

Notes from May 12, 2011 DOE Fugitive Emissions Working Group Meeting

Updates and Review of Fugitive Emissions Award Applications (Josh Silverman, FEWG Chair)

DOE sites have requested clarification on the tracking and reporting of other fluorinated gases that is not provided on DOE's list. These gases are Class 1 ozone depleting substances that were set to be phased out by 2010. DOE has some inventory of phased out gases that are still being used onsite and is being tracked carefully. These gases may be reported as GHGs under the "Other" fugitive emissions category.

HS-22 received 185 nominations for the Environmental Sustainability (*EStar*) Award program. Three of these award applications were from DOE labs and pertained to SF₆. The SF₆ related applications were from the Lawrence Livermore National Lab which identified improvements to their Flash X-Ray System, the Thomas Jefferson National Lab for their SF₆ gas recovery system, and Argonne National Lab for the development of their SF₆ User Group.

Sites have reported a dramatic decrease in SF₆ emissions that has resulted in an average decrease of 43,000 metric tons of emissions and \$38,000 in savings at the sites. The reduction in fugitive emissions through the use of on-going leak detection systems and low-cost management practices, are the primary cause in achieving the larger greenhouse gas reduction goal.

Tracer Gas Substitutes for SF₆ (Peter Pohlot, Brookhaven National Laboratory and Martin Burke/Ben Gonzales, Technical Safety Services, Berkeley, CA) (See PowerPoint attachments previously sent to FEWG members.)

Chemical Fume Hood Commissioning: SF₆ vs. N₂O

Peter Pohlot presented a brief overview of the status of tracer gas substitutes. He emphasized that over the next 2 years, 126 high efficiency lab hoods would be installed by BNL. Mr. Pohlot also discussed BNL's Safety, Health and Environmental Protection Division's progress in developing an allowance for using alternative gases to meet the ASHRAE 110 test method for newly installed hoods. BNL's Chemical Fume Hood Commissioning has determined that use of N₂O for lab hood testing instead of using SF₆ would significantly decrease the quantity of MTCO_{2e} that is released into the air.

Fume Hood Performance Testing with Simultaneous Use of Both Nitrous Oxide and Sulfur Hexafluoride through a Single ASHRAE Standard 110 Ejector

Martin Burke from TSS, Inc. discussed the work that has been done in the “Dual Gas – Dual Ejector (DG2E)” testing that will be part of replacing SF₆ used as a fume hood tracer gas. The replacement of SF₆ will be required in California by January 1, 2013 (regulation: <http://www.arb.ca.gov/regact/2009/nonsemi09/sf6fro.pdf>) and potentially nationwide over the next few years. The testing showed very positive results in substituting N₂O for SF₆ as a fume hood tracer gas. The testing resulted in experimental issues relating to drift in the background concentration of N₂O. These issues have been addressed by combining both gases into a single ejector. This combined approach eliminated errors and the new fume hoods worked so well that leaks had to be induced to provide comparable information from the experiments. All the comparable pass and failure results from the fume hood testing lined up exactly between SF₆ and N₂O and the results have provided compelling data. The ongoing testing showed improved results from the use of a single ejector and is addressing the concerns of the safety community.

Questions from the field:

Are efforts being made to update ASHRAE 110 standards?

Answer: There has been resistance in updating the ASHRAE 110 standard and ASHRAE wants to publish the existing document and not endorse the use of alternative fume hood tracer gases outside of SF₆. The softened language in the current version of the ASHRAE 110 standard is appropriate and ASHRAE does not want to fund research for updating the standard.

Can we extrapolate the results from this testing to other gases as well?

Answer: Yes, the experiment has laid a roadmap for other gases. Other gases would also be excellent choices, however many of these substances are liquids and ASHRAE would have to develop the method of converting them into a gas phase.

Y-12 Fugitive Emissions Reduction Success Story: Jan Gilbert Jackson (Y-12)

Jan Jackson discussed the elimination of Freon 113 as a cleaning agent for metal chips. Y-12 reduced industrial GHG emissions 83% between 2008 and 2010, primarily due to the elimination of Freon 113. Freon 113 is a Class I ozone depleting substance (ODS) and production of this chemical has been banned in the U.S. since 1995. Several solvents have been evaluated and DuPont’s Vertrel XPW was selected to replace Freon 113 as of April 2010. The switch from Freon 113 to Vertrel XPW illustrates one shortcoming of the current GHG reporting process: the ozone depleting risk resulting from use of Freon 113 is eliminated and the GHG emissions associated with the cleaning process are reduced; however, because Freon 113 is already regulated as an ODS, it is not included in GHG reporting regulations. Use of the chemical may

be voluntarily reported along with the HFCs, PFCs, and SF₆ as an “other” emission, but the “other” emissions are not included in the total inventory. Therefore, while in reality Y-12 has significantly reduced their GHG emissions by switching from Freon 113 to Vertrel XPW, the reported total GHG emissions has actually gone up.

Question from the field: How is the use of Vertrel XPW a better choice since it also contributes to global warming?

Answer: The switch to Vertrel XPW in April 2010 resulted in a process change that improved the ability to recapture the material and therefore reduce greenhouse gas emissions. Additionally, the primary component of Vertrel XPW is HFC-43-10mee, which has a GWP of 1300, while the GWP of Freon 113 is approximately 6000. The use of Vertrel XPW, which contains an added food grade surfactant, eliminated over 19,000 pounds of greenhouse gas emissions.

Draft Inventory Best Practices Working Paper (Josh Silverman, FEWG Chair)

Josh discussed the development of the draft inventory best practices working paper and indicated that best practices may not be identified yet but an attempt has been made to describe inventory management systems. The draft document was sent out for review and Josh would like suggestions for improving inventory management in response to greenhouse gas control. The inventory management systems identified include (1) life-cycle tracking, (2) enhanced weighing of storage cylinders before and after maintenance activities, (3) regularly weighing cylinders in storage areas, (4) bar code tracking system, and (5) use of a temperature and pressure tracking system.

The next FEWG meeting is tentatively scheduled for Thursday, June 9, 2011 from 11am until Noon ET.

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