

Minutes of the 7th Nuclear Spectrometry Users' Forum

Module 16, Lecture Theatre, NPL – 6 May 2009

Participants:	Simon Jerome	NPL (Chairperson)
	Sean Collins	NPL (Secretary)
	Ian Adsley	Nuvia
	Keith Bradshaw	NIRAS
	Timothy Broadhead	Canberra UK Ltd
	Jane Caborn	Nexia Solutions
	Matthew Curtis	VLA
	Julian Dean	NPL
	Alan DuSautoy (Speaker)	NPL
	Derek Hammond	HPA
	Chris Hardy	Babcock Marine
	Trevor Hatt	AMTEC
	Marty Johnson (Speaker)	USAFSAM
	Steven Judge (Speaker)	Magnox Southern
	Anna Kutner	Nuvia
	Richard Lukey	VLA
	Olivia Marsden	AWE
	Paul McGinnity	RPII
	Ian McGregor	Rolls Royce
	Stephen McNeilly	Rolls Royce
	Selwyn Runacres (Speaker)	Food Standards Agency
	Sarah Shephard	URENCO (Capenhurst) Ltd
	Charlie Stewart	DSRL
	Klaus Thieme	Nuclitec
	Pam Thomson	AWE
	Shane Tial	ORTEC
	Wolfram Westmeier (Speaker)	GMBH
	Richard Wilson	Westlakes Scientific Consulting

1. Chairman's Welcome, Previous Minutes and Actions Arising

- Simon Jerome introduced himself and welcomed members to the seventh meeting.
- The minutes of the sixth meeting were accepted as a true record
- Actions:
No actions were raised from the previous minutes.

2. NPL Talk: 'Certified Reference, Intercomparison, Performance Evaluation and Emergency Preparedness Exercise Materials for Radionuclides in Food' – Simon Jerome, NPL

- Simon started his talk by talking about the workshop that was held at NIST in 2008 and the need for reference materials in food.
- Simon talked about the actions that arose from the workshop: Types of matrices with fat rich matrices a high priority, required radionuclides and activity levels, international cooperation to develop reference materials, PT program infrastructure, issues with standard method procedures.

Comments/questions

- Following the talk a delegate enquired about buy-in from UK radiation monitoring establishments, Simon replied that as of yet there is none though it was asked that any suggestions of participating organisations would be welcome. Selwyn Runacres added that the FSA has HPA as a first point of contact for UK food monitoring.
- A delegate raised a concern that if an organisation isn't high on the list to be involved in UK food monitoring emergencies what would be the reason to take part in the PT program due to the 8 hour reporting time. An action was raised on Simon to determine how the programme would be co-ordinated and how the UK sub contracts to other organisations.
- A delegate enquired about the use of ^{131}I in the reference material, Simon explained that the half life of many of the ^{131}I radionuclides are too short for a reference material, though in a PT exercise it would be a useful addition.
- Delegates put support behind the use of performance method PT and not using as specified metrology method.
- Action on Simon to get a more coherent view of the UK's emergency response network and how it works.

3. Invited Talk: 'Radioactivity in Food and the Environment' – Selwyn Runacres, FSA (awaiting permission to publish)

- Selwyn began by explaining that RIFE is very large and that it would be far too long to explain comprehensively in a 30 minute talk. Selwyn explained that he would cover the ethos of RIFE, aquatic monitoring, a site example and dose calculations.
- Selwyn explained that the RIFE document covers all of the UK environmental agencies. All of the different agencies do their own selection of sampling and these are published.
- Selwyn talked about other surveillance work that the FSA covers which includes the continuing monitoring of fall out from Chernobyl in sheep, imported foods from contaminated countries coming and habits surveys.

Comments/questions

- A delegate asked whether the amount of detail in the report has reduced over the years, Selwyn commented that he was unaware of this as he has only been reviewing the document for a few years.

