



ASAM - THE INTERNATIONAL PROGRAMME ON APPLICATION OF SAFETY ASSESSMENT METHODOLOGIES FOR NEAR SURFACE RADIOACTIVE WASTE DISPOSAL FACILITIES

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Abstract

The IAEA has launched a new Co-ordinated Research Project (CRP) on Application of Safety Assessment Methodologies for Near Surface Waste Disposal Facilities (ASAM). The CRP will focus on the practical application of the safety assessment methodology, developed under the ISAM programme, for different purposes, such as developing design concepts, licensing, upgrading existing repositories, reassessment of operating disposal facilities. The overall aim of the programme is to assist safety assessors, regulators and other specialists involved in the development and review of safety assessment for near surface disposal facilities in order to achieve transparent, traceable and defensible evaluation of safety of these facilities.

1. Introduction

Use of sources of ionising radiation and nuclear energy for various purposes has led to generation of radioactive waste that need to be managed and disposed of in a safe manner in accordance with the fundamental safety principles, providing protection to the human and environment now and in the future. Safety assessment is an important tool for evaluating the acceptability of planned, on-going or past radioactive waste disposal practices. Therefore safety assessments should be structured and performed in a way that provides the necessary level of confidence in order to make decisions about the facilities. The Agency's co-ordinated research programme (CRP) "Improving Long Term Safety Assessment Methodologies for Near Surface Radioactive Waste Disposal Facilities" (ISAM) has been successfully completed in 2000 and has developed a consistent safety assessment methodology, which has found widespread acceptance. At the end of the ISAM programme, it was recognised that the need for further investigation and development in a number of areas relating specifically to the application of the methodology developed. Taking these recommendations into consideration the IAEA has prepared a new CRP "Application of Safety Assessment Methodologies for Near Surface Waste Disposal Facilities – ASAM" to commence in November 2002.

2. Scope and objectives of the programme

The overall objective of the ASAM programme is to investigate the application of the safety assessment methodologies for near surface radioactive waste disposal facilities, to develop agreed international approaches to their application and develop guidance, which will assist safety assessors, regulators and other specialists involved in the safety assessment for near surface disposal facilities in the application and review of the post-closure safety assessment methodologies.

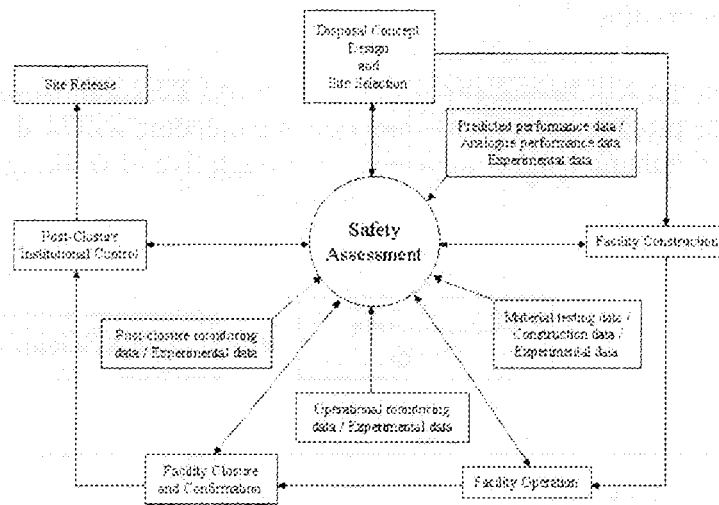


Fig. 1. Application of Safety Assessment at Different Stages of Development of a Radioactive Waste Disposal Facility

The programme will focus on practical application of the safety assessment methodology, developed under ISAM programme, for different purposes, such as developing design concepts, licensing, upgrading of existing repositories, or reassessment of operating repositories (Fig. 1.). It will focus on application of the methodology in a traceable, transparent and consistent manner in order to enable development of a comprehensive safety assessment and safety case that can demonstrate compliance with regulatory requirements and criteria with the necessary level of confidence for the stakeholders involved.

The ASAM programme will consider proposed and existing near surface waste disposal facilities, i.e. disposal facilities at or close to the Earth's surface (e.g. mine and mill tailings facilities, vault facilities) and disposal facilities at depth of up to several tens of meters (e.g. boreholes facilities). The emphasis of the ASAM programme will be on post-closure safety assessment, although, where appropriate, operational safety might also be assessed. The inventories to be considered will include a range of low and intermediate level waste arising from: the extraction and processing of naturally occurring radioactive materials; the generation of nuclear power; the use of radionuclides in research, industry, medicine and education; and the decommissioning of nuclear facilities. The primary focus will be on the radioactive contaminants in the associated waste streams, however, where considered appropriate non-radioactive contaminants will also be assessed.

