

Acoustics and Ionising Radiation Formulation and Strategy

13 November 2008
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- What is the future of Programme Formulation?
- What is Rolling Formulation?
- Programme Overview
- Roadmaps

Future Formulation

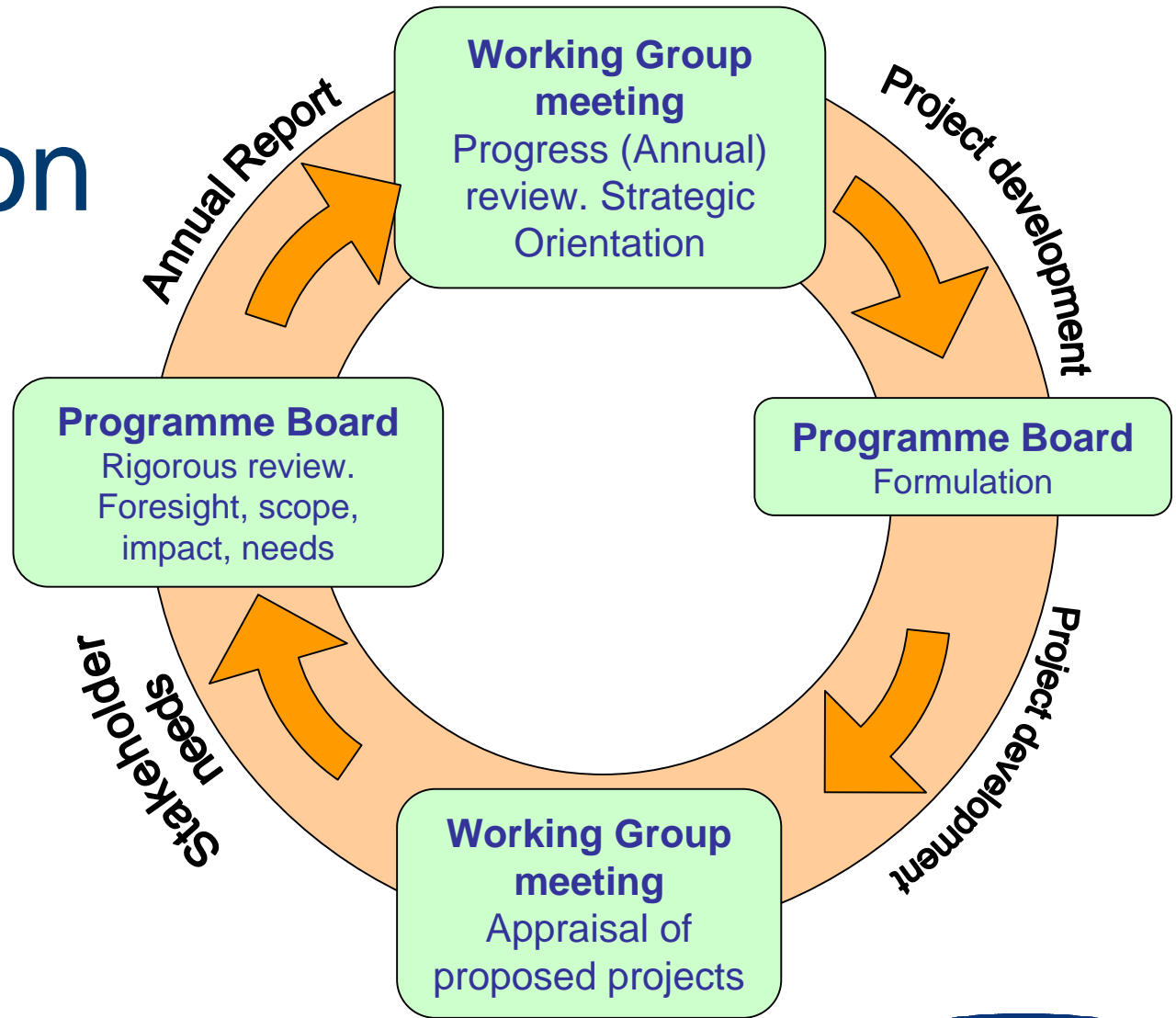
- Improved impact for projects
- More strategic management of Programmes
 - Not just a ranked list of individual projects
- Development of a portfolio of projects to meet a strategy
- Programmes will always extend for 3 years
- Programmes will be more responsive
- Programmes are currently in a period of transition

