THE MANAGEMENT OF SULPHUR HEXAFLUORIDE IN AUSTRALIA

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Introduction

Thank you. I am pleased to have the opportunity to speak with you today about Australia's efforts to manage its sulphur hexafluoride (SF_6) use and emissions.

Global warming is a high-profile public issue, and Australia's policy response to it is subject to a good deal of scrutiny. There is no doubt that the Australian community expects, and wants, effective action to combat the greenhouse effect.

Australia has committed itself internationally to a challenging target. Reducing the growth of our greenhouse gas emissions to 8% above 1990 levels by 2008-2012 is a very real challenge because it represents a reduction of some 30% against forecast business-as-usual growth. It is comparable to reductions that other OECD countries will be making.

Meeting our target will require strong action from all segments of the community - business, industry, government, and the general public – and on all gases included in the Kyoto basket. Today, I would like to tell you about what we are doing in collaboration with our stakeholders to manage SF_6.

Usage of synthetic gases

Synthetic greenhouse gases - HFCs, PFCs, and SF_6 - are used in a limited range of industries in Australia. These include for the non-Montreal Protocol industries, aluminium production, magnesium production, and electricity supply and distribution. The range of use of synthetic gases in the Montreal Protocol industries is similar to that found in most other countries.

Currently, except for emissions of PFCs in aluminium and SF_6 in magnesium, emissions of synthetic gases are not included in Australia's annual inventory of greenhouse gas emissions. Similarly, projections of future emissions of synthetic gases, except from aluminium, have also not been included in previous overall projection analyses due to the lack of data. Work is under way to improve data collections and emission estimation methodology.

The limited synthetic gas emissions data available do indicate that emissions are expected to rise markedly between 1990 and the first commitment period. Key drivers of this increase are their use as replacements for ozone-depleting substances being phased out under the Montreal Protocol, increase in SF_6 use in electricity supply, and as a possible result of marked growth in the magnesium industry.

So what is Australia's overall approach to synthetic greenhouse gases generally, including SF_6?

There are three main elements.

First, the National Greenhouse Strategy (NGS).

The NGS is a major policy initiative of the commonwealth, state and territory governments. It provides the strategic framework for Australia's greenhouse response and is the primary mechanism through which our international commitments will be met.

The NGS provides a broad menu of actions. This includes NGS Measure 7.2, which calls for the development of environmental management strategies for synthetic gases through coordinated action by all Australian jurisdictions in consultation with industry. It states that, "Governments will work with industry to develop environmental management strategies for each of the synthetic gases included in the Kyoto Protocol – HFCs, PFCs and SF_6. The strategy for HFCs will address the use of HFCs in non-refillable containers."

The second element of Australia's response to synthetic gases is through Greenhouse Challenge.

The Greenhouse Challenge is a key voluntary program, involving a partnership between government and industry to reduce greenhouse gas emissions. There is broad and diverse participation in the program, with more than 400 signed agreements with large and medium-sized organizations, and almost 300 more formally indicating their commitment to join the program.

A large number of companies and organisations involved in synthetic gas issues – including, for example, importers of gases, transmission companies, and the metals industries - are members of Greenhouse Challenge.

The third component of Australia's response to emissions of synthetic gases is the Greenhouse Gas Abatement Program, or GGAP.

In May 1999, the Australian government announced a substantial package of additional greenhouse programs, totalling more than $750 million in four years and including GGAP. This program – with an allocation of $100 million per year for four years - is not allocated to any sector or type of measure; rather, it is to further assist Australia in meeting its Kyoto commitments by supporting activities likely to result in substantial emissions abatement, particularly in the first commitment period.

The first round of funding closed on the 5th of September, and at least one was received that focused directly on synthetic greenhouse gas emissions. The proposals will be evaluated over the next few months, and the first projects will begin shortly thereafter.

So what is the situation on the ground with respect to SF_6?

Magnesium

Australia does not currently have a magnesium industry, but it possesses world-class deposits of magnesium ore and cheap electric power, the two essential requirements for magnesium production. Proposals for nine magnesium plants are the subject of feasibility analyses, and some analysts have predicted that, under a high-production scenario, Australia could be producing 266 ktpa of magnesium by 2003, and 533 ktpa by 2008 (Brown and Pawleck, 1999). If these production estimates are realised, Australia will be the world's largest producer of primary magnesium.

With nine proposed new projects, Australia has the major global share of expansion of the magnesium industry. While there is little doubt that these proposals represent an expansion well beyond what the magnesium industry can support, it does reflect Australian interest in becoming a key player in world magnesium production.

Australia's magnesium proposals

Project Owner	Project Location	Nameplate Capacity (tonnes/yr in 2003)	Potential Installed Capacity in 2008
AMC	Kunwarara, Qld	96,000	96,000
Crest Magnesium	Author-Lyons River, Tas	95,000	190,000
Golden Triangle Resources	Main Creek, Tas	0	80,000
Golden Triangle Resources	Woodsreef, NSW	0	65,000
SAMAG (Pima Mining)	Leigh Creek, SA	0	52,500
Mt Grace Resources	Batchelor, NT	50,000	50,000
Pilbara Magnesium Metal Assocs	Dampier, WA	0	50,000
Anaconda Nickel Ltd	Mt. Margaret, WA	0	100,000
Hazelwood Power	Latrobe Valley, Vic	30,000	30,000
Total capacity (potential)		271,000	713,500

It is worth observing that all proposed Australian projects are based on large, high-grade magnesium ore deposits. The technical challenges they face are primarily developing and/or buying the technology to exploit the deposits.

Currently, Australia has no commercial magnesium metal plants. Along with a number of players advancing feasibility studies and the like it does have:

- A 1500-tpa demonstration magnesium metal plant of AMC at Gladstone in Central Queensland.

