

UKAEA Update

**The NNUF Materials Research Facility (MRF)
should be operational in December**



Martin O'Brien

NB UKAEA is increasingly using the CCFE “brand” for just its fusion activities

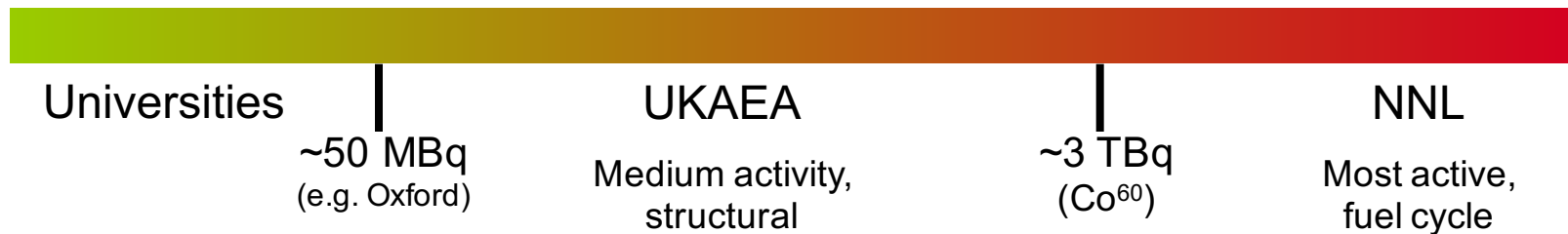


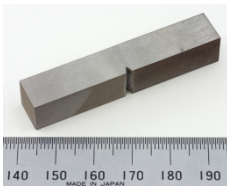
Martin O'Brien, UKAEA Update
Nuclear Academics Discussion Meeting 8-9 Sept 2015



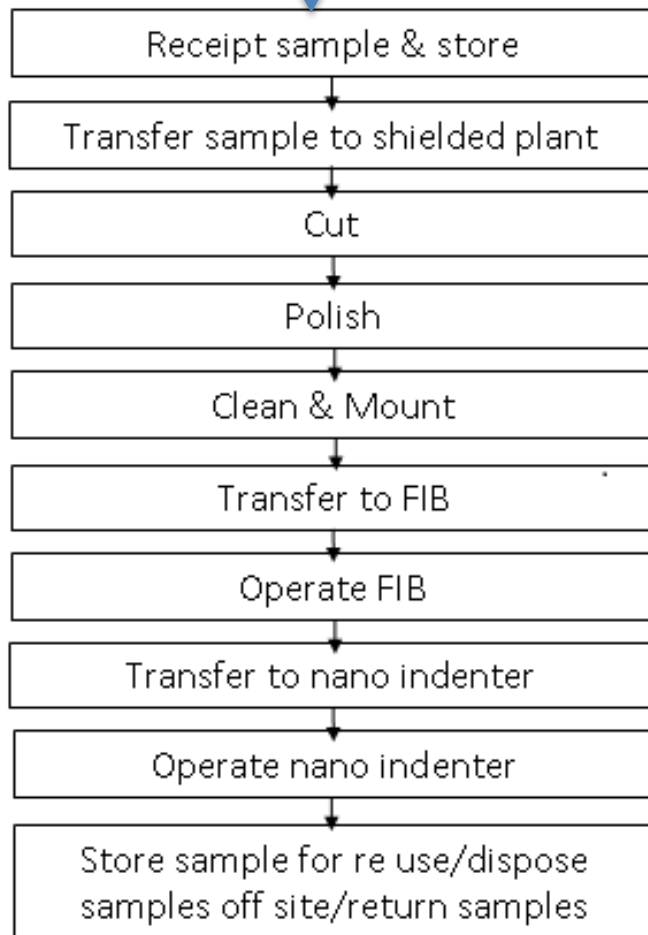
The MRF

- ~ 2200m² building with hot cells and scientific equipment. ~ £9M - £5M from NNUF, remainder from UKAEA funds
- Process active material for analysis on-site or back at the university
- Intermediate between universities (very low activity) and NNL at Sellafield. Non-licensed site – but with nuclear expertise, MRF can take material up to inventory ~ 3 TBq
- Operation in early 2016 will be restricted to active or lightly active material

