

# Welcome to ARMUG 2006

*Steven Judge*

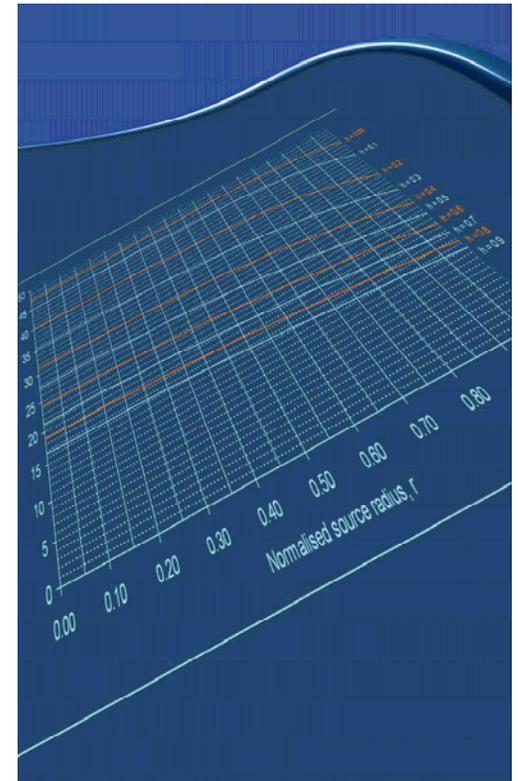
*Julian Dean*

# Main topics for today

- Monitor performance
- Shrouded sampling probe
- Advice on air-monitoring regimes
- Update on positron in gas standard

# New GPG

- Measurement Good Practice Guide No. 82 has been published on 'The Examination and Testing of Equipment for Monitoring Airborne Radioactive Particulate in the Workplace'
- Thank you to Max Pottinger, David Ryden, Julian Dean and Andrea Woodman, and everyone who contributed to the new GPG



# Housekeeping

- The fire alarm is a voice alarm system. In the event of an alarm, the assembly point is the lawn opposite the main entrance.
- Lunch will be served downstairs at 12:15
- The meeting should end around 14:15. Tea/coffee available if you would like to stay on.
- Please switch off mobile phones

# Minutes

- Any corrections / comments on minutes of the previous meeting?

# Actions arising

- 5.1: Adsorption factors: No feedback, but David Ryden has volunteered to write some guidance.
- 5.2: Shrouded probes: Jeff Rivers (lab Impex) has kindly agreed to give a presentation.
- 5.3 Questionnaire. Action stands.
- 5.4 Discussion groups on uncertainties. Action stands
- 5.5 FAQ section on website. WG met in July, final version being compiled and will go out for comment.

# Actions arising

- 5.6 Next GPG – Tritium. Enough funding to start preparing this document. Chair – Trevor Birkett.

# **How to influence the 2007-2010 R&D programme at NPL**

# Mission

"The aim of the programme is to enable all users of ionising radiation in the UK to carry out measurements for radiation dosimetry, radioactivity and neutrons to an accuracy that is fit for purpose and at the forefront of good practice internationally."

# Mission

"The aim is to enable all users of the UK to carry out measurements for radiation dosimetry, radioactivity and neutrons to an international purpose and at the highest level of accuracy internationally."

## Theme 1

Photon dosimetry  
Charged particle dosimetry (electrons, protons)

