart indicates that cumulative emission reductions relative to 1995 levels have begun accruing in 2003.

F. Monitoring and data collection

For projects involving the use of PFCs (i.e., C_3F_8) and/or SF_6 such as this one, it is essential to precisely and accurately measure the amount of these gases used in processes and products. The purity of both gases is precisely specified for the gas suppliers. Electronic grade is used, which is required to be at least 99 percent pure.

Data is collected on the amount of gas purchased from suppliers in compressed gas cylinders (see Figure 3 and Figure 4). The net weight (i.e., minus tare weight of cylinder) of each delivery is recorded. The remaining gas heal in returned "empty" cylinders is also recorded and subtracted for the calculation of net purchases. See Annex VI for an example of Nike's gas delivery recording system.

In November 1998, Nike installed a volumetric flow meter to continuously monitor the amount of gas being delivered through its gas distribution system to airbag production lines. An Emerson ELITE CMF010 mass flow and density meter is used in combination with an Emerson Micro Motion model RFT9739 transmitter (see Figure 5). These instruments are designed to monitor low flow processes.

Figure 3: C_3F_8 gas cylinders

Figure 4: C_3F_8 cylinders connected to gas distribution system

Figure 5: Emerson ELITE CMF010 mass flow and density meter (left) and Micro Motion model RFT9739 transmitter (right)

The output of the flow meter is monitored daily by Nike staff, but mass flow data is recorded monthly. The Micro Motion transmitter totalizes data automatically. Records are to be kept in electronic format.

Data on the number and type of gas filled airbags produced are also recorded on a monthly basis.

Records on all data discussed in this section will be archived for the life of the project in order to facilitate verification.

G. Calculation methodology

Estimates for this project are based on potential emissions of SF_6 and C_3F_8. In other words, it is assumed that all of the gas purchased is eventually emitted to the atmosphere. It is also assumed that all gas is emitted at the time the gas is delivered to the manufacturing facility and/or the airbag is manufactured. Three methodologies are used to estimate annual emissions.

1) Gas purchase records, net gas returns
2) Estimated consumption based on the number and types of airbags produced
3) Monitored consumption from flow meter data

Activity data over the entire time series, beginning in 1995, are only available for the purchase record and estimated consumption methods (i.e., methods number 1 and 2). Annual data from the flow meter is available beginning with the year 1999.

Gas purchase records are the standard basis for estimates of potential emissions of HFCs, PFCs, and SF_6 under the Intergovernmental Panel on Climate Change guidance (IPCC 1997, IPCC 2000). In most cases, this method produces conservative, or upper limit, estimate of emissions. However, this project is complicated by the presence of a pre-1995 stock of SF_6 gas at the Beaverton facility. The standard practice at the facility is to maintain an inventory of roughly 40,000 to 60,000 pounds of gas in cylinders to ensure adequate supply in between shipments. Therefore, the purchase record method actually underestimates emissions of SF_6 due to the presence of this pre-1995 stock. This problem, however, is not an issue for estimates of C_3F_8 emissions because usage of the gas—including the initial shipment—began within the project timeframe (i.e., 1998). In other words, there is no pre-existing stock of C_3F_8.

Nike's engineering group also provides estimate for the mass of gas in each type of airbag used in each of its product lines using computer aided design software. The amount of gas in airbags varies by footwear model design. These estimates are based on engineering knowledge, the airbag's volume, and the number of airbags produced. These gas consumption estimates are adjusted for the amount of gas assumed to be lost during the airbag production process (i.e., from filling and damaged bags), which is assumed to be 1 percent of the total theoretical mass of gas in satisfactory airbags.

The flow meter method simply totals the volume of gas piped to the airbag production lines and converts that amount of gas to mass.

To estimate SF_6 emissions over the timeframe of 1995 through 2002, a combination of the estimated usage and flow meter methods were used. Estimated gas usage data from engineering calculation was used for 1995 through 1998. Gas flow meter data was used beginning in 1999, following its installation. Nike phased-out the use of SF_6 gas in 2002.