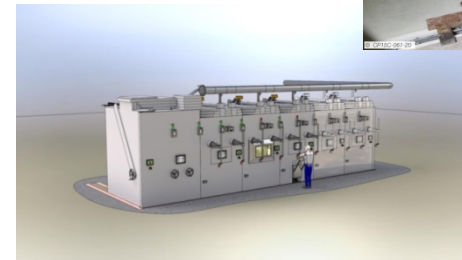




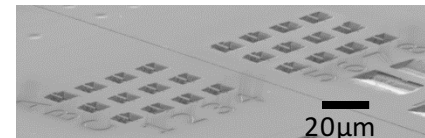
Typical Process



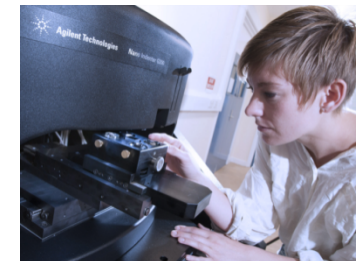
Shielded Activity



Hot cells being installed in July



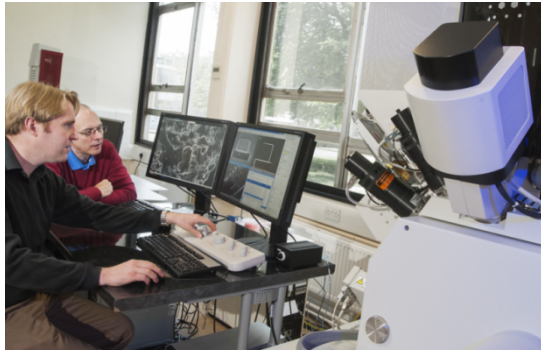
Or transferred to university



Nanoindenter

**Limited and temporary storage
(Culham's inventory for a non-licensed site)**

Analysis equipment operational since 2013 in non-active labs



- Dual beam FIB, Nanoindenter, SEM (EDX, EBSD, TKD), Thermal Desorption Spectroscopy. Wide range of uses (including beryllium and lightly active samples).
- University users so far – Bristol, Loughborough, Manchester, Oxford, Queen Mary, Sheffield, Strathclyde. Birmingham soon.
- To close in October to move equipment to MRF

Pricing of Use of MRF

- Sum of generic costs and job specific costs that depend on:
 - Use of hot cells and for how long
 - Which instruments, and for how long
 - Non-routine scientific and technical support
 - “Nuclear aspects” – waste, etc.

→ Some of the more “nuclear” jobs may be many £k/day
- Please talk to us as early as possible – before you put in grant applications!
- And please help us get industry work!

MRF User Workshop on 9 July

~ 60 participants, mainly fission but some fusion

Industry (AMEC-FW, EdF Energy, Rolls Royce, etc.), universities, AWE, InnovateUK, NDA, NIRO, NNL, EUROfusion, UKAEA

- Described MRF's Day One capabilities
- Discussed equipment users would like added when we have more funding:
 - **Top priority was a mechanical testing suite** with various deformation tests at a range of length-scales and temperatures. Plus support for other capabilities (**metrology, thermo-physical**), **more hot cells**, bigger range of **active machining/preparation**.
 - Plenty of room, especially if building is extended (extension designed, ~ £1.5M)
 - Funding streams for equipment in next 3 years – **NNUF, Royce**



Some of the Workshop participants at the MRF building

We will set up a **user committee** to advise on MRF operations and enhancements.

See Steven or me to book MRF in early 2016!

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www.ccfe.ac.uk/mrl.aspx



Plus high spec gamma detectors - ADRIANA project with Lancaster and Liverpool, also funded by NNUF

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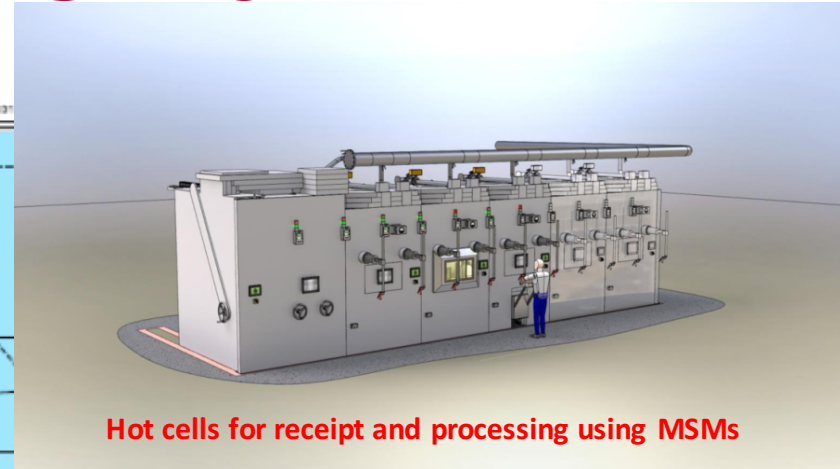


QUESTIONS?