## Theme 2

Radioactivity content (from H-3 to Cf-252) in bulk materials, surfaces and gas

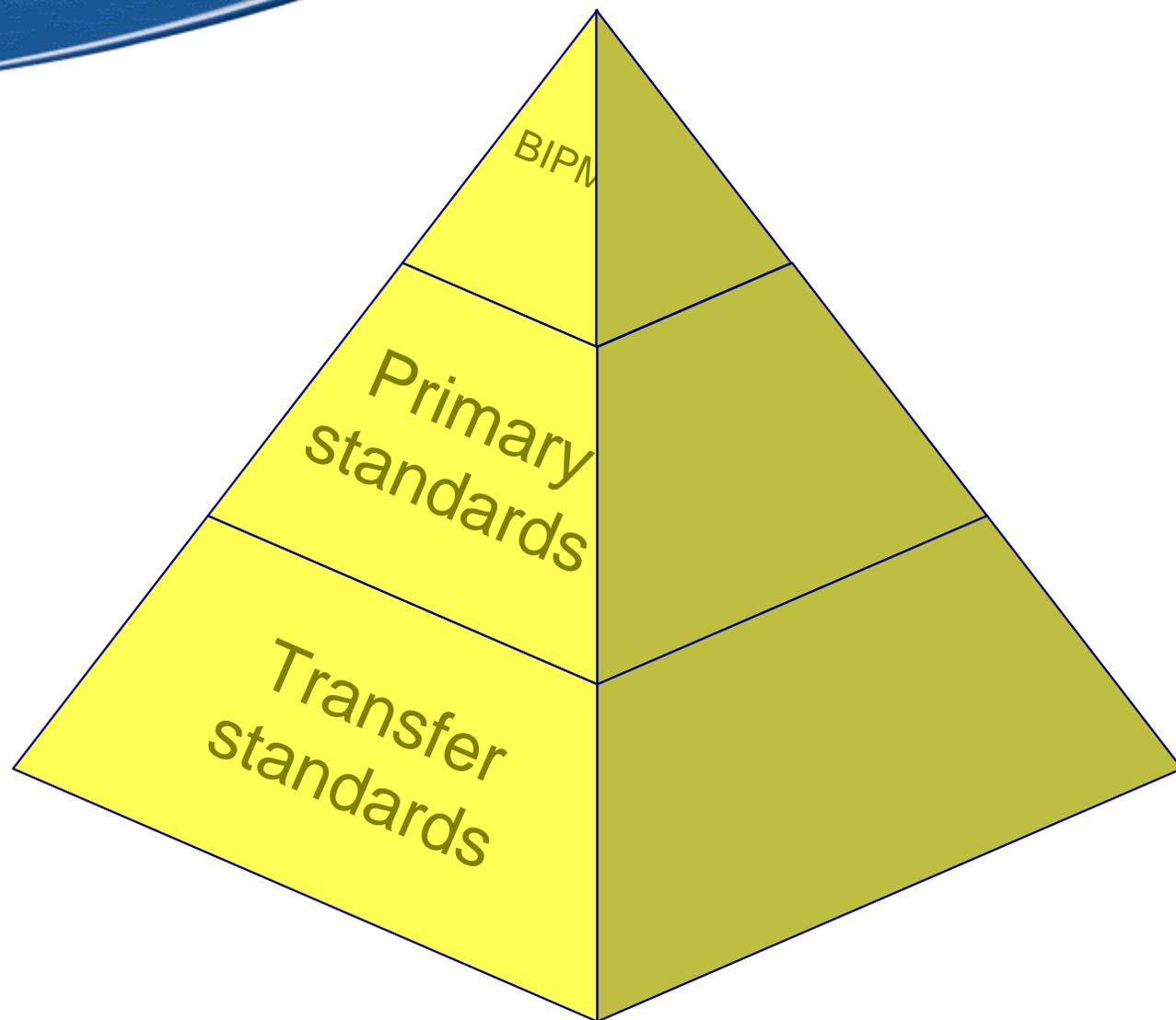
## Theme 3

Neutron fluence and dose standards  
+ very high energy dosimetry (cosmic radiation)

