

International Forum 2025

On the Peaceful Use of Nuclear Energy, Nuclear
Non proliferation and Nuclear Security.

Peter Hiller

11th December 2025

Introduction

Peter Hiller
UKNNL Technical Lead – Civil Nuclear Forensics Provenance.
UKNNL Technical Authority in Characterisation.

Over 35 years of UK and International experience in Contaminated Land, Site and Waste Characterisation and Waste Disposal.

Over 25 years in the Nuclear industry; delivering a dual role in Nuclear Forensics Provenance and Characterisation as part of the UKNNL's wider Waste Management and Decommissioning/ Security and Non proliferation Capabilities.

10 Years engaged with HMG in Nuclear and Radiological threat response capacity/Nuclear Forensics provenance lead from a Civil Nuclear Perspective (UKNFL).

Primary focus is the development of underpinning R&D programmes and the operationalisation of the UK Civil Nuclear Industry's support to the UK Nuclear Forensic Library.



Construct of HMG response to RN incident/event/MORC

UK counter-terrorism (deterrent) strategy (CONTEST – Prevent, Pursue, Protect and Prepare), for which the Home Office (HO) is the policy lead for the preparedness and response to any (CB)RN event.



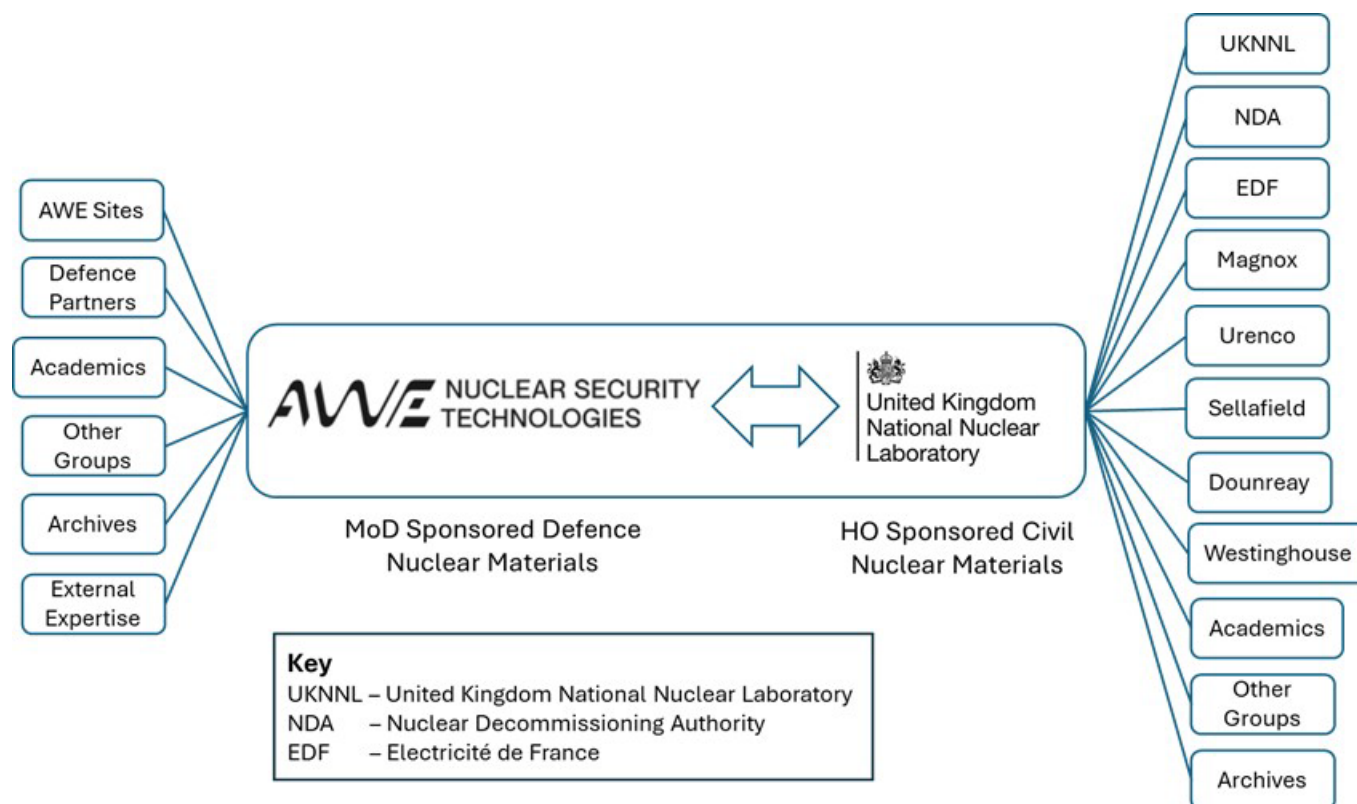
CT Policing will lead the response to any RN event supported as required by AWE as first responders.