Future formulation

- Develop strategy
- Overview
- Roadmaps for next 6 – 10 years
- Rolling formulation (~1 yr) more responsive
- Rigorous review of existing projects
- Annual definition of new projects
- More user focus
 - Better consultation with user groups
- There will still be assessment of ‘impact’
 - Quality of Life
 - Economic
 - Science

Rolling Formulation

Changing emphasis of NMI and Working Group activity on an Annual Cycle



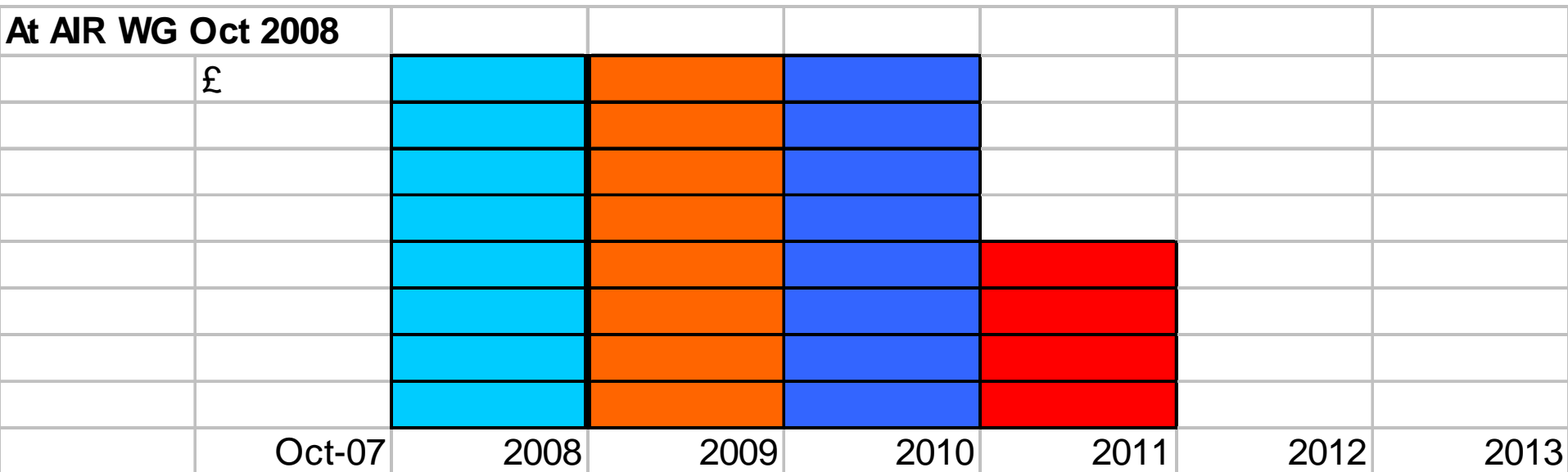
AIR WG meetings

- Completed
 - 27 August 2008 Pilot Programme Board
 - 30 September 2008 AIR WG
- To do
 - Jan 2009 Programme Board
 - Rigorous review. Foresight, scope, impact, needs
 - 23 Feb 2009 AIR WG
 - Progress review
 - Strategic orientation
 - Summer 2009 Programme Board
 - Formulation
 - Sept 2009 AIR WG
 - Appraisal of proposed projects

