

Notes from November 15, 2011 DOE Fugitive Emissions Working Group Meeting

Updates (Josh Silverman, FEWG Chair)

Secretary Chu recognized the FEWG for its role in reducing DOE's GHG inventory by awarding the Secretary's Achievement Award to 10 sites and the FEWG Chair on October 27. The Chair recognized that all of the FEWG members are making great strides toward reducing fugitive emissions, but the award submission had to be limited to the sites that made the largest contributions and/or started implementing these changes ahead of the DOE-wide push and were able to share information with the other sites. This award represents clear and strong recognition of the efforts sites are making to reduce emissions through leak detection, changing gases, and making operational and managerial changes. Each site is using different methods but achieving the same results. The Secretary and Glenn Podonsky, Director of the Office of Health, Safety, and Security, were both impressed with the teaming effort represented by the FEWG and by the variation in the types of sites represented in the FEWG.

In addition to the Secretary's Achievement Award, LLNL was recognized with an EStar award for its efforts to reduce fugitive emissions. Nominations are currently being accepted for the 2012 EStar awards through PPTRS. The Chair encourages all sites to submit award nominations before the January deadline. Jeff Eagan also noted that the awards competition was really tight last year; he encourages sites that submitted nominations last year and did not win to update the nomination and resubmit it this year.

The Chair is actively sharing the story of the FEWG and gaining recognition for DOE's fugitive emissions reductions efforts. The Chair recently made a presentation at the GreenGov conference in Washington, DC. In September, the Chair presented at the ISM Workshop with representatives from ANL and LLNL, and at an EFCOG Sustainable Facilities Management conference with ANL.

2011 Reporting (Josh Silverman, FEWG Chair, and Contributions from the field)

The 2011 DOE Strategic Sustainability Performance Plan (SSPP) has been released and is available on the SPO's website (<http://www1.eere.energy.gov/sustainability/index.html>). The SSPP reports a 39% decrease in fugitive emissions from 2008 and projects a 50% reduction by 2013.

The Chair reminds the FEWG that fugitive emissions are being reported along with the energy reporting in CEDR this year. Those reports are due December 7. The Sustainability Performance Office (SPO) is hosting calls each week to answer any questions sites have on the reporting process.

Site Sustainability Plans (SSPs) are being developed, with due dates approaching soon. The Chair strongly encourages the FEWG participants to be involved in the development of the SSP

and to make sure that the SSP includes information about the future of fugitive emissions. Examples of information to include are: What does your site's fugitive emissions profile look like over the next several years? When will the "low hanging fruit" reductions be achieved, and what does a "steady state" level look like? How will any planned or likely future actions at the site impact fugitive emissions? A clear picture of the future of fugitive emissions will help sites, programs, and the Department plan for the overall emissions profile in the coming years.

The Chair asked the FEWG for volunteers to share preliminary information from the FY2011 reporting.

ANL (Greg Barrett): The preliminary total FY2011 fugitive emissions inventory is 13,000 MTCO₂e, due largely to a 200 lb decrease in SF₆ emissions. New SF₆ reclamation equipment for the Wakefield accelerator has been purchased, but not yet installed. It should be operational by the end of November, and contribute to significant SF₆ savings in FY2012. ANL is also seeing a drop in HFC-134a emissions due to changes at the Advanced Photon Source, and is looking into portable reclamation equipment for the electron microscopy operations. Beyond these items, ANL is looking at a flat emissions trajectory and will be focusing on maintaining reduced emissions and repairing leaks in older equipment.

LLNL (Warren Rued): LLNL is having some issues with reporting because this is the first year actual amounts of SF₆ used in R&D and utility operations have been reported (state requirement in CA). Emissions have been previously reported based entirely on purchase volumes. The actual usage in FY2011 was probably around 5,000 MTCO₂e, but based on purchasing data alone, emissions would be closer to 15,000 MTCO₂e. LLNL has installed a dedicated gas recovery system, replaced suspicious flanges, and replaced the compression chamber. As a result, in the last maintenance effort, LLNL did not have to provide any make-up SF₆. Previously, up to 300 lbs of SF₆ were needed during each maintenance effort. LLNL is implementing a new management plan and requiring users to document quantities used. Scales have been purchased and users are going to start weighing all of the cylinders for inventory tracking.

BPA (Steve Lowder): In calendar year 2010, BPA reported emissions of 6,473 lbs of SF₆; in 2011, BPA is reporting 4,300 lbs of SF₆. BPA uses the EPA's mass balance approach to calculating emissions and this reported decrease may be due to new, more accurate scales. Crews are also aggressively locating and repairing leaks in switch gear. BPA emissions are probably going to be pretty stable after 2011.

