

Nuclear Technologies have significant experience in the preparation and review of all stages of Letters of Compliance (LoC). Our experience is underpinned by a sound understanding of the requirements of NDA RWMD gained during secondments and previous employment with the NDA RWMD. Examples of previous LoC contracts are:

- **DSRL** – Currently producing the conceptual LoC for PFR spent fuels and previously prepared the cLoC submission for Dounreay Shaft and Silos
- **Magnox** - Ministores LoC support – full time long term secondment with additional shielding and criticality support to the LoC process; supported the preparation of LoC submissions on the Chapelcross site; Bradwell Ion Exchange Media in MOSAIK Casks iLoC submission; Berkeley Solid ILW from Active Vaults
- **EDF** – cLoC's for operational ILW for the new PWR's at Hinkley C
- **RSRL** - Interim LoC submission for thorium metal: interim LoC submission for the packaging of remote-handled ILW
- **AWE** – Conceptual, interim and final LoC submissions for the packaging of operational ILW by supercompaction and grouting
- **British Energy** – Interim LoC submission for the cementation of primary circuit ion exchange resins from Sizewell B: conceptual stage LoC submission for novel packaging approaches for ion exchange resins from Sizewell B which included packaging in MOSAIC Casks

Delivery of Letter of Compliance submissions by Nuclear Technologies has included the following activities as an integral part of the process alongside the production of the submission itself:

- Up-front identification of threats to package performance and options/development work for their mitigation. Early identification of key threats minimises the risk of additional issues being identified by RWMD during the assessment process;
- Expert interpretation of *Assessment Reports* (and *Action Points*) and definition of a forward programme to fill the associated needs in a targeted yet comprehensive manner;
- Facilitating informal discussions with RWMD on various aspects of waste packaging options and plans to ensure that early feedback and buy-in are received;
- Development of robust formulation envelopes and demonstration of the performance of the resultant products to ensure that RWMD are armed with the information and confidence required to provide assessment and endorsement;

- Preparing justified supporting information, including robust definition of waste envelope, that fulfils RWMD needs in respect of inputs to assessment and reduces the risk of significant clarification being required during the assessment process which could add time and cost to the project;
- Preparation of *Waste Product Specifications, Criticality Compliance Assurance Documentation* plus *Waste Package Data Recording Methodology* to encourage early dialogue and thereby reduce the risk of delays at final LoC stage, and to ensure that adequate measures are included in plant design and operating procedures;
- Managing interactions with RWMD at the launch of and during their assessment of LoC submissions.

Our extensive experience has given us the technical knowledge and personal relationships that allow us to effectively promote communication with RWMD and to present robust arguments that take account of the requirements imposed by the RWMD Waste Package Specifications and underlying Safety Assessments to achieve endorsement of practicable solutions.

Additional Specialist Support Staff

Criticality - Nuclear Technologies have a Criticality Team that can be deployed to support the LoC process.

Shielding - Nuclear Technologies have a team of internationally recognised shielding experts

Encapsulation and Cementation - Nuclear Technologies have a team of over 20 radioactive waste experts many of whom have substantial encapsulation and immobilisation experience.

Polymers – One of our LoC consultants wrote the RWMD guidance note on the use of organic polymers for the encapsulation of ILW (WPS/901).

Waste Characterisation - Adequate characterisation is vital to the successful underpinning of any LoC application. However characterisation of wastes can incur substantial costs therefore it is important to identify and undertake only that which is required/necessary to make the disposal case. Understanding the wastes, the effects of their environment on waste package longevity and their evolution prior to and post disposal is vital to determining the level of characterisation required and ultimately making the case for a LoC. Nuclear Technologies has a team of over 20 radioactive waste experts that is supported by a team of 8 criticality and shielding experts. This combined expertise enables a holistic approach to characterisation and the production of waste stream characterisation documents.

Wiring Diagrams - In order to make the case for a LoC it is necessary to present detailed technical information in a concise and easily understood format that enables effective stakeholder engagement. The production of wiring diagrams allows the lifecycle of waste treatment from characterisation/retrieval through to disposal/discharge of liability to be clearly shown. Enabling stakeholders to understand and buy into the proposed method of treatment and eventual disposal solution is a vital aspect of successful LoC application.

The wiring diagram process is waste-led and has been adopted by the NDA as the basis for informing the TBuRD process. It is therefore also of importance for internal programme governance during the underpinning of the disposal solution. All Nuclear Technologies radioactive waste experts have experience in producing wiring diagrams.

Computer Codes/Modelling Software - Our Safety and Radiation Physics team has considerable experience in using nuclear inventory computer codes to derive radionuclide source-terms for various uses (radioactive waste inventory derivation, criticality assessment, shielding calculations etc.). Our staff are fully competent with the industry-recognised and approved codes FISPACT, MCNP, MONK, ATTILA, SCALE suite and MicroShield, and in addition are qualified to run the ANSWERS software codes FISPIN, MCBEND and RANKERN on behalf of clients.

In addition to the above activities Nuclear Technologies have been involved directly with NDA RWMD including:

- Supply of two consultants on a full time basis to support the RWMD LoC assessment team
- preparation of numerous reports and thematic guidance documents for RWMD.

In broad outline, we adopt the same consistent, methodical approach to the production of LoC submissions for different LoC stages (conceptual, interim or final) and for different types of material covered (ILW or fuel). The target output is in line with RWMD guidance, aimed to demonstrate compliance with the *Generic Waste Package Specifications* and consistency with the *Disposal System Technical Specification*. The emphasis we place on different parts of the submission, and therefore the effort we apply to the different parts, does vary with LoC stage and material type, but our methodical and structured approach remains the same.