- A few firms that produce magnesium and magnesium alloy die-castings.

- Research into light-metal casting technology — magnesium research is a focus for CSIRO and the Cooperative Research Centre for CASTmm.

The key messages from the above information is that Australia currently does not have SF_6 emissions from magnesium production, except for a small amount from the demonstration plant near Gladstone, but could well have significant emissions in the near future.

Australia's management of SF_6 emissions from magnesium has focused on research conducted by CSIRO, Australia's scientific research organisation, and University of Queensland researchers. I am only going to sketch their work and results, as later today, you will hear Nigel Ricketts explain the results of the research in detail.

Earlier this year, these researchers announced that they have identified, developed and patented a replacement for SF_6. Working within the Cooperative Research Centre for Cast Metals Manufacturing and in association with Australian Magnesium Corporation, these researchers identified and patented HFC-134a as a suitable replacement for SF_6.

As you all probably know, HFC-134a, a refrigerant gas commonly used in domestic refrigeration, is not toxic, corrosive, or flammable and does not contribute to ozone depletion, and has a far lower global warming potential than SF_6. Replacing SF_6 with HFC-134a has the following advantages:

- HFC-134a has a global warming potential of only 1,300, 18 times less than that of SF_6 - resulting in emissions from cover gas being reduced by more than 95% in carbon dioxide equivalent terms.

- HFC-134a is only about one-third of the cost of SF_6.

- HFC-134a is more effective than SF_6 for magnesium melt protection.

- HFC-134a has the ability to extinguish a magnesium fire once started, whereas SF_6 will not.

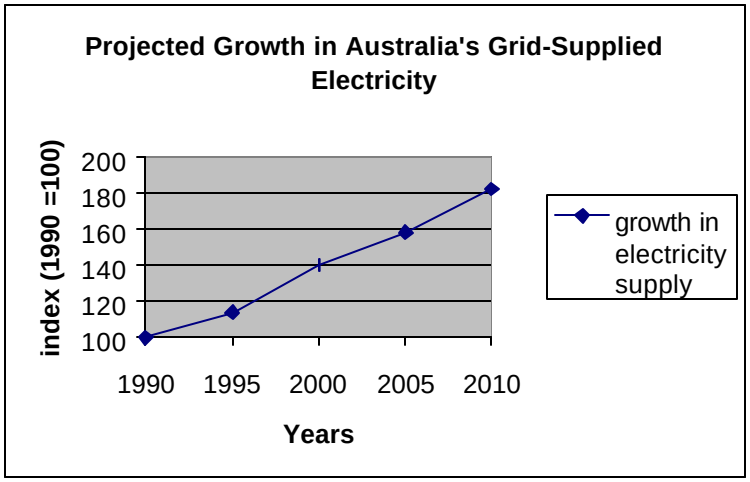
Replacing SF_6 with HFC-134a could potentially save Australia millions of tonnes of carbon dioxide equivalent in greenhouse gas emissions per year. Research is continuing on other, even more benign replacements to SF_6 as a cover gas. It is worth also noting that environmental approval for the AMC magnesium project was given with the understanding that SF_6 would be replaced by HFC 134a.

SF_6 use in magnesium has the potential to rapidly and dramatically increase Australian use and emissions of SF_6. Because of the research conducted by CSIRO and others, the Australian Greenhouse Office is quietly confident that the Australian magnesium industry will be in a position to manage its use and emissions of sulphur hexafluoride.

Electricity Supply

The Australian electricity supply industry comprises a large number of generators, along with extensive transmission and distribution infrastructure. There are in excess of 80 substations of 220 kilovolts (kV) and above, and more than 240 substations of 132 kV and below. While SF_6 is used throughout the transmission and distribution network, an Australian Standard (AS2791/1996) provides guidelines about the use and handling of sulphur hexafluoride in high-voltage switchgear and control gear.

Development of high-voltage transmission networks as a result of adaptation to the changes in the Australian electricity market is likely to result in increased use of SF_6-insulated equipment. Projections of electricity production - obviously a key driver for SF_6 use in the transmission and distribution industries - indicate that Australia's grid will expand from carrying 141,000 GWh in 1990 to 196,000 this year and expand further to carry 256,000 GWh in 2010. Certainly, there will be pressure to expand Australia's transmission and distribution network, and this will likely result in increasing future uses of SF_6.



Government and industry are addressing this issue. The majority of electricity utilities, including all of the transmission companies that use the majority of SF_6, have signed or are involved in preparing cooperative agreements with Greenhouse Challenge. Cooperative agreements require an inventory of emissions, action plans for the management of SF_6 use and minimisation of emissions moving towards industry best practice, and a commitment for ongoing assessment of future developments in SF_6 management.

At the same time, there is still work to do in the electricity supply industry. The AGO has targeted the transmission industry initially for further in-depth work. A focussed process will begin in just a few days. The expectation is that over the next 6 months, the Australian Greenhouse Office will work closely with industry in:

- Getting a better understanding on SF_6 use and emissions.
- Revising data collection procedures and inventory methodology.
- Exchanging information on cost-effective measures in mitigating SF_6 emissions that take into account the particular influences of the Australian environment.

Australia has made progress in managing sulphur hexafluoride emissions from the electricity supply industry, but further growth in use and emissions is expected, and there is still work to do.

Summary

In closing, I would like to leave with you with a simple message.

Australia has made real progress in managing emissions of sulphur hexafluoride, particularly in magnesium, but there is still work to do. With the continued involvement of industry and other stakeholders, this is a challenge that we will continue to effectively resolve. I look forward to hearing the technical papers presented throughout this conference and passing on the undoubtedly valuable information to our stakeholders to help ensure that Australia has the world's best management programs for SF_6.

Thank you.