SNL/NM (Penny Avery): Tracking emissions is a big problem for SNL/NM since SNL is still using purchases to estimate use. FY2011 emissions are looking like they will be 26% higher than 2010; this does not yet include the large purchase of SF₆ that will be needed to refill the Z Machine. Each individual operating line is working independently to develop tracking methods. Penny commented that the ORPS rule change requiring users to report SF₆ has helped in implementing SF₆ tracking requirements for fugitive emissions reporting.

Beyond SF₆ Reduction Strategies: An Introductory Discussion on Managing Halocarbons (Corrie Clark, Argonne National Laboratory)

Corrie Clark recognized the tremendous effort that the FEWG members have put forth in achieving SF₆ reductions and suggested beginning the conversation about what will be the emissions reduction steps beyond SF₆. Halocarbon (halogenated carbon) compounds are chains of carbon atoms linked by one or more halogen (chlorine, fluorine, bromine, or iodine). These chemicals are typically nonreactive and nonflammable and therefore make good tracer gases in high energy applications. Some of the halocarbons (those with chlorine or bromine) are ionized during high energy applications, making them ozone-depleting substances and therefore regulated under the Montreal Protocol and Clean Air Act. Other halocarbons, including the fluorinated halocarbons) are not regulated under any program or legislation.

HFCs and PFCs were approximately 7.2% of the fugitive emissions inventory in 2008. By 2010, HFC emissions had decreased 33% and PFC emissions had increased 42%. After SF₆, the next two highest emission gases are CF₄ (or PFC-14) and R-134a (or HFC-134a), both of which are used in high energy physics, often in ionization chamber detectors. The Cherenkov detectors rely on “heavier” gases such as C₄F₁₀ (PFC-3-1-10) or C₄F₈O. C₄F₁₀ is tracked by the annual DOE GHG inventory, but C₄F₈O is not currently tracked by any reporting system even though it has an estimated global warming potential of 8,700. (This assumes that C₄F₈O has the same GWP as C₄F₈.)

Halocarbon management poses several challenges. Some halocarbons are used as refrigerants, and gases used for this purpose are amenable to management through preventive maintenance and leak detection and repair programs. Like SF₆, however, these gases have unique properties that make them suited for use in detectors and scientific equipment. In such applications, halocarbons are usually used in very precise mixtures and strict quality requirements for these mixtures make reuse very difficult. Historically, detector gases have been vented to atmosphere; however, there are a few recent examples of successful recapture and reuse systems. Fermi successfully recycles CF₄ at a collider experiment and CERN successfully recirculates R-134a.

Corrie asked the FEWG members if and how they are managing their halocarbon emissions and if they are aware of any other recirculating systems. She also asked if there are any other gases that are not currently being tracked but probably should be.

Patty Hunt (TJ) commented that, while her office is aware of the magnitude of these emissions, they need assistance with outreach to the physicists who are actually using the gases. In addition to the selection of gases, TJ is also working with aging detectors that leak more as they age. The Chair asked if the gas usage is being tracked, noting that some sites had success getting the attention of scientific programs just by showing them the magnitude of their emissions/usage. Patty said that the data currently available is only the purchasing information, but that since SF₆ emissions are starting to be under control, they can start focusing on the detectors and halocarbons.

Eric Mieland (Fermi) commented that the detector gases are usually mixed and cost prohibitive to recapture and reuse. He also noted that until very recently nobody ever considered the need to recapture detector gases.

Warren Rued (LLNL) asked if the price of halocarbons/detector gases is going up and would cost be an incentive to recapture and reuse the gases.

Dave Northacker (Fermi/University of Illinois) builds detector systems and has built many of the DOE systems. He commented that physicists are generally not opposed to recapturing and reusing the detector gases as long as the precise quantities and purities can be maintained and their equipment and experiments continue to work efficiently. CERN has mostly fixed the problem and figured out how to recirculate good quality gas. Brookhaven is installing the CERN technology this winter/spring in hopes of recirculating R-134a by summer 2012. Brookhaven currently uses 6 tons of R-134a each year.

CF₄ currently costs about \$2,000 per bottle. Until very recently, nobody cared about reducing use of these gases for environmental purposes. The bigger facilities have been recirculating CF₄, but the smaller facilities have not bothered. Dave suggests that instead of needing outreach to the physicists, outreach is needed to educate the funders. If grant funding were increased to allow for purchase and use of recirculating equipment, the physicists would have no problem using it.

Closing Remarks (Josh Silverman, FEWG Chair)

The Chair thanked all of the sites for participating and sharing information and suggested that future calls feature Fermi, CERN, and Brookhaven to learn about the recirculating technology.

The next FEWG meeting is tentatively scheduled for Thursday, January 12, 2012 from 11am until Noon ET.

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