The difference between the cumulative amount of gas purchased and the amount estimated to have been used based on engineering estimates and flow meter data over the timeframe of 1995 through 2002 is 49,524 pounds. This value is consistent with a pre-1995 stock of SF_6 of between 40 and 60 thousand pounds of gas.

Purchase record data is to be used for all annual emission estimates of C_3F_8.

Data for all variables addressed in this section should be recorded and archived as specified in the Appendix I.

H. Quality control (QC)

The following quality control procedures should be followed:

- The recording and archiving of all gas purchases/deliveries, monthly gas flow readings, and number of airbags produced
- Monthly data should be compared with historical data and trends in gas usage should be consistent with changes in production operations.
- The inlet gas meter to the airbag production facility should be calibrated by a licensed technician once per year. The calibration records should be kept on file and submitted to ERT each year with the emission reduction calculations (see Appendix I).
- The implementation of corrective actions when problems are identified and the reporting of those problems to ERT when they occur
- The establishment of routine reminders for site technicians to perform calibration and other QC procedures
- Estimates of the annual amount of gas consumed using each of the three methods described above should be compared and differences explained and justified.

This MRV Guideline will be available for review and comment by all stakeholders. The feedback and comments received will be considered in future revisions.

I. Reporting and Documentation

All records and logs should be maintained such that an independent third party verifier can audit them. An annual emissions reduction report should be submitted to ERT in order to complete the verification process. This annual report should include the following:

- The reporting guideline as depicted in Appendix IV.
- Copies of gas purchase and delivery records
- Signed attestation statement, as provided in Appendix II

J. Uncertainties

Although three different methods have been used to estimate annual emissions of SF_6 and C_3F_8, each method was selected to minimize the uncertainty in emission estimates based on the particular year and availability of data. In addition, accounting for the pre-1995 stock of SF_6 leads to a more conservative (i.e., lower) estimate of cumulative emission reductions.

As can be seen in Figure 6 for SF_6 emission estimates, all three methods produce highly consistent results. The primary difference is the estimate for the cumulative consumption (i.e., emissions) of gas between the purchase record method and the combination of the other two methods. This difference is indicated by the bars in Figure 6, and represents the pre-1995 stock of gas. In 2000 and 2002, it is clear that this stock is being drawn down by consumption that is greater than purchases.

In Figure 7 a reverse process is apparent in the data for C_3F_8. Purchases exceeded consumption, as the stock of gas was built up at the facility. Based on this data, a stock of approximately 50 to 60 thousand pounds of gas was maintained at the end of 2003. This stock can then be to have been depleted in 2004 and 2005 when purchases were less than estimated consumption.

Although considered to be the most accurate method to estimate potential emissions, the use of gas purchase records or consumption data (i.e., estimated usage of flow meter) does lead to interannual biases because gas purchased or used in one year is not necessarily emitted in that year. For example, purchases may occur in year *t*, airbags may then be manufactured in year *t*+1, and finally footwear containing the airbags may be disposed of—resulting in release of the gas—in year *t*+5. However, according to the potential emissions methodology all the gas would be assumed to have been emitted in year *t* in the case of the purchase record methodology or in year *t*+1 for the flow meter or estimated usage methodologies.

These interannual biases, however, are not necessarily a problem, assuming that cumulative emissions are totaled over several years. Both SF_6 and C_3F_8 have extremely long atmospheric lifetimes, and the reductions claimed have occurred over the course of many years (i.e., the interannual biases have averaged out). Actually, estimates of reductions are likely to underestimate actual reductions because emission estimates of C_3F_8 do not account for the accumulation of a stock of the gas at the Nike facility (i.e., we assume more has been emitted than actually has occurred). Therefore, the use of purchase records to estimate C_3F_8 emissions also leads to a more conservative estimate of emission reductions, given the baseline selected.

Nike has not performed any ambient air sampling for SF_6 or C_3F_8 within manufacturing facility. The mass flow accuracy of the Emerson flow meter is reported by the manufacturer to be ±0.35% of the flow rate. Overall, the total uncertainty in cumulative emissions SF_6 and C_3F_8 over the time series has not been estimated. However, the methodologies and baseline selected are far more likely to have underestimated versus overestimated the reductions achieved by the project.