4. Invited Talk: 'Automated Radionuclide Separation System for Field Laboratory and/or Fixed Laboratory' – Marty Johnson, USAFSAM (awaiting permission to publish)

- Marty explained that ARSIIe developed from a medical isotope separation system ARSII. The system was developed due to a need for a military mobile field laboratory that could cope with α and β analysis with a quick analysis time in case of emergency. The ARSIIe had to be rugged, simple to use and allow for remote use.
- Marty showed a number of graphs that showed approximately 99 % recovery of ^{241}Am , ^{233}U and ^{239}Pu with a two column system. The system was further developed to a three column system that allowed a 90+ % recovery of ^{239}Pu , ^{99}Tc , ^{233}U , ^{85}Sr and ^{241}Am though Th was approximately 40 %.
- Marty explained that the ARSIIe was further developed to a four column system that will allow more flexibility and process sample in

approximately 60 minutes. Though he hopes to reduce that to less than 30 minutes.

- Marty talked about how the ARSIIe could be used to perform emergency sample analysis with minimal support and in far less time than most separation chemistry methods currently used in a case of national emergency.

Comments/questions

- Following the talk a delegate enquired as whether the system will become commercial, Marty indicated that it would be through North Star though the protocols belong to the USAF.

5. NPL Talk: ‘ISO TC147 WG4 Update’ – Simon Jerome, NPL

- Simon informed the participants that the time of the presentation would only be about five minutes instead of the published thirty minutes in the agenda.
- Simon explained that this working group was specifically involved with radioactivity in water. The working group used to be responsible for four ISO standards total α , total β , ^3H and γ spectrometry. They are still working on the standard for ^3H , though there are a few more in preparation, which includes standards for liquid scintillation counting, polonium and strontium.
- Simon went on to explain the process that a working group goes through to produce and publish an ISO standard.
- Simon has been nominated as the ‘sherpa’ for ISO standards of the measurement of ^{210}Pb and uranium in water. Where he will look at chemical techniques e.g. ion exchange extraction chromatography, and measurement techniques e.g. alpha spectrometry, mass spectrometry. Simon asked for any suggestions that should be included.

6. NPL Talk: ‘Acoustics and Ionising Radiation Formulation and Strategy’ – Alan DuSautoy, NPL

- Alan informed participants of his role as Impact and Formulation Leader at NPL.
- Alan explained to the participants how the Radioactivity project formulation will be produced in future to improve impact and be more responsive to the UK needs by having a rolling programme formulation that will be carried out each year.
- Alan showed a number of diagrams to show how the programme formulation would work in future at NPL. Alan asked for any feedback to the programme formulation roadmap.
- Alan talked to the participants that the programme formulation would be carried out with much greater consultation with the ‘stakeholders’ though:
 - 1-2-1 site visits
 - User group meetings
 - E-mail/Web consultation.
- Alan informed the delegates that any ideas for new projects, or ideas for strategy would be welcome. A web page for comments would be set up for user comments at www.npl.co.uk/air.

Comments/questions

- A delegate supported the idea of a rolling 1 year programme.

7. NPL Talk: ‘The Identification, Separation and Non-Destructive Testing of Beach Finds from the West Cumbrian Coastline’ – Simon Jerome, NPL

- Simon started by outlining the history behind the project and people who were involved in the work at NPL, SERCO and NUVIA.
- Simon showed a map of the West Coast with beaches that were being monitored for 'hot' particles. He then went on to describe the method of locating the particles using a Groundhog Evolution 2.
- Simon described with pictures a number of the particles that were found and how they were separated from the sand that was transported with.
- Simon explained the methods used to determine the nuclides and their activities through non-destructive testing and the problems that occurred:
 - Electro static charge of the alpha particles causing problem with mass determination.
 - Determination of the actinides activities due to photo peak convolutions.
 - SEM/EDX scanning made problematic due to not being able to stick down the particles or coating them to make them conducting and worrying about the particle disappearing into the vacuum system.
- Simon showed tables of the results that were determined and highlighted some of the more interesting particles.
- Simon went on to discuss the overall issues and improvements for future projects.