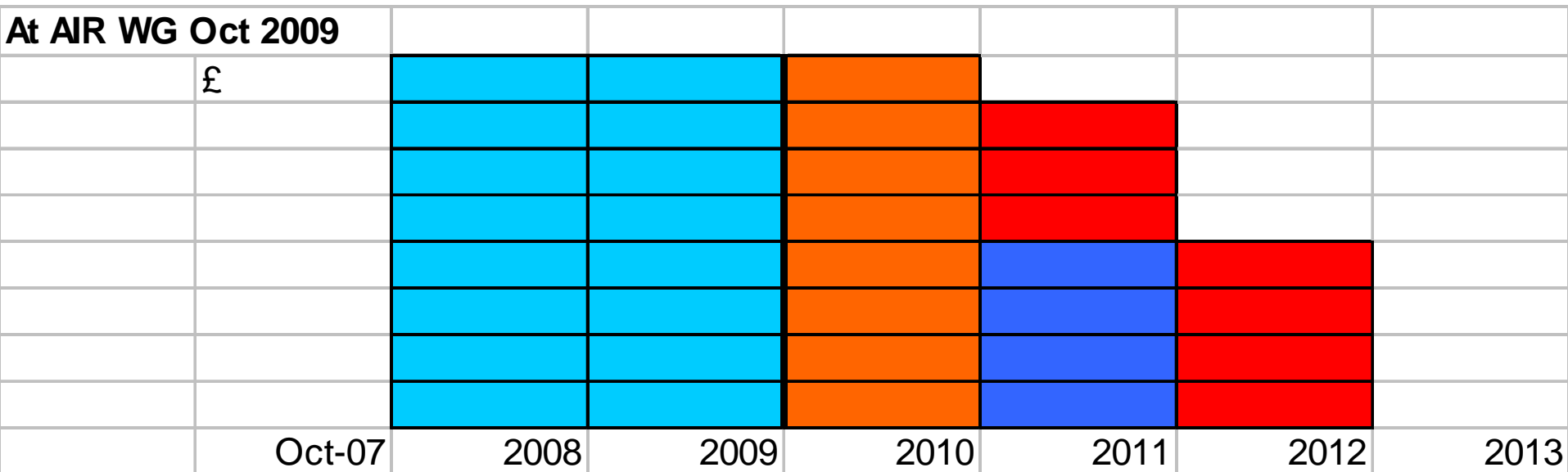
AIR Rolling Formulation



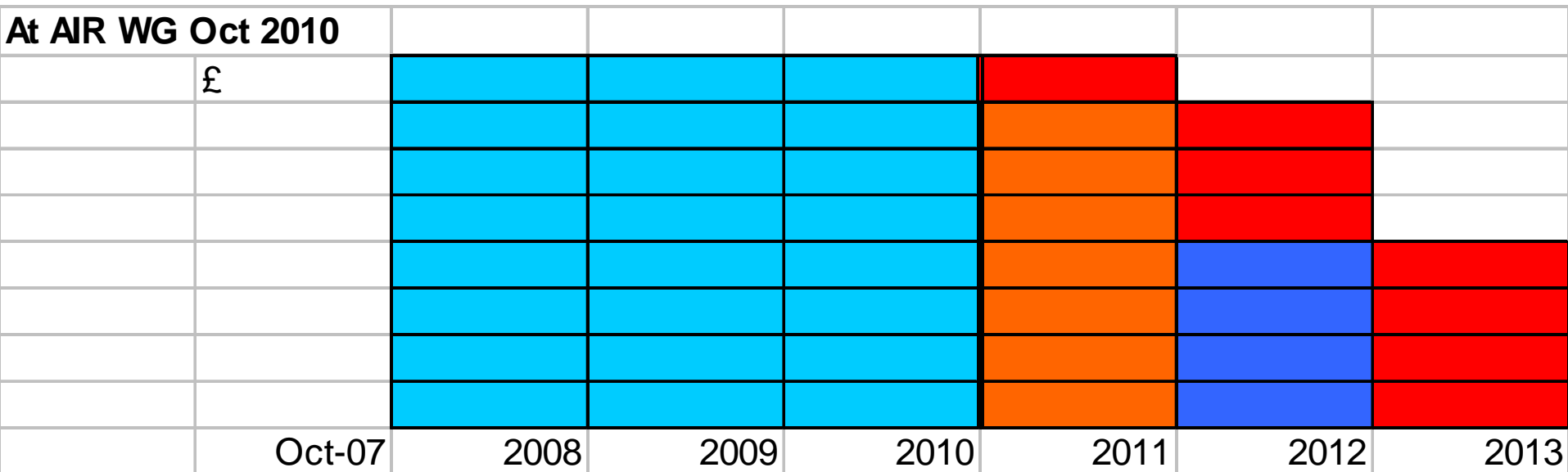
AIR Rolling Formulation



AIR Rolling Formulation

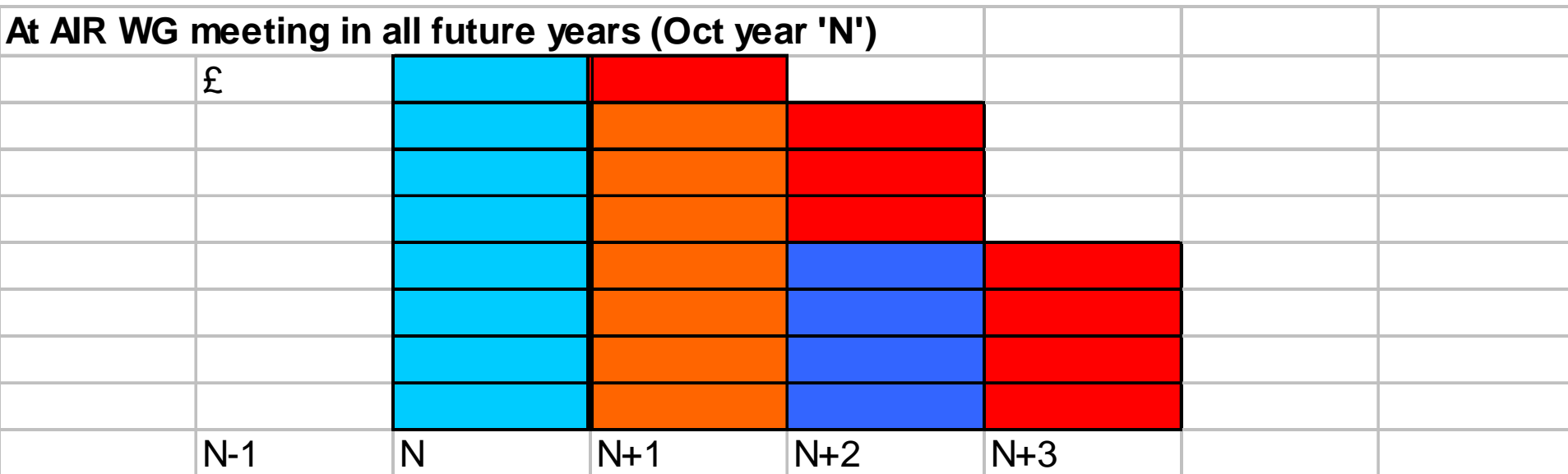


AIR Rolling Formulation



AIR Rolling Formulation

	Funded
	Completed
	New projects
	Rigorous review



AIR Programme Overview

NATIONAL MEASUREMENT SYSTEM

Acoustics and Ionising Radiation PROGRAMME OVERVIEW

APPLICATION AREA & PRIORITY FOCUS OF IMPACT

CHALLENGE

HOW THE NMS PROGRAMME INTENDS TO ADDRESS IT

SPECIFIC NMS IMPACT

Healthcare - Therapeutics

Improving cure rates and quality of life for UK citizens (disease treatment and amelioration)

Developing metrology infrastructure to support the effective use of existing and new modalities in radiotherapy (IMRT, Stereotactic, IGRT, targeted radionuclides), ultrasound (inc. HIFU) and application of digital hearing aids.

Effective application of ionising radiation and acoustics in medicine

Healthcare - Diagnostics

Medical diagnostic techniques for accurate and earlier diagnosis of disease

Development of new methods of measurement, instrumentation, test protocols, standards, measurement services, quality assurance, proficiency test exercises, good practise guides (e.g. in nuclear medicine, ultrasound and X-ray)

Optimised application of medical diagnostic techniques

Healthcare - Personal Safety
Underpinning Metrology - Regulation

Protect the public and radiation workers from ionising radiation

Disseminate legally traceable personal standards that meet evolving regulator needs

Continued safe operation of industries that use ionising radiation (IRR99, IRMER)

Environmental Sustainability - Pollution