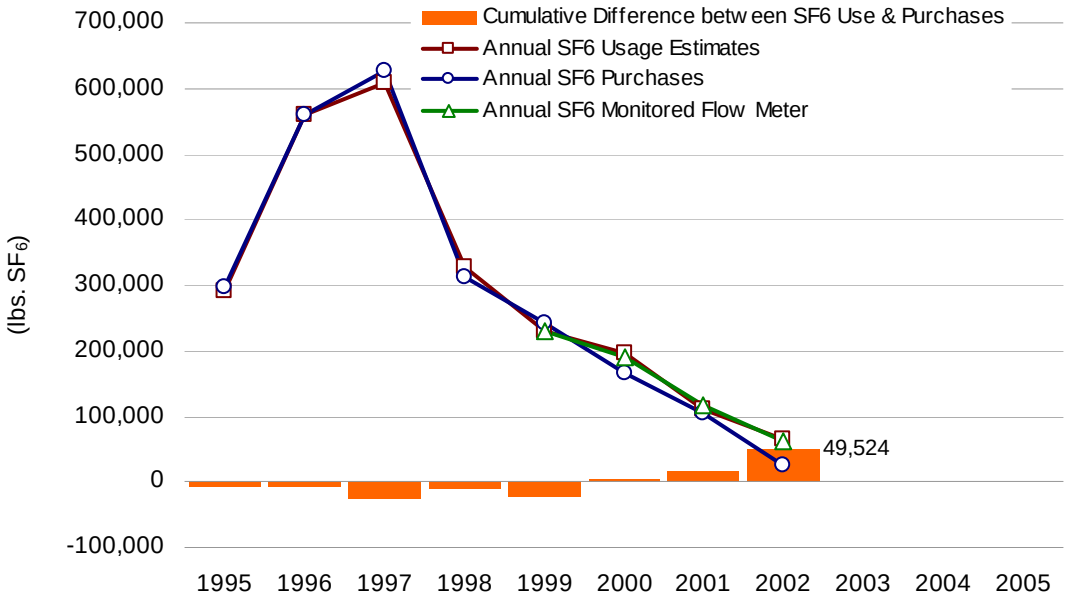

Figure 6: The point of this chart is to illustrate the differences in annual SF_6 usage estimates and SF_6 purchase records. All these datasets exhibit an excellent degree of correlation. The cumulative difference between usage (monitored and from engineering estimates) and purchases is believed to be primarily explained by the presence of a pre-1995 stock of SF_6 gas at Nike. The approximate magnitude of this pre-1995 stock has been estimated based on the cumulative difference in usage estimates and purchase data until SF_6 use was phased out. Positive values for the bar graph indicate more SF_6 was used than purchased. SF_6 ceased to be used by Nike in 2002.