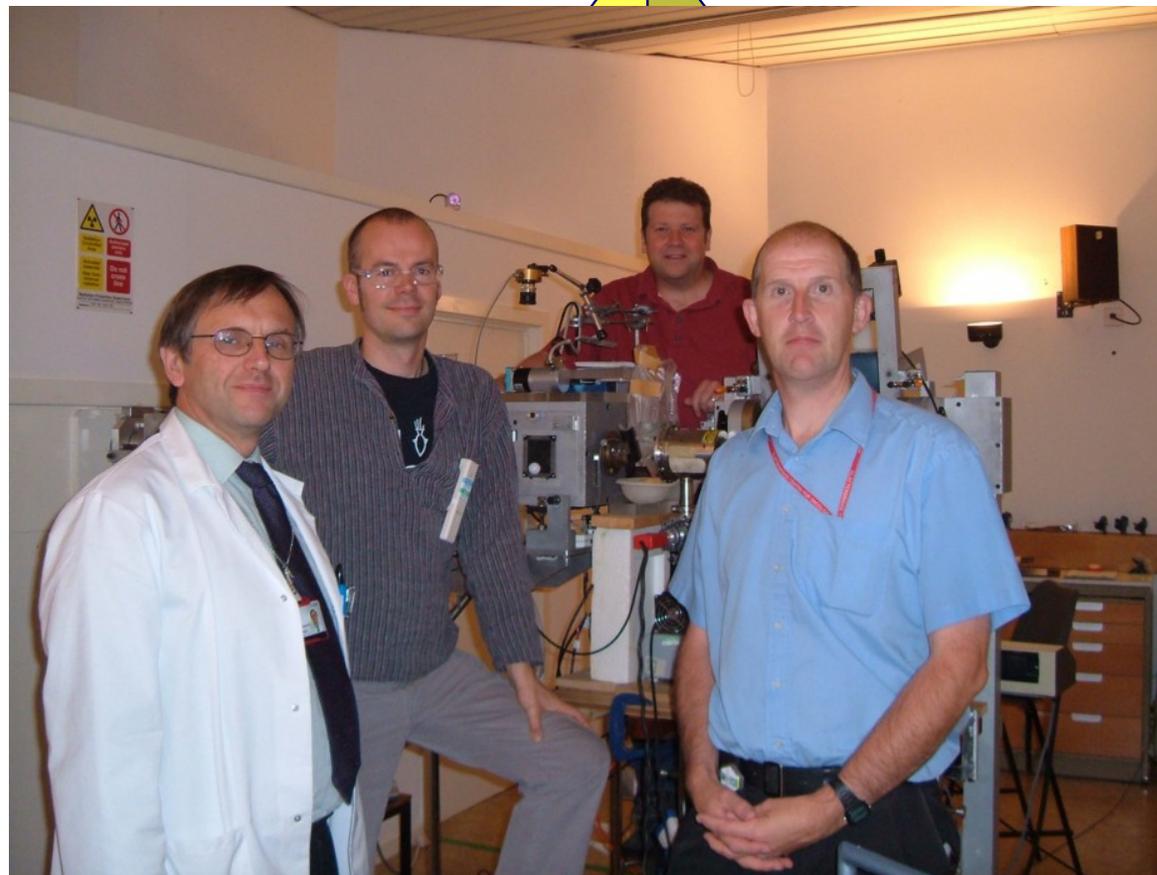
# Outcomes



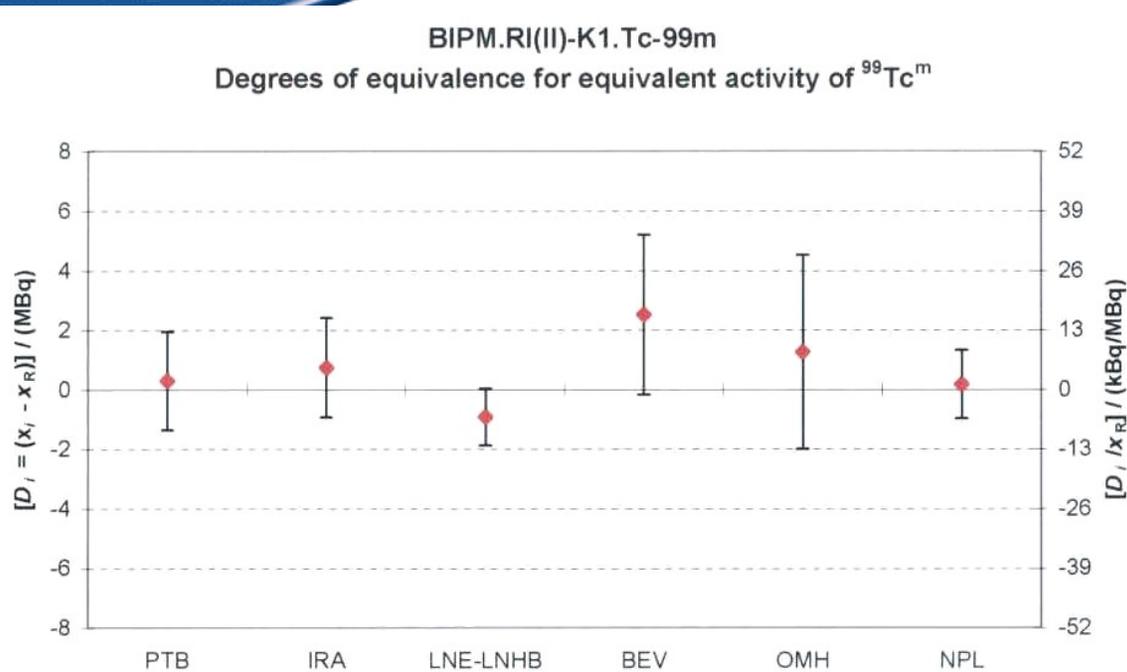
# Common features of the 3 themes



# Common features of the 3 themes



# Common features of the 3 themes



# Knowledge transfer

- Measurement services
- Calibration services
- User Forums
- Proficiency testing exercises
- Good Practice Guides
- Training
- Research papers
- Committee memberships
- Audits
- Visits
- Newsletters



### Solar Flare Dosimetry

It is now well established that the average commercial airline crew member receives an annual radiation dose greater than the average worker in the nuclear industry.

