



Sellafield Ltd

**A Nuclear Management Partners company
operated under contract to the NDA**

Changing workload for Highly Active Analysis

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Date: Wednesday, 28 October 2015

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Introduction

- Sellafield Analytical Services currently carries out 300,000 determinations per year on 100,000 samples;
 - Current work is scheduled, regular, consistent and mainly known matrix
 - Customer expectation is well established, understood and met
 - 10% of overall workload is specific to SNM analysis
 - 18% of overall workload is “non-routine”
- High β/γ activity samples accounted for an average of 200 samples per week over the 2014/15 period.
- Currently operating two higher activity facilities
 - A suite of HA & MA cells in the main Analytical Services Laboratories
 - A dedicated HA cell facility within the THORP reprocessing plant
 - At present the cells are used for dose reduction as opposed to analysis

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Analytical Services - New Challenges

Reprocessing & Effluents

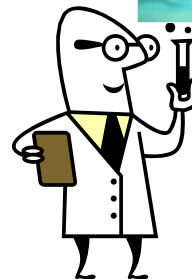


Is the plant working as it should?

POCO & Decommissioning



What is this stuff?



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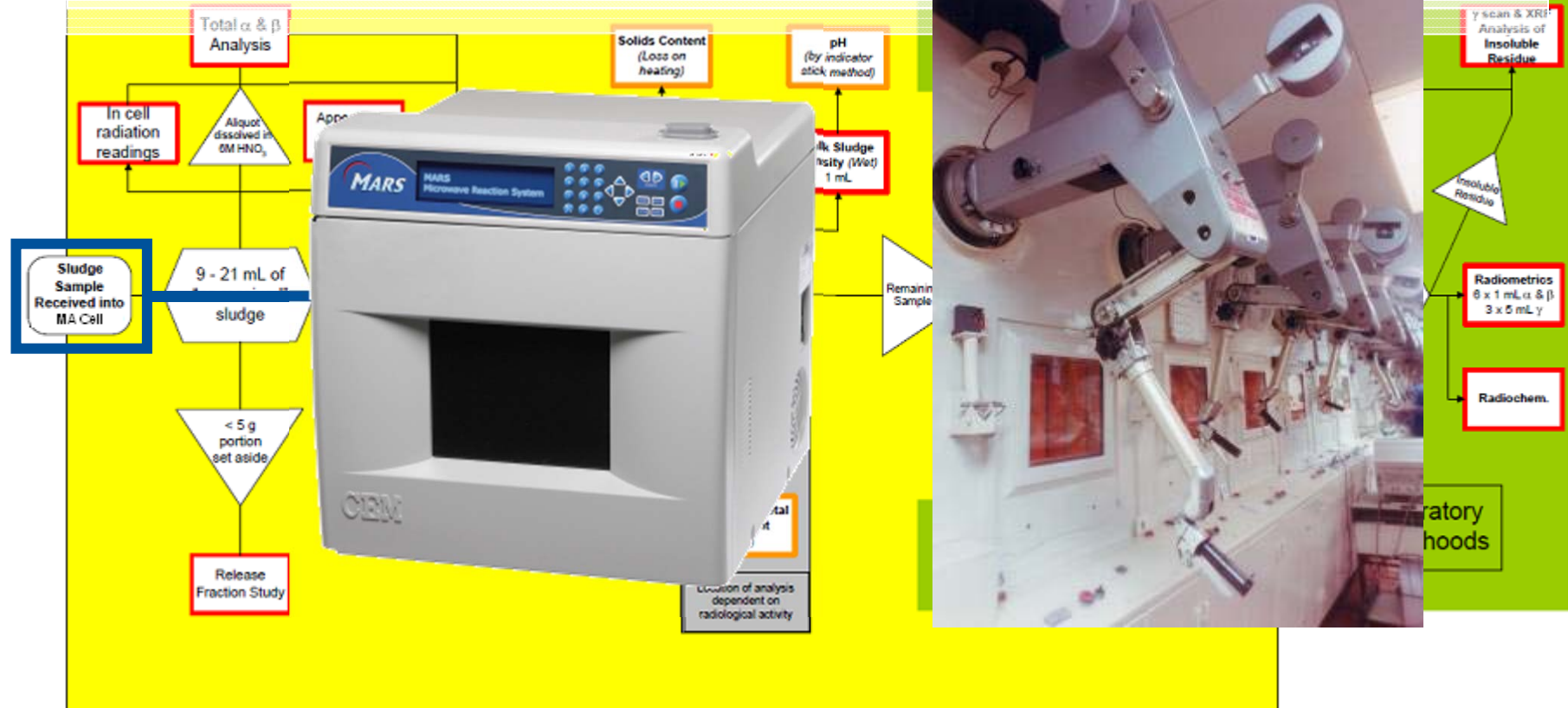
Analytical Services - New Challenges



