Waste Management and Decommissioning Working Group

Radiological Characterisation: its Role in the Efficient Management of Low-Level Radioactive Material

Supporting Concurrent Reuse, Recycling and Disposal

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Essential Message

The Importance of Efficient Management of Low-Level Radioactive Material

Converging towards greater efficiency in the management of low-level radioactive materials (LLRM) is an important objective for the nuclear sector. This requires consistent strategies and approaches between countries for proper reuse, recycling and disposal. Domestic strategies may have cross-boundary implications, e.g. recycling steel which may be ultimately exported abroad cannot be viewed as a purely domestic choice.

WNA:

- supports further international standardization and implementation; and
- seeks constructive discussions toward this important international objective; with a view to
- facilitating its practical implementation at the national level.

The Need

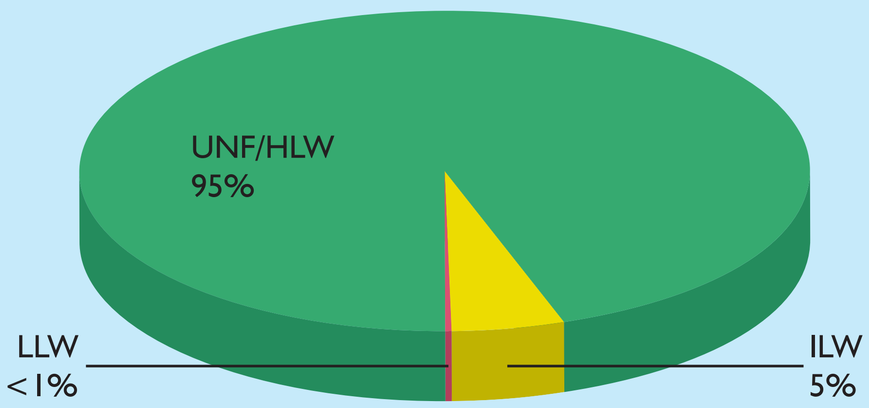
Inefficiency comes at a high price, for the nuclear industry and society

There are currently over 430 operating civil nuclear power reactors in the world with an impressive number planned or already under construction as well as a range of associated nuclear fuel cycle and research facilities.

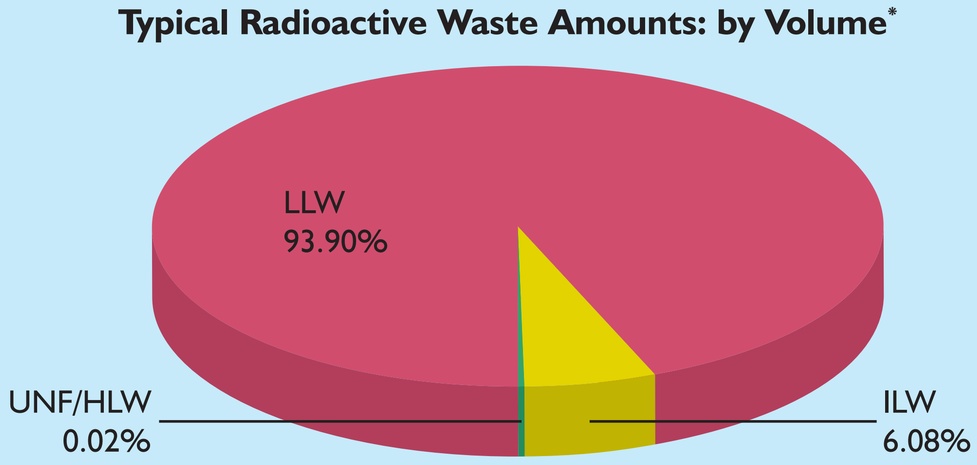
During the operation of these facilities, materials with low levels of radioactivity are generated from normal activities. Such materials are not radioactive to start with and are isolated from the nuclear process but come into contact with tiny amounts of radioactivity in the work environment. Most of this material can be separated from its added radioactivity through survey and decontamination as necessary. The major volume of radioactive material generated at nuclear facilities (other than the nuclear fuel) is of this nature.

Gaining experience on all three fronts with the material generated in operational quantities is essential to prepare for subsequent management of the larger amounts of material produced during decommissioning.

Typical Radioactive Waste Amounts: by Activity*



Typical Radioactive Waste Amounts: by Volume*



The Solution

Concurrent availability of the three options. Proven, established technologies exist for all three.

An optimal solution for all materials required a balance of options and this can only be achieved through the concurrent availability of reuse, recycling and disposal routes.

- **Over-reliance on disposal:** potential for rapid saturation of available disposal capacity by large volumes of material that could safely be recycled;
- **Over-reliance on Recycling:** driving potential uneconomic recycling of:
  - large volumes of low-value material;
  - valuable materials but in volumes to small to justify the facility.
- **Indecision:** leading to unnecessary accumulation, storage and potential double-handling.

All of the three options have been successfully implemented through proven technologies, over many years, in several countries and a wealth of operational experience has been gained worldwide. This experience commonly shows that a pre-condition to success is a solid industrial business case. We emphasize that the reuse and recycling case is mainly about a controlled industrial process with input material and output products that have defined specifications.

The Role of Characterisation

Knowledge from prior radiological characterisation should support appropriate re-use, recycling and disposal where needed.

Advances in the prior radiological characterisation of the materials which exist within, and are generated by, nuclear facilities have increased the degree of precision and sensitivity achievable. This has come with an associated improvement in the limits of detection for radioactivity. Where appropriate to the level of risk posed by the material, this increased precision can complement the already robust methods which are in place to achieve adequate protection throughout re-use, recycling or disposal.

This information should also inform a balanced decision-making process on the appropriate route for the material. Such knowledge should challenge the irrationality which continues to prevail in too many countries surrounding re-use, recycling or disposal of low level radioactive material, including those with large nuclear power programmes.

Conclusion

Industry and government must seek full deployment of the three material management options, for all of which established solutions exist.

Despite the compelling reasons to do so and safe techniques being well established, too few countries have enabled concurrent reuse, recycling and disposal options. This deprives society of the full benefits of a flexible and efficient material management framework. Should these facts be more widely known, an often negatively charged debate could be substantially depolarized, reducing habitual systematic opposition to the reuse, recycling or disposal of such material.

The status quo is clearly untenable. International and national leaders from industry and governments must enable the concurrent availability of these three safe management options. WNA supports this more flexible approach and is convicted that the exclusive commitment to a single option is not sound on any grounds.

**Information from: The 2010 UK Radioactive Waste Inventory, Nuclear Decommissioning Authority, February 2011*