Healthcare - Personal Safety

Protection of the public and marine environment from anthropogenic noise

Development of methodologies (including MEMS), standards, and new instrumentation to support urban noise mapping & marine renewable energy sources (wind-farms; tidal etc.)

Better understanding and mitigation of the effects of personal and environmental noise exposure

Environmental Sustainability - Pollution
Energy Gen & Transmission - Emissions reduction

Decommissioning of nuclear power facilities; management of radioactive discharges and nuclear waste

Providing standards, reference materials, consultancy, tools (e.g. microfluidics), exercises and proficiency tests of UK (and CTBTO) environmental laboratories

Enable the UK to comply with international obligations and more accurate sentencing of waste

Security - National Security
Security - Personal Security

Prevent and reduce significant security threats, national emergencies and improve to personal security.

Characterising sonar systems under ocean-like conditions. Developing new generation of measurement techniques. Enabling countries to move to civil uses of nuclear technology by training, consultancy and measurement expertise.

Reduce risks from nuclear weapons and enhanced marine defence.

Energy Gen & Transmission - Production

Maintain and develop capabilities for existing and new nuclear power facilities. Establish new energy sources.

Validation and adapting current NPL facilities to perform reactor instrumentation tests. Measurements in support of the off-shore oil and gas industry.

Maintaining a science base to support national nuclear energy options and hydrocarbon exploration.