If required by CT Policing to establish the provenance of radioactive material outside regulatory control (MORC), The UK Nuclear Forensics Library (UKNFL) will be stood up.

Key philosophy/Principles – UKNFL Construct

United Kingdom Nuclear Forensics Library for Provenance assessments



Joint Collaboration UKNNL/AWE to maintain a stable, long term UKNFL capability for the UK.

Leverage existing capability/programmes in the Civil Nuclear Sector to support NF Provenance – NF “Veneer”.

Provides access into the whole nuclear infrastructure to call on Subject matter experts, historical records and analytical capability to support NF provenance.

Regular exercising of the capability to ensure readiness – Current player in CMX-8.

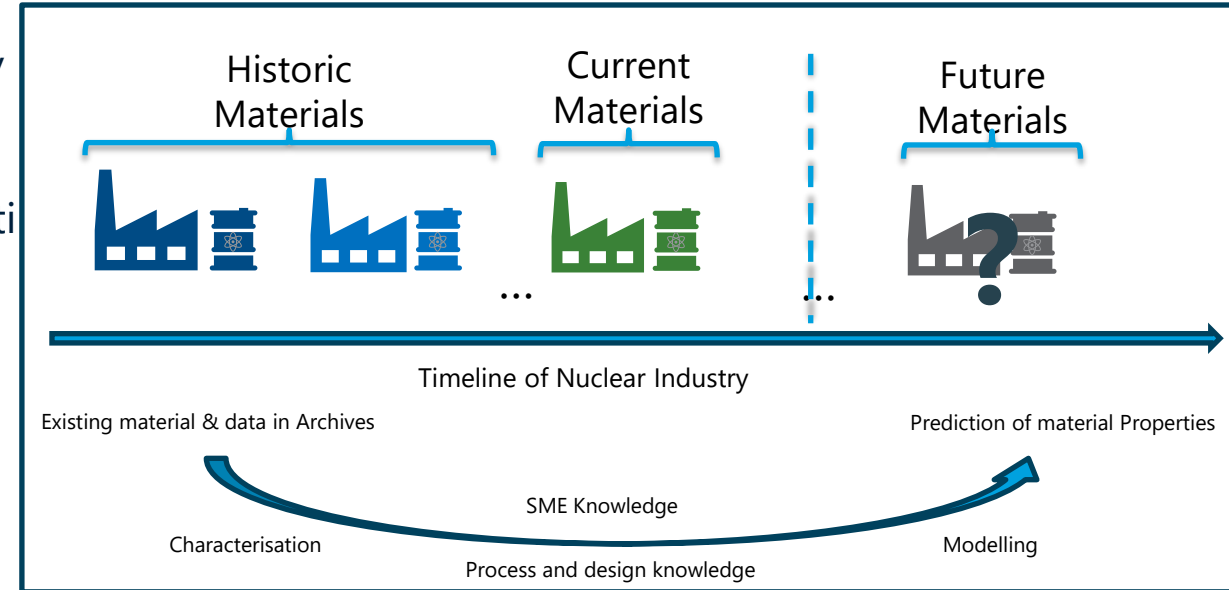
Cross-discipline approach – Characterisation, reactor physics, statistics measurement and analysis, modelling etc. etc.