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Analytical Services - New Challenges

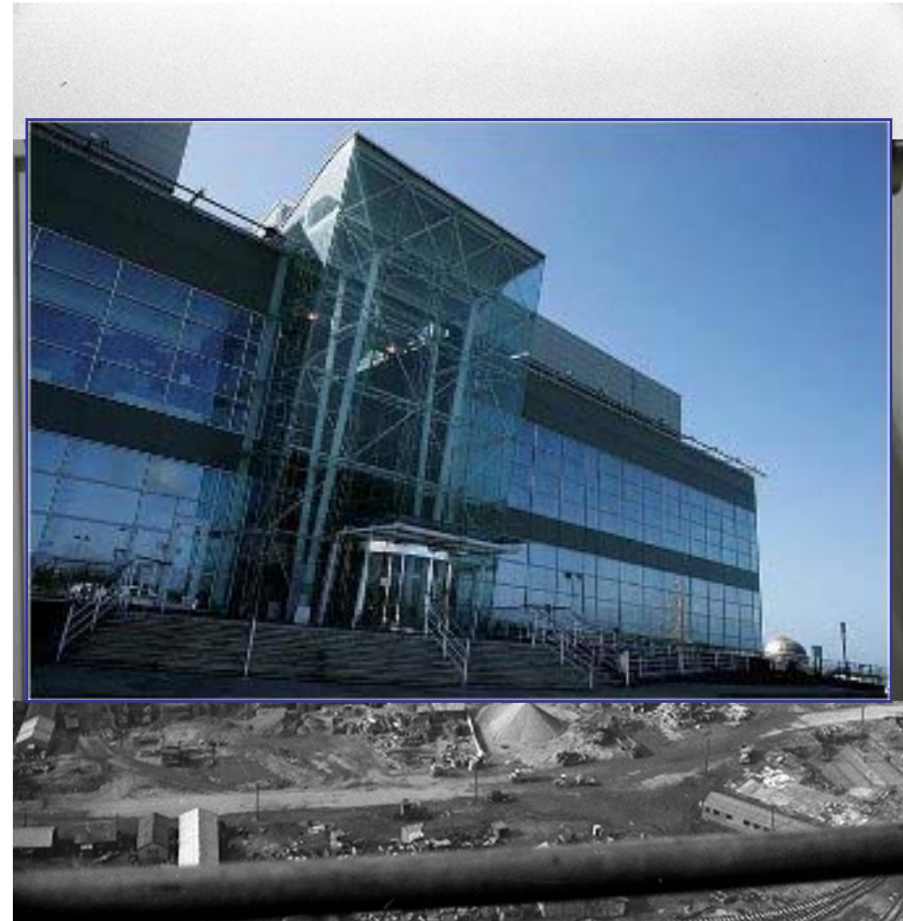
- Each sample was subject to over 50 different determinations