MRF building layout

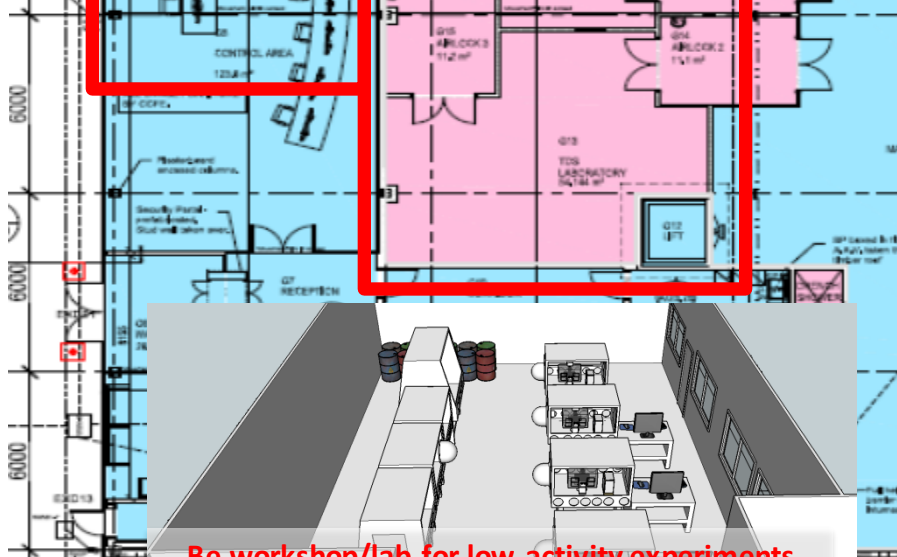


Control room for remote operation



Hot cells for receipt and processing using MSMs

32m

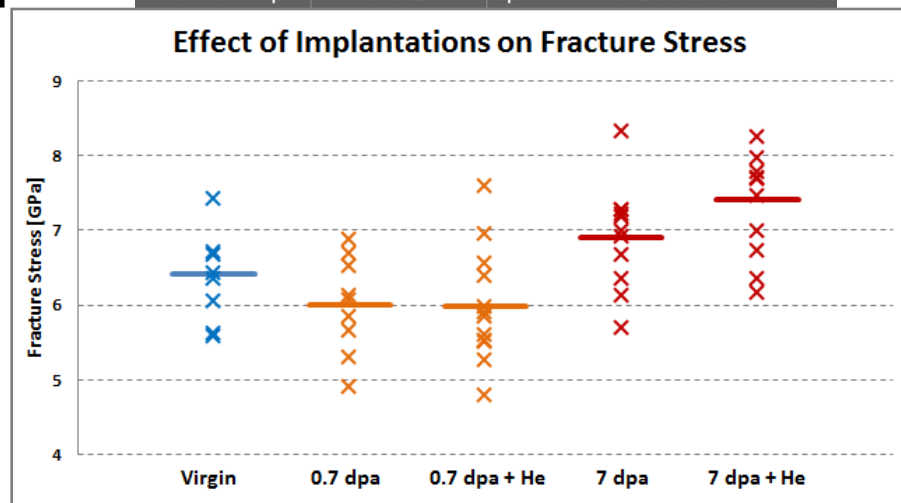
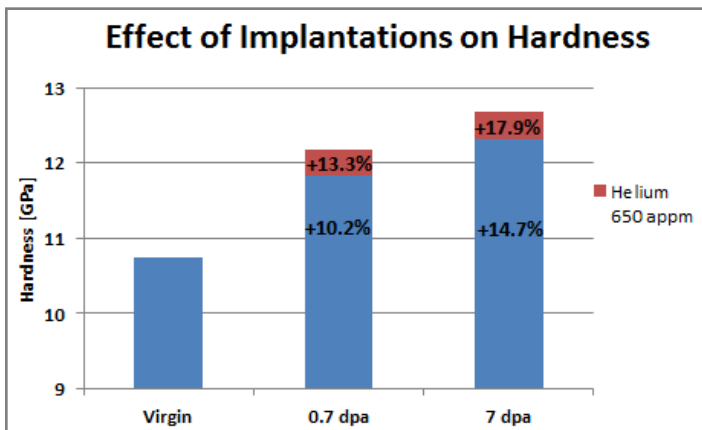
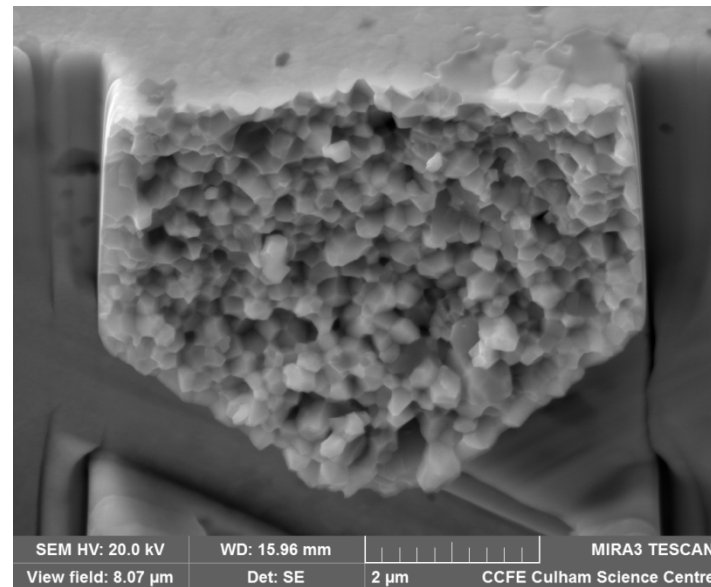
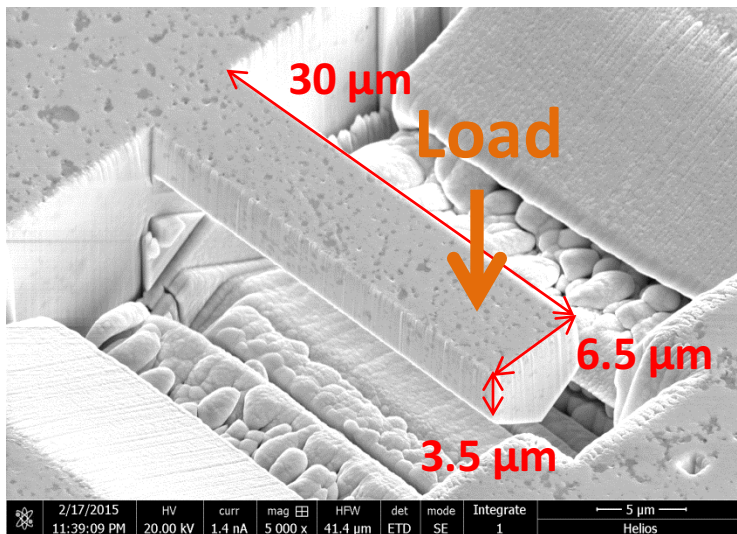


Be workshop/lab for low activity experiments (e.g. tritium)



Shielded rooms for scientific equipment

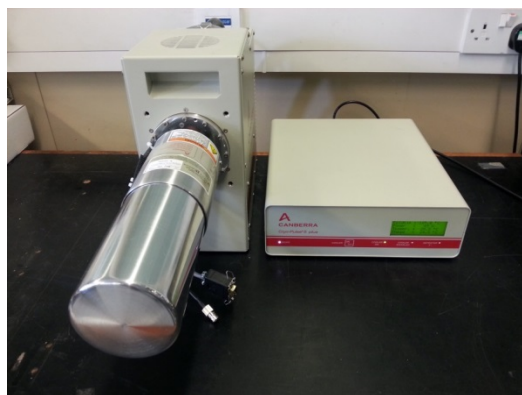
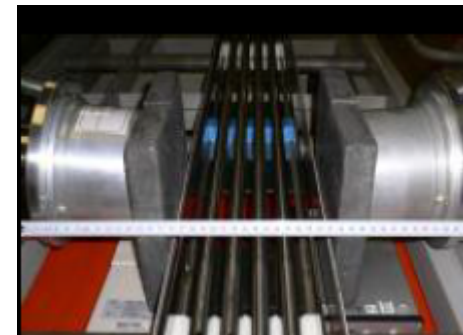
Fracture strength of W-Cr10-Ti2 under ion-irradiation



ADRIANA

(Advanced Digital Radiometric Instrumentation for Applied Nuclear Activities)

Lancaster -
High-order neutron multiplicity analysis of
actinide materials (32 channel array)



Liverpool - spectroscopic imaging & location of γ
contamination



UKAEA - Ultra-low background
 γ -ray spectroscopy systems

M Joyce (Lancaster), P Nolan & L Harkness Brennan (Liverpool), S Lilley & I Jenkins (UKAEA)