ENISS
European Nuclear Installation Safety Standards

POSITION PAPER

De-licensing & Site Release

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Summary

This ENISS position paper sets out the position of ENISS member organisations in relation to de-licensing and site release. In the development of this position paper, ENISS member organisations provided information on current issues relating to site de-licensing, including any existing or potential difficulties and how these could be addressed. The ENISS member organisations that contributed to this position paper did not have direct experience of de-licensing and site clearance. Nonetheless, the ultimate end state, including de-licensing and clean-up considerations, is a factor in the overall decommissioning strategies and plans developed by licensees. These principles have been developed for the industry to communicate the ENISS common position and to consider further as the development of standards, guidance, and decommissioning projects progress:

Principle 1: Undertake early engagement between regulators and licensees on the proportionate application of regulations for NPP de-licensing and site release.

There is limited experience of the application of a graded approach to regulation in the context of de-licensing of NPPs. Further consideration of proportionate application of regulations to the de-licensing of NPPs, and engagement between regulators and licensees, would be beneficial.

Principle 2: Provide for flexibility to allow for possible adjustments to anticipated end states.

A flexible approach to variations to/evolution of end state criteria, recognising the significant timescales involved in reaching that point, would provide benefits to licensees, regulators, and other key stakeholders to ensure that the future uses of NPP sites are not constrained, whilst ensuring safety remains paramount.

Principle 3: Appropriate consideration must be given to management of all hazardous waste when developing plans for site release.

In addition to nuclear/radioactive waste, other hazardous waste (e.g. organic pollutants, heavy metals, asbestos, chemicals, and oils) are also present on NPP sites, and the applicable regulations and legislation must be adhered to. Whilst this may not prevent the site from being de-licensed from a nuclear regulatory perspective, the site may be unable to be used for its final purpose unless appropriate clean-up of all hazards has been undertaken. A combined approach to management of radioactive and non-radioactive waste by operators and regulators is essential.

Principle 4: Undertake meaningful and timely engagement with stakeholders.

Stakeholder engagement is essential. Effective engagement can prevent undesirable consequences such as delays and reputational damage, and may broaden support for future use of the site, including new build projects.

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1. Introduction

This ENISS position paper sets out the current position of ENISS member organisations in relation to de-licensing, end state and site release, identifies current issues, and proposes a number of principles for the industry to consider further as the development of standards, guidance, and decommissioning projects progress. It is expected that the position of ENISS members on these topics will continue to evolve as decommissioning progresses and experience is gained, and this will be communicated accordingly. Reflecting the membership of ENISS and the experience of members, the position paper is focused on the de-licencing and release of Nuclear Power Plants (NPP) sites, nevertheless the paper and its principles are applicable to nuclear installations more generally.

As NPPs reach the end of their operational lives after many decades of electricity production, the focus changes to decommissioning of these NPPs with the ultimate end goal of site de-licensing and release i.e. the site is clear of regulation and can be re-used for other purposes.

An increasing number of facilities have come or are coming to the end of their operational lifetimes and are at present being, or are going to be, decommissioned with the intention of removing the sites from regulatory control. In many cases decommissioning activities include the decontamination of land, ponds and buildings and other structures such as underground pipes and tanks at a site that have become contaminated as a result of an authorized practice. The release of a site from regulatory control may be contingent on measures taken to clean up the site as part of the decommissioning activities at the end of an authorized practice conducted at a facility or part of it. The extent of the clean-up is a function of the size, complexity and hazard potential of the site and the potential future uses envisaged for it.

Although few NPP projects are at this particular stage of decommissioning at this point (noting that several reactor decommissioning projects have been completed), it is important for industry to engage with the issues of de-licensing and site release at an early stage. Moreover, there is a need for industry to identify end states for decommissioning and develop strategies and plans to attain them.

2. Issues Relating to Site de-licensing and End State

Within the ENISS member organisations, there is currently no direct experience of de-licensing and site clearance, however the ultimate end state, including de-licensing and clean-up considerations, is a factor in the overall decommissioning strategies and plans developed by licensees.

The de-licensing and end state requirements must be considered at an early stage to ensure any potential risks, opportunities, or constraints are considered in developing the decommissioning strategies and plans.

In the development of this position paper, ENISS member organisations provided information on current issues relating to site de-licensing, including any existing or potential difficulties and how these could be addressed. A number of areas of interest in common were noted, and these form the core of this position paper.