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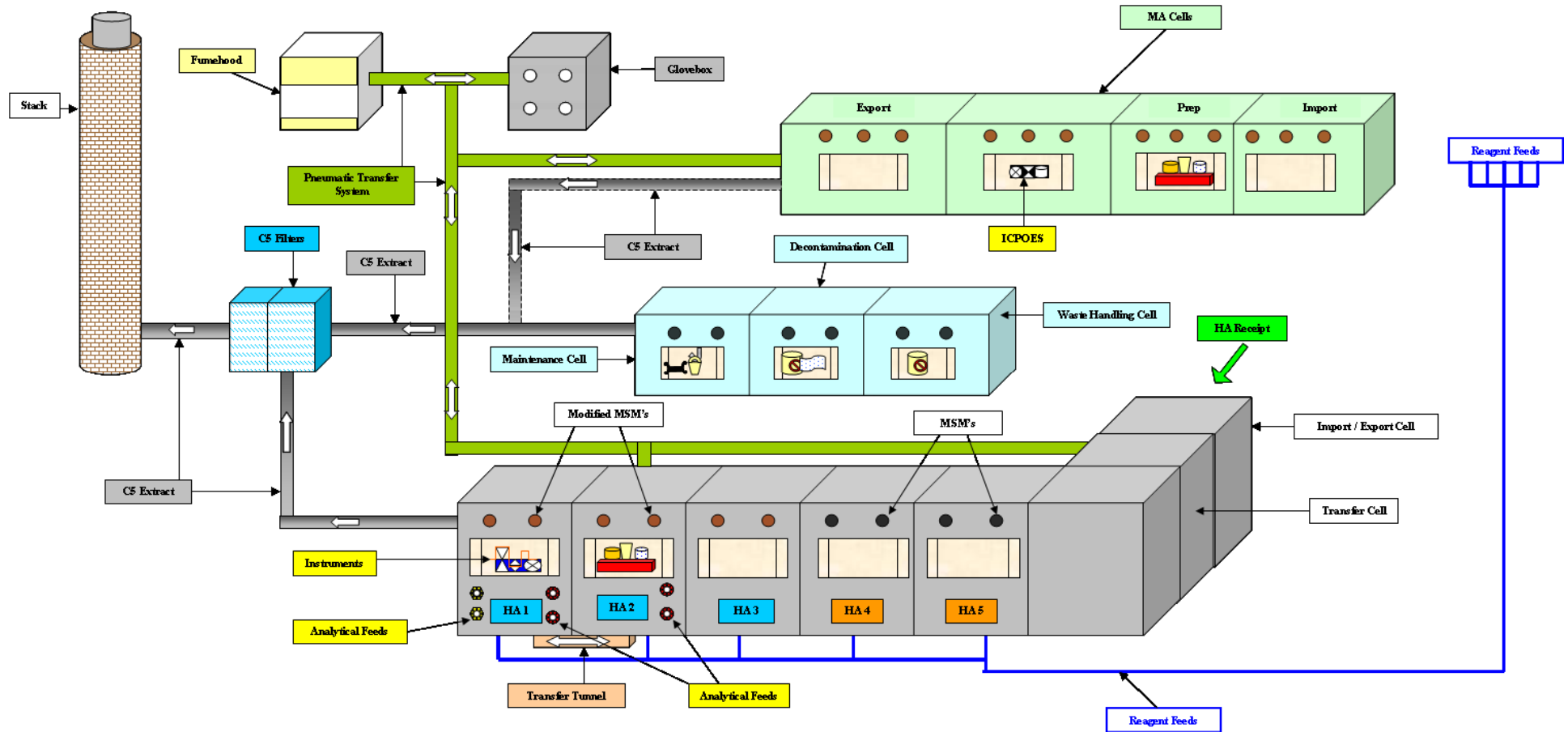
Change in Facility

- The current AS facility is approaching 70 years old and is in terminal decline.
- Over the next 10 years operations will be progressively transferred to a new facility.
- This will feature a new HA cells facility and supporting MA module.



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Change in Facility



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Life Time Cost/
Waste
production

Low



Perform Required Analysis

Understanding our customers so we can differentiate between their needs and wants. Using our expertise to meet these needs.

Rationalise Demand Further

Understanding the quality and quantity of analysis required and that it is fit for purpose.
Conditional analysis.

On Plant

E.g. 'Dipstick'

In-situ, In-line, On-line

E.g. NRTMA

Lab Based Non-destructive

E.g. Gamma Spectrometry.