Provenance Work – UKNNL/Joint Programmes

Predictive Signatures – Previous work looking at historic signatures over previous 10 years (predominantly undertaken by AWE).

Recent Global Landscape review complete. Development of multi-year programme to target resources on materials of interest to the UK in the areas of;

- Enrichment,
- Fuels
- Reactor design,
- Reprocessing.



Pu/MOX collaboration

Joint three-year collaboration with JAEA currently under development – awaiting funding decision. Focus on the development of signature information with respect to UK and Japanese Pu/MOX materials.

Underpinning statistical program

Early development of underpinning statistical programme to support the interpretation and reporting of data to support provenance assessments.

Provenance Work – UKNNL/Joint Programmes

Stable Isotopes – Cross over with predictive signatures – Focus on stable isotopes and their behaviour through the whole fuel cycle. Programme in development.

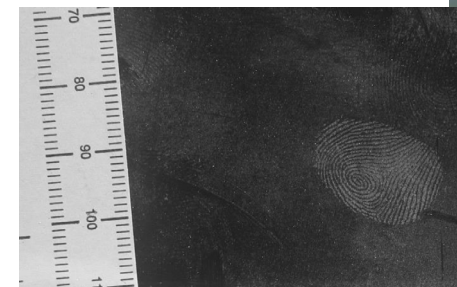
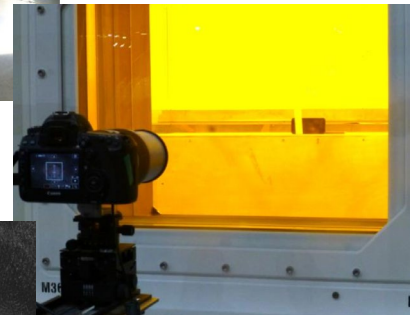
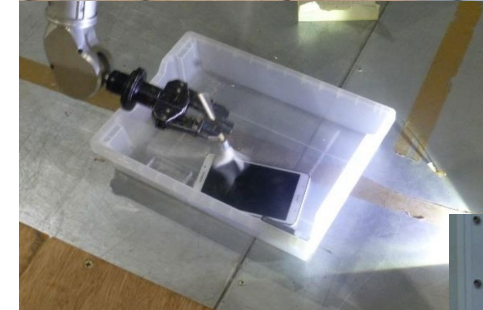
Sealed Sources/other Radiological materials – Review to determine relevance of such materials to the UK programme. Programme under consideration.

Exercises – Further development of national exercises using other UK materials. Programme under consideration.

Maintenance of operational capability – Development and maintenance of operational procedures, evidence storage and management (surge) capability, record keeping and storage. Ongoing work.

Other Supporting UKNFL Activities

- **Support to HO on operationalisation of the UK response via UKNFL construct.**
- **Undertake specific Operational capability tasks as required.**
- **Exercising** – TTX and full provenance exercises, International and National (CMX, Galaxy Serpent).
- **International Engagement** – ITWG Hosted in Manchester and active in Technical Working Groups.
- **Annual NuFor conference.**
- **International collaboration** - for example; JAEA, IAEA, ITWG etc.



In Conclusion

Overall aim of the programme is the delivery of a long term, stable UK Nuclear Forensics Provenance capability (through the maintenance of the UK Nuclear Forensic Library capability) to support HMG ambitions as part of the UK's Nuclear renaissance.

The UKNFL forms part of the underpinning effort supporting the UK's overall deterrent/national security programme.

Thank you

**United Kingdom
National Nuclear Laboratory**
5th Floor, Chadwick House
Warrington Road, Birchwood Park
Warrington WA3 6AE
T. +44 (0) 1925 933 744
E. customers@uknnl.com
www.uknnl.com