



Sellafield Ltd

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

Operation of the Analytical Services H.A. Laboratory and Dispensary

Peter J. Watson

Date: Wednesday, 28 October 2015

A Nuclear Management Partners company operated under contract to the NDA



Sellafield Ltd

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

A Nuclear Management Partners company operated under contract to the NDA

Remote Handling

- In cell operations in both facilities are carried out using Wälischmiller A202 Master Slave Manipulators (MSMs)

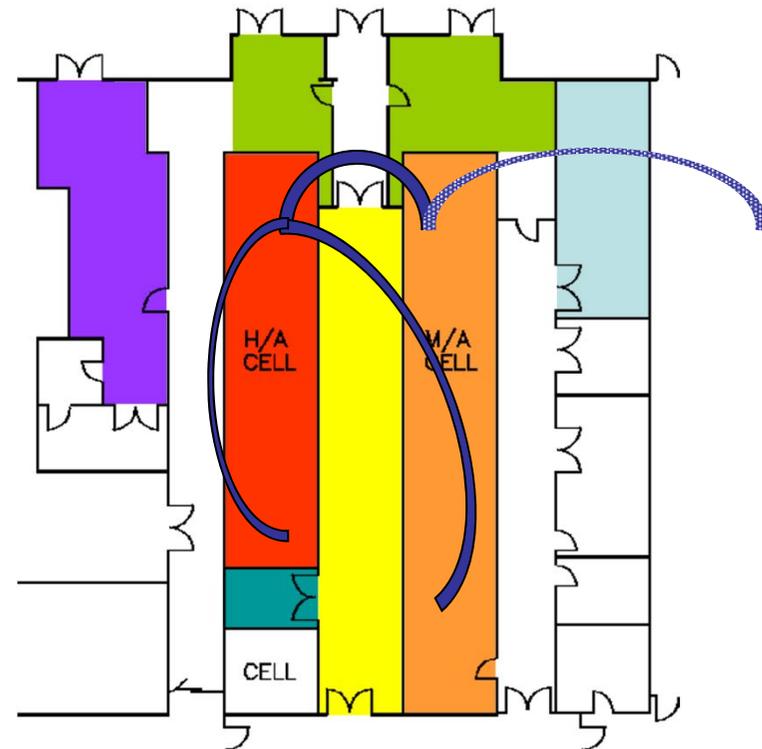


A Nuclear Management Partners company operated under contract to the NDA

The ASL HA / MA Cells Facility

Constructed in 1989 the facility features;

- 2 Flasking Stations
- 2 Connected HA Cells
- 6 Connected MA Cells
- A Pneumatic Transfer System (PTS)
- An in cell ICP-OES instrument
- A supporting Fumehood area
- A MSM Workshop
- An Operator Area



A Nuclear Management Partners company operated under contract to the NDA

The ASL HA / MA Cells Facility

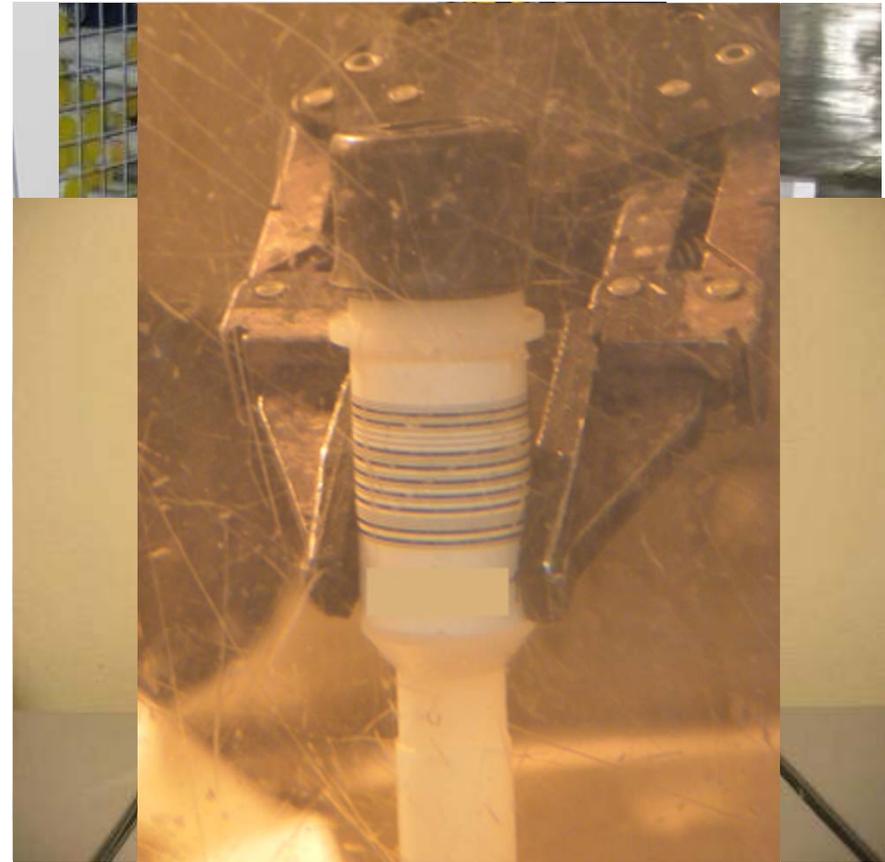
Samples come to the ASL facility from across the Sellafield Site