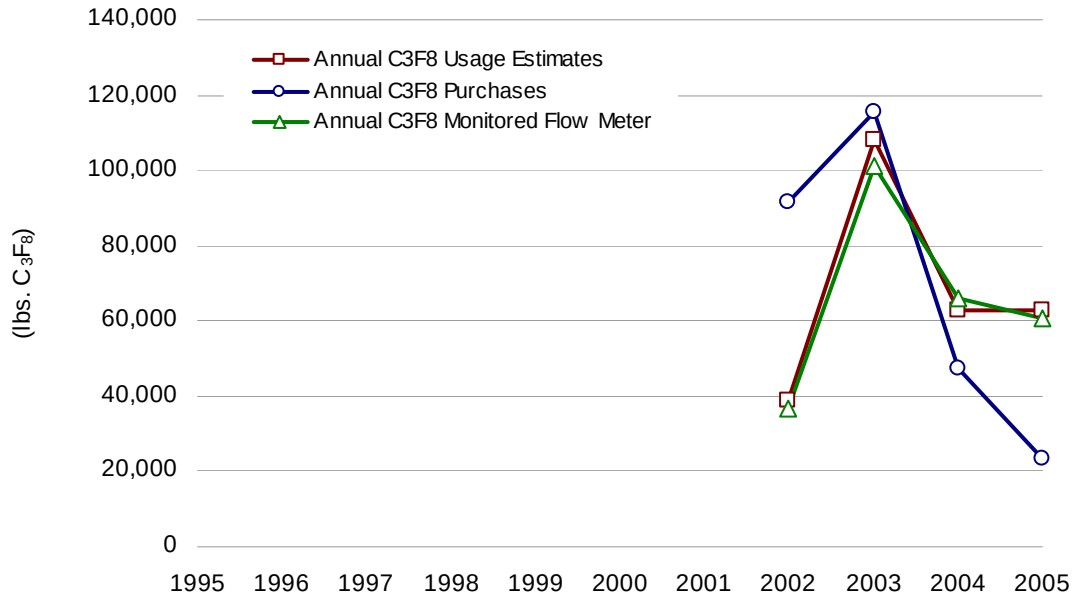

Figure 7: The point of this chart is to illustrate the differences in annual C_3F_8 usage estimates from both engineering calculations and C_3F_8 purchase records. Both sets of usage data exhibit an excellent degree of correlation. The difference between usage (monitored and engineering estimates) and purchases is illustrates the accumulation of a stock of gas at Nike in anticipation of possible supply disruptions. Nike began using C_3F_8 in 2002.

K. Verification and registration

ERT and its subcontractor, CH2MHill, conducted a site visit of the Nike Beaverton, Oregon manufacturing facility in January 2003 in order to prepare this MRV protocol. During that visit, ERT toured the Nike manufacturing operations, examined their gas handling and storage equipment and operations, and verified Nike's monitoring, data recording, and quality control procedures. Nike personnel were interviewed and internal SF_6 purchase and delivery records were examined (see Appendix V).

ERT will conduct additional site visits to Nike manufacturing facilities once ever five years, with prior notification of the facility operators, in order to verify the operating conditions of this project.

ERT will annually verify and apply audit-sampling methods. Once verified, following the provision of the annual emissions reduction report and complete supporting documentation, ERT will register any applicable emission reductions in the account of Nike Corporation for the preceding year's vintage. A Project Verification Statement will be produced for each registration of emission reductions cycle (see Appendix III).

L. Attestation statement

The attestation statement in Appendix II must be signed by management of Nike Corporation and submitted annually to ERT, along with the project report, by March 31 following each year of the project's lifetime, or upon submittal of periodic emission reduction documentation for verification and registration.

M. References

IPCC (1997) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, Paris: Intergovernmental Panel on Climate Change, United Nations Environment Programme, Organization for Economic Co-Operation and Development, International Energy Agency. Paris, France. http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm

IPCC (2000) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories.* IPCC National Greenhouse Gas Inventories Programme Technical Support Unit, Kanagawa, Japan. http://www.ipcc-nggip.iges.or.jp/gp/report.htm

N. Appendices

Appendix I: Factors, Variables, and QC procedures summary
Appendix II: Attestation statement
Appendix III: Project Verification Statement template
Appendix IV: Nike Reporting Guideline
Appendix V: Examples of Nike gas purchase records
Appendix VI: Example of gas delivery record

Appendix I: Factors, Variables, and QC procedures summary

Factor Used for Converting SF_6 and C_3F_8 to Carbon Dioxide Equivalents

Gas	Global Warming Potential	Reference
SF_6	23,900	*Climate Change 1995: The Science of Climate Change*, IPCC (1996)
C_3F_8	7,000	*Climate Change 1995: The Science of Climate Change*, IPCC (1996)

Conversion Factors

Description	Factor	Units	Description
C_3F_8 density	8.163	g/L (288K & 1 atm)	Density should be corrected for local temperature and altitude
SF_6 density	6.261	g/L (288K & 1 atm)	Density should be corrected for local temperature and altitude

Data to be collected or used to monitor emissions from the project activity, and how this data will be archived

Variable	Description	Data unit	Measured, calculated or estimated	Recording Frequency	Proportion of data to be monitored	How are data archived?	Comments
M_{C3F8}	Mass of gas purchased and delivered	kg	Measured	At each occurrence	100%	Electronic	Mass measurements should be checked upon delivery.
V_{C3F8}	Volume of gas delivered to production lines	m^3	Measured	Continuous	100%	Electronic	Measured by flow meter.