Comments/questions

- A delegate enquired as to how the gamma spectrometry geometry was matched for the particles, Simon replied by explaining that the photopeak efficiency was determined by using single nuclides and mixed standards evaporated in a centrifuge tube to match the position of a small particle at the bottom of the tube and measured at distance to produce a point source geometry.
- A participant asked what the estimated probability of discovering something within a depth of 10 cm of sand, a participant directly involved in the work answered that they use the ^{137}Cs to discover the particles and was greater than 99.9 %, though there were a number of specifications for ^{60}Co , ^{241}Am and ^{90}Sr .
- The same participant wondered if the activity had been tried to be determined in situ as another method of determination, the same participant from above answered that it was not required as the exercise on the beach was to find the particle for later determination in a lab.
- A delegate enquired as to how the alpha rich particles were found on the beach, he was answered that they were found by the ^{241}Am γ emission.

8. Commercial Talk: 'New Trends in Spectrometry' – Dr. Wolfram Westmeier, GmbH

- Dr. Westmeier started by informing the participants that his company is a nuclear spectrometry applications and research company, working in designing and producing user defined spectrometry software and scientific and software research into:
 - Nuclear and decay data
 - Transmutation of nuclear waste
 - Peakshapes
 - Baseline under peaks
 - Programming strategies for quantitative spectrum analysis:

- Physics not Numerology
- Fuzzy logic
- Repeat Analysis
- Physically correct peakshapes and baseline
- Dr. Westmeier went on to describe his research into software analysis for BrillanCe scintillators from Saint Gobain, describing how the BrillanCe detector has a greater efficiency than a NaI (TI) detector of the same size and a HPGe detector of 25 % compared to a 1.5” x 1.5” B380. Though the resolution is poorer than the HPGe. The SODIGAM, developed by Dr. Westmeier, is the only software on the market for quantitative B380 spectrometry.
- Dr. Westmeier explained that he uses physics and not numerology to determine the baseline and peakshapes in gamma spectrometry analysis. Refuting the use of the square fit or curve fit function used currently when the physics of the interactions in a gamma detector is known and thus can be programmed into software to produce better results.
- Dr. Westmeier talked about using ‘fuzzy logic’ to use all available methods and assign a weighting on the results based on applicability to determine an average result, which are more stable and more significant than a single result.
- Dr. Westmeier described the development of an In-Tank Monitoring automatic waste disposal supervision system being used in over 40 nuclear medicine departments worldwide and showed measurement results for ¹³¹I.
- Dr. Westmeier commented that standard commercial software cannot determine peaks that are just visible in the spectrum which he is focusing his application of software to analyse.

9. Invited Talk: ‘Proposed Good Practice Guide for gamma spectrometry’ – Steven Judge, Magnox South (awaiting permission to publish)

- Steven started by asking for volunteers to help with the production of the γ spectrometry good practice guide. He then went on to discuss the reasons why there is a need for a good practice guide.
- Steven laid out the current scope for this good practice guide, which is based around the use of the gamma spectrometer in situ with example of sections to be:
 - Calibration
 - Quality Control
 - Interpretation of Measurements
- Steven then split the participants into small discussion groups to discuss what the participants would like included into the good practice guide. Steven was then given feedback from each group as to preferred subjects to be covered.

10. NPL Talk: ‘Imperial College Reactor News’ – Simon Jerome, NPL

- Simon briefly talked about the current opportunities and issues presented by continued operations at CONSORT, with the academic community wanting to see the initiative go ahead and a new undergraduate degree in nuclear engineering.

11. Any Other Business

- No other business was discussed.

12. Date of Next Meeting

- Simon Jerome is proposing the next meeting held in Manchester, with the tentative date being 18 May 2009.

Sean Collins

Secretary, NSUF