- HA Samples
 - High Activity Evaporator Liquors
 - Dissolver Liquors from Magnox & THORP
 - Magnox High Activity Raffinate
 - Centrifuge cake (THORP)
- MA Samples
 - THORP Raffinate
 - *After dilution in THORP HA*
 - MSSS Silo Liquors
 - Legacy Pond Sludges
 - THORP Sump liquors
 - Lower activity Magnox liquors

A Nuclear Management Partners company operated under contract to the NDA

The ASL HA / MA Cells Facility

- Depending on the source samples can be delivered to the ASL facility by;
 - Shielded 2 tonne Flask
 - various shielded Castles
 - or by PTS directly to the MA cells from THORP



A Nuclear Management Partners company operated under contract to the NDA

ASL HA/MA Analytical Methods

- Quality Assured Analytical Methods (QAAMs) are used alongside a number of other supporting methods. These include;
 - Sample Preparation for Determination of U and Pu by TIMS
 - Determination of Total Sols remaining at 1000 °C
 - Determination of Acidity in Plant Solutions
 - Elemental Analysis by ICP-OES
 - Determination of Suspended Solids
 - pH of MA samples
- Samples are also dissolved and diluted for further downstream analysis in the ASL fumehood and instrument laboratories
- Additionally MA Cell 6 is used for occasional experimental work

A Nuclear Management Partners company operated under contract to the NDA

The ASL MA Facility

- A large proportion of the work carried out in the MA Cells is to achieve dose reduction prior to downstream analysis.
- Prepared samples are removed from the MA cells manually.
- To allow this there is man access to the back of the MA cells controlled by interlocks and in cell gamma monitoring



A Nuclear Management Partners company operated under contract to the NDA

In Cell ICP-OES Instrument

- A new inductively coupled plasma, optical emission spectrometer is being installed in the MA Cell facility
- In order to maintain containment the bulk of the instrument is outside the cell with an optical window into Torch box
- There is manned access via glove ports for setting up and maintenance of the instrument
- Excess sample material is removed via PTS prior to access in order to reduce dose uptake.



A Nuclear Management Partners company operated under contract to the NDA

The THORP HA Cells Facility

- The THORP HA Cells provide a dedicated service to the Thermal Oxide Reprocessing Plant.
- The facility consists of 2 cells that receive samples directly from a number of autosampler systems.



A Nuclear Management Partners company operated under contract to the NDA

THORP HA Analytical Methods

- As in the ASL facility, THORP HA operate a number of QAAMs and supporting methods including;
 - Determination of Free Acidity
 - Determination of Suspended Solids in THORP HA Liquors
 - Sample Preparation of Determination of Pu and U by TIMS
 - Determination of Specific Gravity by Weight
- Samples are also dissolved and transferred via PTS to the ASL MA facility for further processing and downstream analysis.

A Nuclear Management Partners company operated under contract to the NDA

Thank you for your attention

- Any questions?

A Nuclear Management Partners company operated under contract to the NDA