NPL has been involved in measuring the cosmic radiation exposure of aircrew since 2000, as part of a collaborative project with the Medical Space Research Laboratory, Virginia Atlantic Airlines and the Civil Aviation Authority. The results are outstanding although calculations for individual flight hours are somewhat less than reach as 50%, the figure here average is equal to within 20% which is acceptable for radiation risks with a large random component such as cosmic rays at aircraft altitudes.

At least 80% of the crew 50% of the time while the rest is in the air. It is being steadily however, there are occasional bursts per year, on average, when it is not.

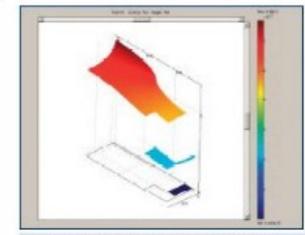
Key findings from the Sun Storm on a Solar Flare is accompanied by a massive burst of ionising radiation that can last for days, causing radiation levels at altitude for several hours. Calculations indicate that, had the current generation of aircrew been flying in January 2005, certain high latitude long haul flights may have exceeded their average radiation exposure for that year by just a few hours!

In the past 20 years, a handful of events may have occurred in flight crew's lives. The researchers, both their generation as poorly understood and they are unable anticipated. The lack of knowledge

held these events is reflected in the accuracy of dose predictions, owing to an error as a factor of 100. This is what NPL is currently offering a 'Flarewatch' programme, which is a network of radiation detectors to be established, providing continuous monitoring of the radiation levels of aircraft altitude. The idea is not to reach to provide a definite value for a flare dose (the dose rate will vary significantly with altitude and location, but to provide comparative radiation with experimental data to help refine the calculations. Monitoring is expected to begin in the later half of 2005.

Contents:

- Solar Flare Dosimetry 1
- New NPL programme looks off 2
- ICRP Drafts new Calibration Service from May to July 2005 2
- PD Power: Distributed to support the new energy radiation application 3
- Measurement for Innovators 4
- Forthcoming events 4



### Advances in standards for radiotherapy dosimetry

A project to develop a new primary standard of absorbed dose for external beam radiotherapy will start in October, to take full account of recent advances in calorimetry at NPL.

These advances raise the possibility of improving our relative uncertainty, perhaps by a factor of two, by secondary standards available to the sector. The progress has been made. Currently the standards are 1% (100) for measurements under reference conditions, compared to a clinical need for dose to patients to be accurate to within 2% or 3%, depending on the tumour site.

The improvement has been made possible by the introduction of a new alternative method of operation for graphite calorimeters. In this mode, the temperature of internal parts of the calorimeter are actively controlled, and held constant to within a few millidegrees of one degree. The energy absorbed in the calorimeter from radiation, and hence absorbed dose,

Contents:

- Advances in standards for radiotherapy dosimetry 1
- ICRP standard looks off 2
- ICRP Drafts new Calibration Service from May to July 2005 2
- NPL website on desktop fashion shows 2
- News in Brief 3
- Review of uncertainty monitoring NPL's Plans Forthcoming events 4



# Timetable

- *May* *Orientation meeting with MAC WG*
- **Jun – Oct** **Consultation to identify needs**
- Nov – Jan Develop project proposals – 150%
  
- Jan/Feb MAC WG select 125% for public consultation
- **Feb/Mar – Apr/May** **Public consultation**
- Jun/Jul Decision conference to agree final content

# DTI Requirements

- Develop plans for 3+3 years
  - First 3 years in detail and a further 3 years in outline
  - Then rolling formulation, adding a year each year
- Link to
  - DTI Technology Strategy
  - OGD/research council priorities
- Focus on greater innovation & impact

# Technology Changes

- What technology changes are affecting your area of interest?
- What technology changes might you anticipate over the next 7 years?
- How will these impact your measurement needs?
- How will they impact what NPL should do to help meet those needs?

# How can you help?

- Request to be kept in touch
- Talk to NPL staff
- Suggest NPL visit you or you visit NPL

# Formulation Contacts

- Formulator: Dave Rayner – [dave.rayner@npl.co.uk](mailto:dave.rayner@npl.co.uk)  
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- Formulation website:
  - [www.npl.co.uk/formulation](http://www.npl.co.uk/formulation)