The ISAM Safety Assessment Methodology will be applied to real disposal facilities with the aim of producing credible safety assessments for realistic situations. This approach will ensure that the focus of the programme remains on credible solutions to safety assessment issues that can be used in practical assessments.

In order to fulfil these objectives, the associated work programme will focus on the application of the ISAM safety assessment methodology to:

- reassessment of existing facilities;
- disposal of disused radioactive sources and other heterogeneous waste;
- disposal of mining and mineral processing waste, and other wastes with enhanced content of naturally occurring radionuclides; as well as
- review of safety assessment and associated regulatory aspects.

3. Programme activities

The ASAM programme will be organised through several Research Co-ordination Meetings (RCMs) at which the programme's focus, direction and outcome will be discussed and agreed. The agreed work programme will be implemented through five of working groups (Fig. 2).

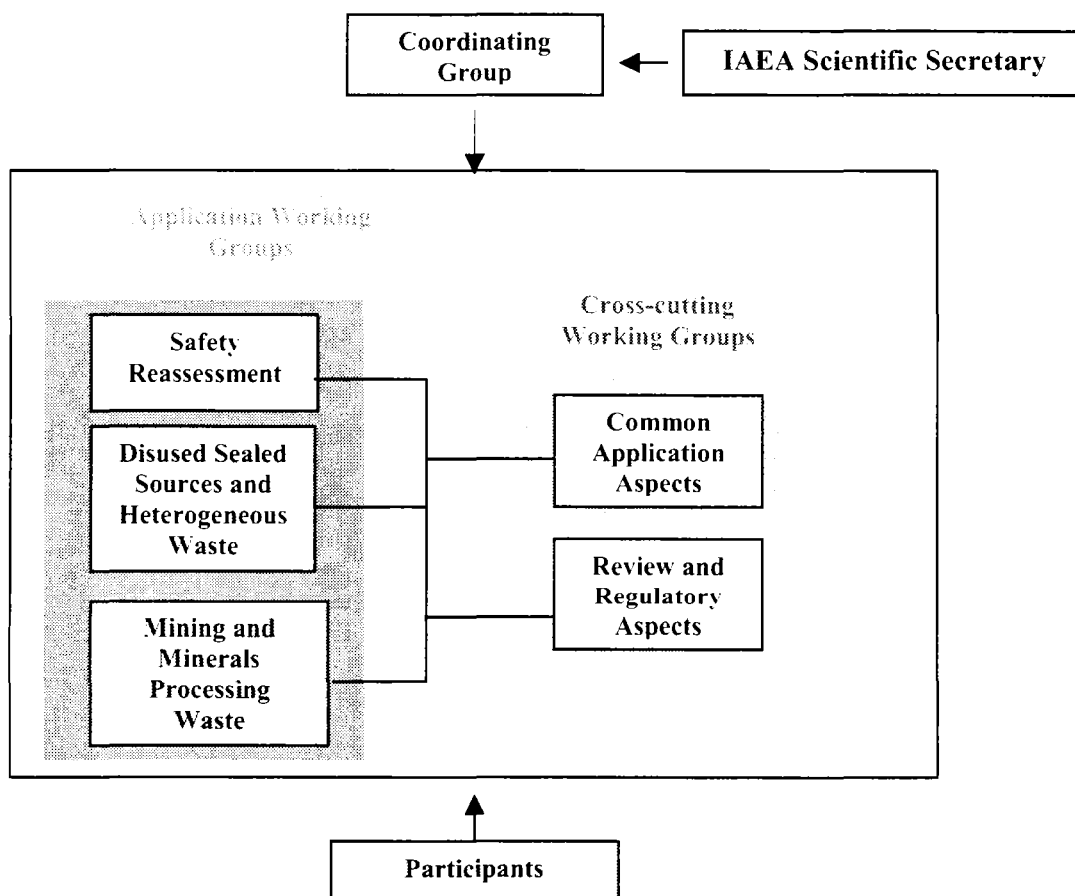


Fig. 2. Organizational Structure of the ASAM Programme

Three working groups (the Application Working Groups) will be associated with practical application of the ISAM methodology:

Reassessment of the Safety of Existing Disposal Facilities

This working group will demonstrate the application of the ISAM safety assessment methodology to operating waste disposal facilities, where the safety of the facility has not been proven yet; no safety assessment has been performed; safety has been questioned because revisions to the operating conditions have been proposed; or a periodic review and update of the safety assessment is required by the regulator. Comparison of different options of corrective actions (see Fig. 3) will be made with the aim of assisting decisions for future development of these types of facilities. The same approach could be appropriate for waste storage facilities under consideration for conversion to disposal facilities.