Quality control (QC) procedures are needed for the monitoring equipment and the data collected

Data	Uncertainty (High/Medium/Low)	Explanation
M_{C3F8}	Low	Copies of all purchase and delivery records will be archived. Delivery weights will be checked upon arrival.
V_{C3F8}	Low	Flow meters will be subject to a regular maintenance and calibration regime to ensure accuracy.

Appendix II: Attestation Statement

As an officer of Nike Corporation I hereby certify that the emissions reductions reported in connection with the substitution of C_3F_8 for SF_6 in footwear airbags have been calculated according to the methods and procedures as outlined and described in this MRV Guideline and are a true representation of the emission performance of the project.

MRV.NIKE.2006.01
Verification Statement Reference Number

_____
Name

_____
Title

_____
Signature Date

Appendix III: Project Verification Statement template

[see attachment]

Participant Data

Name:	[Click **here** and type client company]
Contacts:	[Click **here** and type client name]
Prepared by:	[Click **here** and type ERT staff name]
MRV Protocol:	[Click **here** and type MRV doc #]
Date Prepared	"[Click here and type date]"

Summary

Based on its review, ERT has verified the information submitted by [Click **here** and type company name] as being consistent with the attached monitoring, reporting, and verification protocol. ERT has registered a total of [Click **here** and type number] metric tons of CO_2 equivalent emission reductions, conditioned on the followings findings and adjustments.

Key Findings*

Project Boundaries & Dates:
Additionality & Leakage:
Baseline:
Monitoring, Data Collection, & Methodology:
Quality Control, Reporting, Documentation, & Uncertainties:

*Applicable to this verification statement versus entire project lifetime.

Incremental Account Adjustment

Valid as of:	[Click **here** and type date]

Registered reductions (metric tons of CO_2-equivalents):	[Click **here** and type tons]
Vintage Year(s):	[Click **here** and type years with amounts]
ERT Serial Numbers:	[Click **here** and type serial number range]

Attachments/Exhibits

A
B
C
D

Special Notes

Disclaimer: While ERT believes that all allocations in its GHG Registry℠ result from a true and fair representation of participants' emissions performance, ERT assumes no liability for the allocations in the GHG Registry℠ or the uses to which they are put. Use of the GHG Registry℠ is governed under the terms and conditions of the GHG Registry℠ user agreement.

Environmental Resources Trust, Inc.
1612 K St., NW Suite 1400
Washington, D.C. 2006
Tel: 202 785 8577
Fax: 785 2739
www.ert.net

Appendix IV: Nike Reporting Guideline

NIKE GHG EMISSIONS CALCULATION TABLE

CALENDAR YEAR	TOTAL SF_6 PURCHASED (lbs)	TOTAL SF_6 MONITORED USE (lbs)	TOTAL SF_6 ESTIMATED USE (lbs)	TOTAL SF_6 USE (lbs)	CUMULATIVE DIFFERENCE BETWEEN USE & PURCHASES	TOTAL C_3F_8 PURCHASED (lbs)	TOTAL C_3F_8 MONITORED (lbs)	TOTAL C_3F_8 ESTIMATED USE (lbs)	TOTAL ANNUAL EMISSIONS (Gg CO_2-eq)	ANNUAL CHANGE FROM 1995 BASELINE (Gg CO_2-eq)	1995 BY CUMULATIVE EMISSION REDUCTIONS (Gg CO_2-eq)	EMISSION REDUCTIONS FOR REGISTRATION (metric tons)
1995	298,080		291,070	291,070	-7,010				3,156	0	0	NA
1996	560,455		559,105	559,105	-8,360				6,061	2,906	-2,906	NA
1997	626,980		609,140	609,140	-26,200				6,604	3,448	-6,354	NA
1998	311,820		326,354	326,354	-11,666				3,538	383	-6,737	NA
1999	242,180	231,222	231,222	231,222	-22,624				2,507	-649	-6,088	NA
2000	165,060	190,791	197,166	190,791	3,107				2,068	-1,087	-5,001	NA
2001	104,000	115,623	111,291	115,623	14,730				1,253	-1,902	-3,099	NA
2002	25,800	60,594	64,237	60,594	49,524	91,295	36,764	38,795	947	-2,209	-890	NA
2003						115,680	100,949	108,266	367	-2,788	1,898	1,898,382
2004						47,521	66,258	62,874	151	-3,005	4,903	3,004,613
2005						23,460	60,696	62,939	74	-3,081	7,984	3,081,011