Quality/
Demand

Low

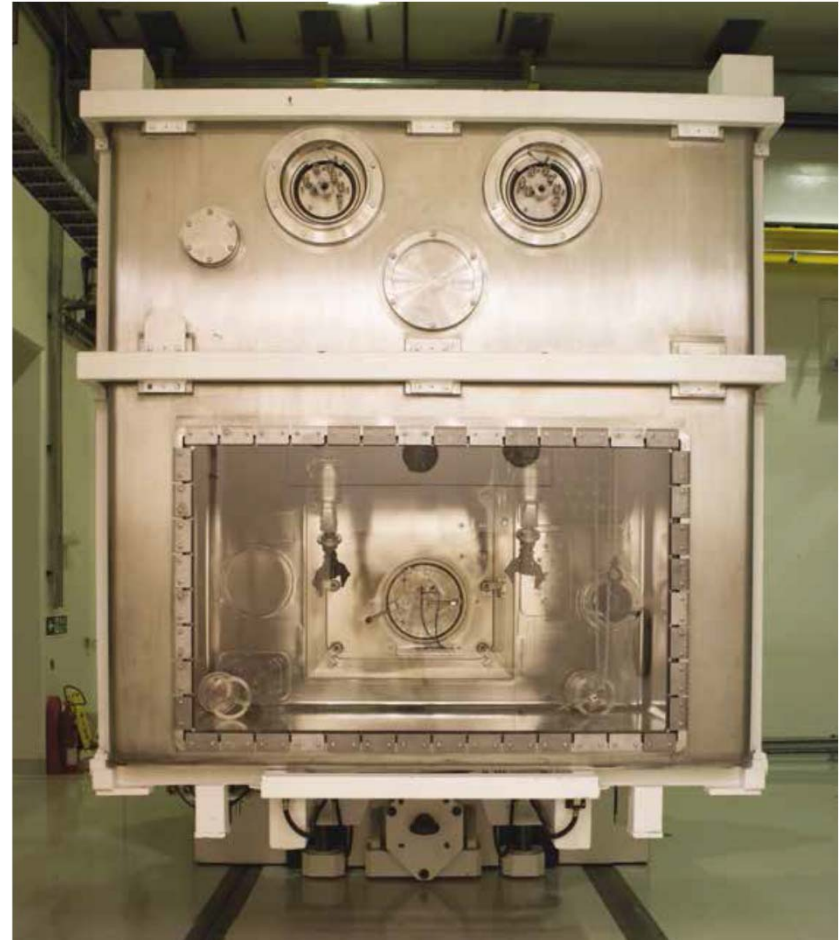


Automated



New Facility – Equipment Philosophy

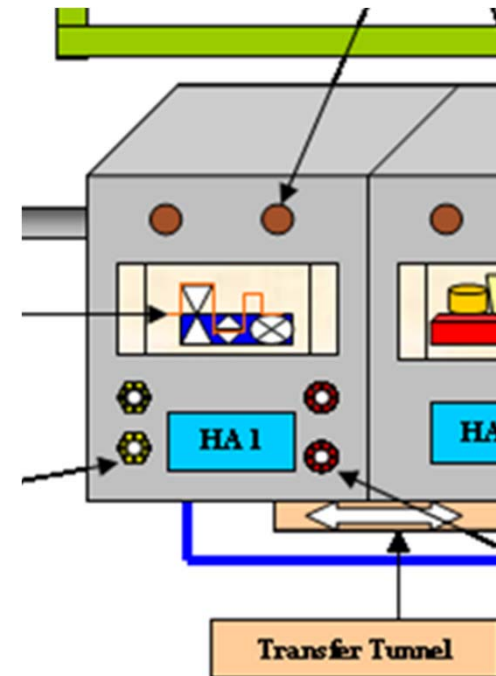
- In the new facility equipment will be installed in one of two ways;
 - Complex / expensive items will be modified such that only the portions in contact with samples will be inside the cell.
 - Simpler / cheaper items will be installed wholly in cell and treated as disposable.