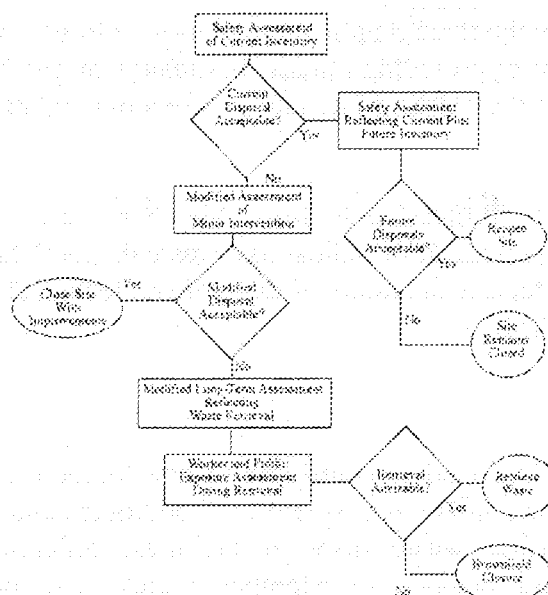


Fig. 3. Proposed Decision Flowchart for Mixed Practice-Intervention Situations

Disposal of Disused Sealed Sources and Other Heterogeneous Wastes

The working group will study the applicability of the ISAM safety assessment methodology in evaluation of disposability of heterogeneous wastes, in particular disused sealed sources, in near surface disposal facilities. It is expected that the work will lead to classification of identified heterogeneous wastes with regard to their radiological impact; identification of the additional radiological risks associated with such heterogeneous wastes to be taken in comparison to other wastes; generation of relevant scenarios (and conceptual and mathematical models) associated with such heterogeneous wastes; and derivation of reference activity levels for the disposal of such heterogeneous wastes in near surface waste disposal facilities.

Disposal of Mining and Mineral Processing Wastes and Other Wastes with Enhanced Content of Naturally Occurring Radionuclides

This working group will investigate the application of the ISAM methodology to disposal of mining and mineral processing radioactive waste and other wastes with enhanced content of naturally occurring radionuclides in near-surface disposal facilities with the purpose of exploring the issues affecting their long term safety. It will also identify FEPs specific to these facilities; and assess the applicability/suitability of the regulatory review procedure, developed by the Review and Regulatory Aspects Working Group (see below) to the assessment of the facilities.

Two additional working groups (Cross-cutting Working Groups) will be associated with issues that cut across the three Application Working Groups, namely:

Review and Associated Regulatory Aspects

The group will consider undertaking development of a procedure for the regulatory review of a post-closure safety assessment of a near surface disposal facility; the integration of the post-closure safety assessment in safety case; regulatory review of the safety. The group will also consider development of strategies to build confidence in the post-closure safety assessment and the safety case of near surface waste disposal facility.

Common Aspects of Application of Safety Assessment Methodologies

Issues of common concern to the application of long-term safety assessment methodologies, such as evaluation of disruptive events (e.g. human intrusion), role of engineered barriers, etc.

and also topics identified by the three Application Working Groups will be considered by this working group with the aim of providing practical guidance on the treatment of these issues, based on detailed review of the existing international recommendations and good practice in the Member States.

The programme is open to professionals from Member State who undertake technical activities related to safety assessment of radioactive waste disposal facilities. Participants can be from regulatory bodies, facility operators or developers, technical support organizations or research organisations. ASAM.

4. Conclusions

The ASAM programme is expected to contribute to development of improved mechanisms for application of post-closure safety assessment methodologies and for systematic review of safety cases for near surface waste disposal facilities, reflecting current international recommendations and good practice in Member States. The programme will provide operators, safety assessors, regulators and independent reviewers with recommendations and guidance on development of safety assessment and a safety case for near surface waste disposal facilities, guidance on the review of safety assessment and safety case and on demonstration of quality and depth of safety assessment and safety case. It will also lead to improvement in the level of knowledge of participants in the application of post-closure safety assessment methodology for different purposes (e.g. licensing) and increased confidence in the development and review of safety assessment and safety cases for specific site in their own countries.

References

- [1] INTERNATIONAL ATOMIC ENERGY AGENCY, "ISAM, The International Programme for Improving Long Term Safety Assessment Methodologies for Near Surface Radioactive Waste Disposal Facilities: Objectives, Content and Work Programme", Final Version, International Atomic Energy Agency, Vienna, 1997.
- [2] INTERNATIONAL ATOMIC ENERGY AGENCY, "ASAM, The International Programme on Application of Safety Assessment Methodologies for Near Surface Waste Disposal Facilities – Scope, Objectives, Content and Work Programme", Version 1.0, International Atomic Energy Agency, Vienna, 2002.