NOTE: Global Warming Potential (GWP) values

SF_6:	23,900
C_3F_8	7,000

Sources: IPCC Second Assessment Report (1996)

1,000 Gg = 1 Million Metric Tons

* Usage data for 2005 includes several days of final usage in 2006

Appendix V: Examples of Nike gas purchase records

PURCHASE ORDER

Bill To:
NIKE IHM, INC. - OREGON
PO BOX 4350
BEAVERTON, OR 97076-4350
USA
Equal Opportunity Employer

Confirmation - Do Not Duplicate

☐ Taxable ☒ Non-Taxable

Buy From: T18455
3M
PERFORMANCE MATERIALS DIVISI
3M CENTER BLDG 223-6S-04
ST PAUL MN 55144-1000

Ship To: NIKE IHM, INC.
13630 SW TERMAN RD. B-16
BEAVERTON OR 97076
Phone 503-671-1500
Fax: 503-646-8430

Contractor certifies that, unless exempt, it will (a) comply with the requirements of Executive Order 11246, as amended, and the implementing regulations found in 41 CFR Part 60 [including the filing of compliance reports or certificates as may be required by Part 60-1.7 (a) and (b) plus Part 60-1.8], 250, and 741, each of which is incorporated herein by reference; and (b) include the provisions of 41 CFR Part 60-1.4 (a) (1) through (6), Part 60-250.4 and Part 60-741.4 in each of its subcontracts.

Date	P.O. Number	Buyer	Currency	Payment Terms	FOB	Ship Via
5/12/2003	10110LH	LISA HAHN	US Dollar	1% 10/NET 30	FOB DESTINATION	BEST WAY

CONFIRMING VIA FAX-SUE SCHIED 800-810-8514
GAS SHOULD BE AS PER PF-5030 SPECIFICATIONS
THATWERE TESTED ON SITE
GAS WILL BE SHIPPED IN 940LB CYLINDERS

Line No	Nike Part No	Part Description	Due Date	Qty	UM	Unit Price	Line Amount
1	105-0003	PF5030 C3F8 PFP GAS, 26 CYLINDERS @940 #s	9/3/2003	24,440	LB	$9.250	$226,070.00
						P.O. Total:	$226,070.00

COMPLETED

NIKE IHM SIGNATURE: Lisa Hahn

COMPLIANCE WITH LAWS AND REGULATIONS: Seller shall comply with all applicable federal, state, and local laws, rules and regulations. Seller shall indemnity Nike IHM, Inc. and its customers for loss or damage sustained because of Seller's noncompliance with the law including, but not limited to, the Occupational Sagety and Health Act of 1970, as amended, the Service Contract of 1965, as amended, the Environmental Protection Agency regulations concerning hazardous materials, and the Equal Employment Opportunity clauses prescribed by Executive Orders regarding nondiscrimination because of race, creed, color, sex, age, national origin, religion, physical or mental disability or veteran status. Seller certifies that all products to be furnished to Nike IHM, Inc. will be manufactured in compliance with the Fair Labor Standards Act of 1938, as amended.

VENDORS AND SUPPLIERS: Entering into this contract indicates you have read and agree to the "TERMS AND CONDITIONS" and the "Year 2000 Warranty Required of NIKE Vendors and Suppliers" disclaimers on the back side of this PO.

AT METROPOLIS, IL

STRAIGHT BILL OF LADING - SHORT FORM
ORIGINAL - Not Negotiable

Honeywell

SHIPPERS NO. N = DH003844

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official, Southern, Western and Illinois Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification of Tariff if this is a motor carrier shipment.

Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including these on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and for his assigns.