Regulatory Approach

The release of a site from regulatory control requires that nuclear regulators are satisfied that the specified end state in the decommissioning plan has been achieved, and that any additional requirements set by the regulators have been met. In general, the industry views these as acceptable for ensuring nuclear/radiological safety.

The WENRA Decommissioning Safety Reference Levels Report provides high level regulatory guidance for releasing sites from regulatory control, however at national level more detailed arrangements exist in various formats from complete legislation to supporting guidance documents. Regulators have incorporated WENRA and/or IAEA guidance into their respective arrangements, although this is not always explicit.

As regulatory guidance is generally not facility specific, a 'one size fits all' approach tends to be applied to de-licensing and site release regardless of the type of facility. It is therefore challenging to understand how regulations may apply to de-licensing of NPPs until actually undertaking the process. This adds substantial risk to the decommissioning programme, as the actual application of legislation and related guidance will only be fully understood when a NPP site goes through the process of de-licensing.

There is limited experience of the application of a graded approach to regulation in the context of de-licensing of NPPs. Further consideration of proportionate application of regulations to the de-licensing of NPPs, and engagement between regulators and licensees, would be beneficial.

Principle 1: Undertake early engagement between regulators and licensees on the proportionate application of regulations for NPP de-licensing and site release.

End State and Site Release

The general aim of de-licensing and site release is for the non-restricted use of the site i.e. clear of regulation and able to be used for other purposes, including future nuclear activities. There is also the option of releasing a site for restricted use, should it not be possible to meet the entirety of the release criteria; this typically comes with further monitoring and/or compliance requirements for managing the site.

Even in cases with release of sites without restrictions, site end states will vary as a result of what structures are kept in situ (including underground structures filled with rubble/soil), and the extent of landscaping and restoration.

For the majority of ENISS members, the anticipated site end state is fixed when decommissioning plans are being developed, and once committed to, it can prove challenging to depart or diverge from the originally declared end state. The potential for changes to legislation and political opinion that could occur during the time between setting the decommissioning strategy and ultimate de-licensing and site release presents a significant risk to licensees in being able to achieve a pre-established end state. An iterative approach that is able to evolve in line with new or additional information is beneficial where there are

longer timescales involved in the decommissioning process e.g. a deferred dismantling strategy.

A flexible approach to variations to/evolution of end state criteria, recognising the significant timescales involved in reaching that point, would provide benefits to licensees, regulators, and other key stakeholders to ensure that the future uses of NPP sites are not constrained, whilst ensuring safety remains paramount.

Principle 2: Provide for flexibility to allow for possible adjustments to anticipated end states.

Waste Management and Hazard Removal

Management of radioactive waste is clearly the significant factor in achieving the desired end state and achieving de-licensing of the site. There are a number of factors, particularly characterisation of waste, waste processing/treatments, removal of waste from site, and arrangements for residual waste, therefore a suitable waste management plan must be in place to address waste for the entire decommissioning period.

The availability of off-site storage or disposal facilities for radioactive waste has implications for site release, particularly for higher activity waste including spent fuel, as some waste may be required to be stored on site until a suitable facility becomes available. This could delay or prevent full site release. It may be possible to allow release of parts of the site.

The free release criteria (acceptable activity levels) that must be met in order for a NPP to be de-licensed are typically specified by regulators and are well understood.

In addition to nuclear/radioactive waste, other hazardous waste (e.g. organic pollutants, heavy metals, asbestos, chemicals, and oils) are also present on NPP sites, and the applicable regulations and legislation must be adhered to. Whilst this may not prevent the site from being de-licensed from a nuclear regulatory perspective, the site may be unable to be used for its final purpose unless appropriate clean-up of all hazards has been undertaken. A combined approach to management of radioactive and non-radioactive waste by operators and regulators is essential.

Principle 3: Appropriate consideration must be given to management of all hazardous waste when developing plans for site release.

Stakeholder Engagement

Whilst the de-licensing process is typically a regulatory driven process, the requirements for site clearance and subsequent use requires the involvement of a number of diverse stakeholders.

In addition to regulators, there are many other parties that have an interest in both the decommissioning and future uses of a site, and the associated development and commercial opportunities.

There may be a number of official bodies, including Federal, regional and local government, frequently with overlapping or competing positions. The communities adjacent to the NPPs can have influence on regulatory positions through statutory consultations etc., and can also make direct local impact through stakeholder consultations, local and national media, and social media. Stakeholders can also influence decisions, including those of regulators and other governmental bodies, including via judicial processes if necessary.

Stakeholder engagement is essential. Effective engagement can prevent undesirable consequences such as delays and reputational damage, and may broaden support for future use of the site, including new build projects.