Advanced Manuf. - Process Control
Advanced Manuf. - Instrumentation

The optimised application of industrial processes and non-destructive monitoring techniques

Developing and dissemination of standards to meet the requirements of the radiation processing industry. Development of methodologies, standards, and new instrumentation for acoustic emission and hydrodynamic cavitation

Affordable control of infection rates. Optimised application of ultrasound in detection and processing

Underpinning Metrology - Extension of SI
Underpinning Metrology - Traceability

Enabling the measurement of acoustic and ionising radiation quantities at the accuracy required by society

Providing traceability to the SI by maintaining and developing standards and measurement methods, linking to international metrology, and providing measurement services and advice to users

Internationally accepted and accessible measurement standards

Programme Themes

Sound-in-Air

Sound-in-Water including ultrasound

Radiation Dosimetry

Neutrons

Radioactivity Primary and Secondary Stds

Radioactivity Sector related activities

Knowledge Transfer and Management

Theme Roadmap – Radioactivity primary and secondary standards

Targets

Primary standardisations
e.g. ^{56}Mn

International comparisons
1. ^{177}Lu NIST PTB
2. ^{223}Ra NIST
3. PET nuclides, e.g. ^{64}Cu , $^{68}\text{Ge}/\text{Ga}$
4. Surface contamination monitoring exercise

Deliverables

Existing measurements of surface emission rate, radionuclide identification and content and total activity

Nuclear data evaluations
e.g. ^{232}U ^{231}Pa , PET nuclides

Development of new high pressure proportional counter

Technologies

Existing primary
1. 4π β - γ coincidence
2. Triple to double coincidence
3. Ciemat/NIST
4. Gas counting

Automation of existing processes removing transcription errors

Existing:
secondary
1. γ spectrometry
2. α spectrometry
3. Ion chambers
4. Liquid scintillation
5. 2π multiwire proportional counters

1. New electronics for ion chamber systems
2. Validation of new coincidence counting software
3. Hardware upgrades for multiwire proportional counters

1. Extend TDCR to include coincidence counting
2. Extension of HPPC counter to include b-g sum counting
3. Upgrade of DCC hardware

Enabling Science

Existing:
1. Absolute standardisation
2. Secondary standardisation
3. Digital coincidence counting (DCC)

Development of primary standards

New small detectors

1. Improvement of efficiencies for low energy beta
2. MC modelling
3. Improved DCC

2008

2010

2012

2015

Drivers or Challenges

Underpins all the work in Radioactivity:
Health, Environmental, Decommissioning and Radiation protection.

Theme Roadmap – Radioactivity related Environmental, Decommissioning and Radiation Protection activities

Targets

Deliverables

Technologies

Enabling Science

In situ, cheaper, and safer analysis techniques

Carry out standardisations of radionuclides required for environmental applications

Report on Microfluidics

Knowledge transfer on the use of maths models in decommissioning

Report on the characterisation of surface contamination monitors

Provision of photon emitting large area reference source standard (by AWE)

Comparison of true and apparent activities on stack discharge filters

Production and certification of reference materials for nuclear decommissioning

Production of calibration standards for portal monitors

Existing:
1. Standards
2. Facilities
3. Services
4. User meetings

Assessment of response of instrumentation to Tritium gas in different chemical forms

Develop non-destructive assay techniques for the characterisation and assay of actinide species

Annual Environmental Radioactivity Proficiency Tests

Creating new artificial reference materials

Study microfluidics principles

1. More drums and reference materials
2. More exotic nuclides as specified by the regulators

Liquid scintillation counting by triple to double coincidence ratio method

Develop in-situ measurement technologies with instrument manufacturers

Existing:
Comprehensive knowledge of radio-assay techniques across a wide range of radionuclides

1. Development of in-situ assay techniques
2. Review issues for nuclear new build

1. Mass spectrometry (collaboration with Analytical science)
2. Calorimetry/Bolometry in collaboration with Dosimetry
3. Better understanding of the use of positron decay in medicine
4. Possible primary standard for radioactive aerosols
5. Review issues for new build
6. Improving skills to perform non-destructive assay of plutonium (and other actinide) contaminated material

2008

2010

2012

2015

Drivers or Challenges

1. Many nuclear facilities are coming to the end of their life
2. Strict legal control of discharges of radioactivity from nuclear sites
3. Risk reduction to ensure the public don't receive elevated doses of radiation
4. Ensure most effective use of nuclear waste disposal facilities
5. Nuclear new build

Thank you

Any Questions?

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