CONSIGNED TO

Nike IHM Inc
Airsole Manufacturing
13630 Southwest Terman Drive
Building Sixteen
Beaverton OR 97076

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

D.M. McHaney
(Signature of consignor)

ROUTE					
CUST NO. 636661-002	DELIVERING CARRIER RANCHO	CAR OR TRUCK NO. CT= T 723	CARRIER CODE CC=	COLL	
LOC.SEQ.NO. L=	CUSTOMER ORDER NO. B4441-3	ORDER DATE 03/09/00	SHIP DATE 11/08/00	REQ. DEL. DATE 11/08/00	DATE SHIPPED

LINE #	NO. OF PCS.	HM	DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	WEIGHT
001	1	X	TRAILER, SULFUR HEXAFLUORIDE, 2.2, UN1080	27,840 LBS
Totals :	1			27,840 LBS

RECEIVED
NOV 10 2000

11-10-2000
S/O Jim Gd

NIKE SECURITY
05:18 A.M

60,380 32,540

11/6/00
Dwight Pollard

This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportation.

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whteter it is "carrier's or shipper's weight."

NOTE - Where the rate is dependent on values the released value of the property is hereby stated by the Shipper to be not exceeding 165 cents per pound for each distribution package or any higher value per article, whichever value results in the lowest transportation charges on date of shipment.

Carrier certifies that Emergency Response (ER) information is in their possession for hazardous materials identified in this shipping document and that the ER information is immediately available for use by appropriate personnel. Carrier certifies that applicable placards have been provided by Honeywell for hazardous marerials identified in this shipping document. Carrier certifies that the applicable placards are affixed to the vehicle for hazardous materials identified in this shipping document.

HONEYWELL SPECIALTY CHEMICALS PERMANENT POST OFFICE ADDRESS OF SHIPPER: PO BOX 430, METROPOLIS, IL

D.M. McHaney

FOR HELP IN CHEMICAL EMERGENCIES INVOLVING SPILLS, LEAKS, FIRE, OR EXPOSURE, CALL CHEM TREC TOLL FREE 800-424-9300 ANYTIME DAY OR NIGHT

Appendix VI: Example of gas delivery record

NIKE IHM SF-6 USAGE									
Month	LBS/Monitored	LBS/USED	TOTAL PAIRS PRODUCTION - SF6 BAGS	TOTAL PAIRS PRODUCTION	PAIRS PER LBS SF-6 BAGS	REC' DATE	TRAILER #	LBS/REC/RTD	WEIGHT CHECKED
Jan-01	**8,732**	**11,272**	**5,524,503**	**8,035,400**	**633**				
Received						**1/24/2001**	**T687**	**28,900**	**29,040**
Returned						**1/16/2001**	**T697**	**-1,660**	**-1,520**
Feb-01	**9,898**	**5,568**	**7,242,536**	**10,981,425**	**732**				
Mar-01	**10,460**	**10,060**	**7,507,832**	**11,252,010**	**718**				
Apr-01	**11,642**	**11,560**	**7,774,411**	**11,962,962**	**668**				
Received						**4/6/2001**	**T723**	**26,320**	**26,320**
Returned						**4/2/2001**	**T723**	**-5,240**	**-5,240**
May-01	**11,387**	**10,180**	**7,156,715**	**10,346,952**	**628**				
Jun-01	**9,192**	**11,044**	**6,402,517**	**10,436,100**	**697**				
Received						**6/29/2001**	**T697**	**28,920**	**27,780**
Returned						**6/25/2001**	**T723**	**-1,020**	**-1,220**
Jul-01	**8,037**	**9,308**	**5,677,399**	**10,637,322**	**706**				
Aug-01	**9,128**	**8,773**	**5,456,197**	**9,958,255**	**598**				
Sep-01	**8,064**	**7,884**	**4,580,527**	**9,788,329**	**568**				
Oct-01	**12,009**	**9,315**	**6,183,640**	**12,456,147**	**515**				
Nov-01	**8,392**	**11,568**	**4,041,144**	**9,024,081**	**482**				
Received						**12/5/2001**	**T687**	**28,800**	**28,980**
Returned						**11/30/2001**	**T723**	**-1,020**	
Dec-01	**8,682**	**4,759**	**3,801,795**	**9,692,484**	**438**				
TOTALS	**115,623**	**111,291**	**71,349,216**	**124,571,467**	**617**			**104,000**	**104,140**