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New Facility – Proposed Equipment

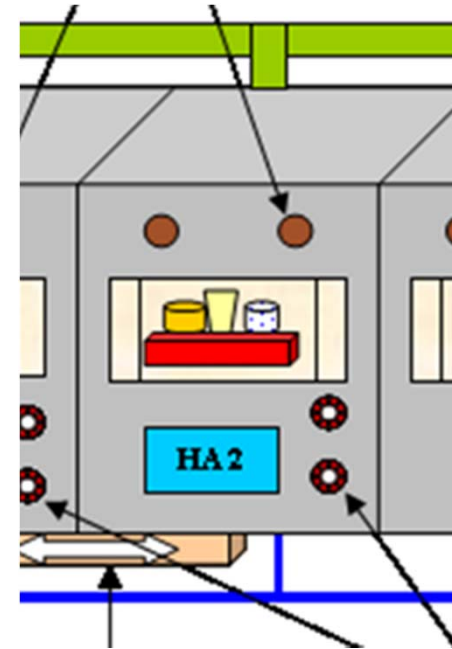
- Cell 1 – Instrumentation / Analysis Cell
 - Non-destructive Analysis Workstation
 - LIBS system
 - Raman spectrometer
 - Gamma (γ) Spectrometer
 - Hybrid K-Edge system
 - X-Ray Fluorescence system
 - Neutron (η) coincidence counting



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New Facility – Proposed Equipment

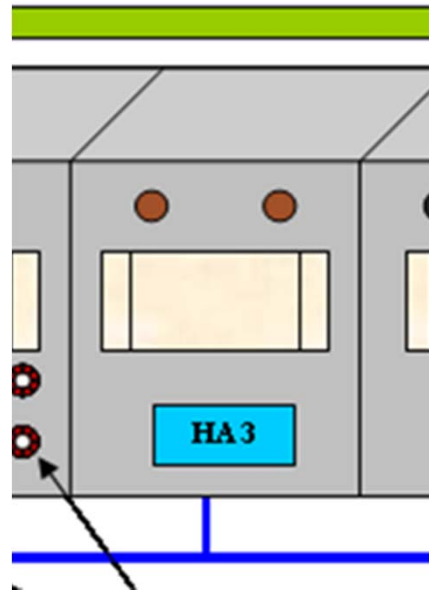
- Cell 2 – Sample Preparation Cell
 - Analytical grade balance
 - Laser sampling apparatus
 - Sample dissolution apparatus
 - Centrifuge
 - Ultrasonic bath
 - Digital Optical Microscope
 - Radiation Monitoring equipment



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New Facility – Proposed Equipment

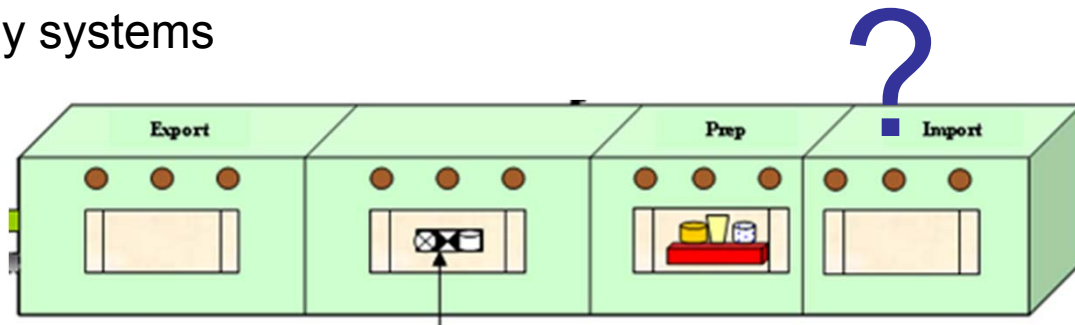
- Cell 3 – Experimental Cell
 - Inert atmosphere capsule
 - This cell will be equipped as required on a project by project basis



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New Facility – Proposed Equipment

- MA Cell Module
 - Proposed equipment includes;
 - Elemental analysis – ICP-OES or ICP-MS
 - including laser ablation sampling system for solids
 - Scanning Electron Microscope
 - Gamma Spectrometry
 - Particle size analyser
 - Ion chromatography systems



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New Facility - Challenges

- The new facility is required to support High Hazard reduction activities from 2019 onwards.
- The current proposal is for a shared facility which will require integration of programmes.
- The HA cells are already constructed and partially commissioned but will require adaptation for AS purposes.
- Suitable waste routes need developing and putting in place.

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Thank you for your attention

- Any questions?

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