

A Scheme to Develop a Decommissioning Safety Case

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1. Introduction

The safety case is a collection of arguments and evidences to demonstrate the safety of a facility or activity. A safety case reflects the actual work performed at the facility, so that the safety case normally includes a safety assessment as well as information and assumptions (including support evidences and reasoning) on the robustness and reliability of the safety assessment.

In the decommissioning phase there are various issues, or at least in comparison with operation issues. So, it is needed to identify some remarkable points for the decommissioning safety. This paper is to review some major issues of the safety case on decommissioning of the nuclear facilities for various stakeholders. Information is provided that may be used by nuclear facility operators and managers for planning and developing strategies for the shutdown and decommissioning of a facility as it approaches the end of its operational phase.

2. Issues of the Decommissioning Safety Case

2.1 Potential Hazards during Decommissioning Phase

It is needed to protect workers by eliminating or reducing the radiological and conventional hazards that may happen during the decommissioning activities. The hazards with decontamination and dismantling of structures, systems and components are important not only because they may be a direct cause of harm to workers, but also because their occurrence may, indirectly, result in increased radiological hazard. In the radiological hazards, the established dose limits must be met and applicable dose constraints should restrict the projected individual doses based on ALARA principle. The conventional industrial hazards are critically considered during the decommissioning process

because that may be greater than those experienced during the operation of the facility. Any hazards to the public and to the environment will be decreased progressively during the decommissioning phase.

Controlled releases of liquid and gaseous effluents into the environment and clearance of solid materials for reuse or disposal as conventional waste needs another control regime related to protection of the public and the environment.

2.2 Characterization of the Facility

Prior to developing a decommissioning plan, the radiological status of a facility must be determined. Characterization is not limited to simply collect data, facts and information necessary to identify situations, which may affect workers and the public or the environment. Characterization should be considered as a starting point of any decommissioning project and the results be maintained and updated as necessary throughout the whole decommissioning project.

- Prepare radiological and chemical inventories that might be hazardous to workers, the public or the environment.
- Analyze structural stability conditions of the facility that may affect the safety or protection of workers.
- Determine the nature and quantity of radioactive materials and conventional chemical contaminants

It may likely be important to check and review the various types of records and resources in the facility for characterization.

- Official documents associated with licensing of facility operation
- Safety and inspection reports describing actual and potential hazards and the measures taken to control them during the operation.
- Design records such as “as built” design drawings and documentation

- Construction records such as descriptions and photographs of the various construction stages
- Operating records with any modifications carried out on the facility during the operating phase
- Personal Account from facility operating staff

In addition to the characterization work described above it is also important to contact former employees of the facility to collect unidentified operational records.

2.3 Decommissioning Safety Assessment

The safety assessment is performed to demonstrate that exposures of workers and of the public are as low as reasonably achievable (ALARA) and do not exceed the relevant limits or constraints during the decommissioning phase.

The safety assessment for decommissioning is consistent with the decommissioning plan and with other relevant national and site specific strategies and requirements, for example, with requirements for radioactive waste management and for the release of material and sites from regulatory control.

Therefore, the safety assessment is developed in a systematic manner using a graded approach, commensurate with the hazards associated with the facility and with the possible consequences of the decommissioning activities under evaluation. The safety assessment for decommissioning may be based on the framework as defined in IAEA [3]. The results of safety assessments can serve to demonstrate compliance with regulatory requirements and criteria expressed in terms of effective dose

2.4 Management Procedures

Practical implementation of decommissioning depends on the technical, managerial and administrative tasks necessary for achieving the goals of the safety case for decommissioning. Management tasks must ensure that all decommissioning activities will be conducted in accordance with approved procedures and that the licensee has a methodology for managing the development, review and maintenance of the procedures.

- Selection of decommissioning technology
- In-process survey
- Containment of contamination

- Provision of radiological protection
- Management of radioactive waste
- Planning for emergencies and physical protection
- Quality assurance
- Project management
- Task management
- Personnel management
- Stakeholder involvement

These management tasks have to be prepared to meet the safety requirements with reflection to the safety assessment.

3. Conclusion

The key issue in the decommissioning of nuclear facilities is the progressive removal of hazards, by stepwise decontamination and dismantling activities that have to be carried out safely and within the boundaries of an approved plan. In addition, it is important to address conventional aspects in the decommissioning safety assessment, as they may outweigh some radiological aspects.

The decommissioning safety case is a strategic document specifically designed for analyzing these hazards, and the separate stages required for hazard reduction. So the safety case will be consistent with the decommissioning plan and address the changing hazards from the facility which may occur as a result of modifications to the facility which take place during the stages of decommissioning.

Therefore, to prepare the decommissioning safety case there needs its own facility characterization, safety assessment and, in most cases, management procedures.

REFERENCES

- [1] Achieving the Goals of the Decommissioning Safety Case, NEA No. 5417, 2005.
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- [3] Safety assessment for the decommissioning of facilities using radioactive material, IAEA Safety Standards Series No. WS-G-5.2, 2008.