Principle 4: Undertake meaningful and timely engagement with stakeholders.

3. Conclusions

This position paper and its four principles have been developed to reflect the issues identified by ENISS members, for consideration in developing strategies and policy in relation to site de-licensing and release.

ENISS anticipates this position paper will be updated as experience in decommissioning progresses and experience with de-licensing and site release is gained. Such updates could also include broader industry experience of site de-licensing and release of other types of nuclear installations, alignment with emerging IAEA principles and standards, and integration of additional aspects of sustainability in de-licensing and site release.

Annex 1: Other reference material

The following documents may help to plan a decommissioning project although not all the advice given in these reports are valid for all decommissioning projects. Therefore the ENISS members have to decide for their own, whether they use these documents or not.

- INTERNATIONAL ATOMIC ENERGY AGENCY, Release of sites from regulatory control on termination of practices, IAEA Safety Standards Series No. WS-G-5.1, IAEA, Vienna (2006).

The current IAEA Safety Guide WS-G-5.1 sets out recommendations on meeting the requirements for the release of sites from regulatory control on the termination of practices. The process is currently underway to replace WS-G-5.1 with new and updated guidance on Release of Sites from Regulatory Control on Termination of Activities in Planned Exposure Situations. In the long term structure of the IAEA safety standards, the proposed publication will be a Specific Safety Guide supporting the GSR Part 6.

WS-G-5.1 was published in 2006, the same year as the IAEA's Fundamental Safety Principles and prior to most of the current IAEA Safety Standards in the waste safety and radiation safety area. Key concepts and definitions were introduced by new IAEA General Safety Requirements, namely GSR Part 3, and GSR Part 6, which were published in 2014. In addition, a new Specific Safety Guide for decommissioning has been published in 2018.

A key objective for the planned new Specific Safety Guide is to provide guidance on release of sites or parts of sites from regulatory control after facilities that were located on the site have been decommissioned or activities that took place have ceased. Such release from regulatory control may require clean-up of contaminated sites, and this publication will provide guidance to facilitate the clean-up activities and subsequent release from regulatory control for both remaining structures and soils. It will address the GSR Part 6 requirements on the completion of decommissioning and on release of sites from regulatory control, as well as the applicable requirements of the GSR Part 3.

The new Specific Safety Guide will be applicable to sites and areas adjacent to sites that have become contaminated as a result of activities relating to planned exposure situations and that are being considered for release from regulatory control as part of an overall decommissioning process. Sites may include remaining buildings, underground structures, pipes, etc. All activities that will be covered in this Specific Safety Guide are considered a planned exposure situation and related requirements of the GSR Part 6 and the GSR Part 3 are applicable.

- INTERNATIONAL ATOMIC ENERGY AGENCY, Fundamental Safety Principles, IAEA Safety Standards Series No. SF-1, IAEA, Vienna (2006).

- INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, IAEA Safety Standards Series No. GSR Part 3, IAEA, Vienna (2014).

- INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning of Facilities, IAEA Safety Standards Series No. GSR Part 6, IAEA, Vienna (2014).

- INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning of Nuclear Power Plants, Research Reactors and Other Nuclear Fuel Cycle Facilities, IAEA Safety Standards Series No. SSG-47, IAEA, Vienna (2018).

The following publications are also relevant to the context of development of the ENISS position paper:

- INTERNATIONAL ATOMIC ENERGY AGENCY, Monitoring for Compliance with Remediation Criteria for Sites, IAEA Safety Report Series No. 72, IAEA, Vienna (2012).

- INTERNATIONAL ATOMIC ENERGY AGENCY, The International Working Forum on the Regulatory Supervision of Legacy Sites: A Summary of Activities and Outcomes, IAEA-TECDOC-2016, IAEA, Vienna (2022).

- INTERNATIONAL ATOMIC ENERGY AGENCY, Disposal of Radioactive Waste, IAEA Safety Standards Series No. SSR-5, IAEA, Vienna (2011).

- INTERNATIONAL ATOMIC ENERGY AGENCY, Safety Guide on The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, IAEA Safety Standards Series No. SSG-23 (2012).

- INTERNATIONAL ATOMIC ENERGY AGENCY, Safety Guide on Near Surface Disposal Facilities for Radioactive Waste IAEA Safety Standards Series No. SSG-29 (2014).

Some of the issues covered in the ENISS position paper are expected to be discussed in an IAEA report to be published after the IAEA Project on the Completion of Decommissioning (COMDEC) is finished during 2024.