- CRAFT -

The International Project
on
COMPLIMENTARY SAFETY REPORTS,
DEVELOPMENT AND APPLICATION TO
WASTE MANAGEMENT FACILITIES

Scope, Objectives, Content and Work Programme

Version 1.0, April 2010
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The International Project
on
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EXECUTIVE SUMMARY

The safety of radioactive waste management and disposal facilities can be evaluated by using safety assessment methodology. In this context safety assessment means evaluation of the actual and potential hazards to human health and the environment associated with the natural evolution of a radioactive waste management facility over time, and with events, both deliberate and accidental, which could affect its integrity. By means of such analysis it is possible to identify the strengths and weaknesses in the overall safety of such facilities and as necessary to develop actions to improve their status.

When presented to the IAEA Waste Safety Standards Committee, (WASSC) it was agreed that the safety guide DS284 (Safety Assessment for Radioactive waste predisposal facilities and activities) would be supplemented by a number of complimentary safety reports. Work has been underway within the International Atomic Energy Agency (IAEA) for a number of years to develop safety standards in the form of a Safety Guide addressing safety assessment for facilities and activities associated with the management of radioactive waste prior to disposal. DS284 has been structured to cover all waste management facilities.

In 2005 the IAEA started the development of the SAFRAN safety assessment tool for waste management facilities under the auspices of the SADRWMMS project. The final meeting of the SADRWMMS project was held in April 2010. It was agreed by this meeting that the IAEA should initiate a separate project to oversee the development of the complimentary safety guides and provide support to the SAFRAN steering committee.

The CRAFT (Complimentary Safety Reports, Development and Application to Waste Management Facilities) Project is an international programme of work to:

- develop the safety assessments complimentary to DS284, as requested by the WASSC;
- support with the SAFRAN steering group on the application of SAFRAN; and
- provide expertise to the IAEA and SAFRAN users on the application of safety assessment to Radioactive Waste Management.

The CRAFT project will encompass all types of radioactive waste including disused sources, small volumes, operational waste and spent fuel, legacy and decommissioning waste, and large volume NORM residues.
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1. INTRODUCTION

The International Atomic Energy Agency (IAEA) is a Specialist Agency within the United Nations family and amongst its main statutory functions are the establishment of safety standards for the protection of human health from the effects of ionising radiation [1], and to provide for the application of the standards. In discharging these functions, the IAEA has established a framework [1, 2] of internationally agreed standards on nuclear safety, radiation protection, transport and radioactive waste safety and a number of mechanisms for their application, such as peer reviews, technical assistance, exchange of scientific and technical information on peaceful use of atomic energy, training and research and development. Projects based on a series of Technical Meetings are one of the useful mechanisms for exploring the safe use of atomic energy and for improving the safety of radioactive waste management. This includes research projects on the safety of radioactive waste disposal [3, 4] and in particular, on long-term safety assessment methodologies for low and intermediate level radioactive waste disposal facilities.

2. BACKGROUND

Safety assessment is a process which is used to evaluate the safety of radioactive waste management and disposal facilities. Such assessments, which are iterative in nature, evaluate the potential impact that such facilities could have on human health and the environment as a function of time in the future.

It is important that safety assessments are carried out in a traceable, transparent and consistent way in order to provide an assurance to stakeholders (such as governments, regulatory authorities, the general public and technical/scientific personnel) that the facility has been or will be sited, designed, constructed, operated and closed in such a manner that will provide a high level of assurance that human health and the environment is protected over the necessary long timescales.

Between 2005 and 2010 the agency developed the SAFRAN tool to help users undertake safety assessment of waste management facilities in a consistent and transparent manner. SAFRAN was developed under the auspices of the Safety Assessment Driving Radioactive Waste Management Solutions (SADRWMS) project. SADRWMS members provided the technical input necessary to have confidence in the validity of the SAFRAN tool. In 2007 the agency established a SAFRAN steering group. This group oversaw the technical development of SAFRAN and provided the funding necessary for development. The SAFRAN steering group will continue.

In 2009 the draft Safety Guide DS284 Safety Assessment for Radioactive waste predisposal facilities and activities was presented to the IAEA Waste Safety Standards Committee, (WASSC). DS284 has been written to cover all types of waste management facilities. As a result it was agreed that the safety guide should be supplemented by a number of complimentary safety reports to help different users.

To oversee the development of the complimentary safety reports and provide technical support to the ongoing development of SAFRAN it was agreed to establish the CRAFT project.
3. **OBJECTIVES OF THE CRAFT PROJECT**

Objectives of the CRAFT project are:

- Develop the safety assessments complimentary to DS284, as requested by the WASSC.
  - these should be sufficient in number to cover the range of applications covered by DS284;
  - provide a report that can be published by the IAEA in support of DS284; and
  - available for use within the timeframe of the CRAFT project.
- Support with the SAFRAN steering group on the application of SAFRAN.
  - provide the technical input required by the steering committee on developments to SAFRAN;
  - be an expert forum on the areas of SAFRAN that could be changed or improved; and
  - provide the expertise necessary to develop the documents required to support SAFRAN.
- Provide expertise to the IAEA and SAFRAN users on the application of safety assessment to Radioactive Waste Management.
  - provide members to support the development of the complimentary reports;
  - review the safety reports; and
  - review the SAFRAN forum for any new developments or necessary changes.

4. **SCOPE OF THE CRAFT PROJECT**

The CRAFT project will consider a range of practical applications of the SAFRAN tool to produce the complimentary safety reports requested by the WASSC for DS284. Any of the following radioactive waste management practices and facilities, could be used as a complimentary case:

- all aspects of legacy and decommissioning waste including waste from rehabilitation;
- large volume NORM / TENORM waste arisings;
- interim storage (especially considering integrity of waste and facilities);
- the predisposal storage of spent fuel;
- overview of operational waste (establishing the point of reference);
- small amounts / disused sources; and
- both new and existing facilities, together with those in need of upgrading.

5. **ORGANISATION, WORK PLAN AND OUTCOMES**

5.1 **ORGANISATION**

The organisation structure of CRAFT is presented in Figure 1 and the main components are described below.
a) The Steering Group
The SAFRAN Steering Group will consist of a Treasurer and sponsors. Its role will be to fund and coordinate the development of the SAFRAN tool.

b) The IAEA Scientific Secretary
The IAEA Scientific Secretary will provide coordination with the IAEA and technical and administrative assistance to the project. The Scientific Secretary will also make the necessary arrangements for planning, conducting meetings and other working group activities in accordance with the CRAFT work plan, as well as for documentation of the proceedings of the meetings, working group activities and final outcomes of the project.

c) Working Groups
The working groups will prepare the material needed for the presentation, discussion, and documentation of the technical issues which will be addressed by the project; help organise the technical sessions of Technical and Working Group meetings; and support the Coordinating Group as required in production and reviewing the CRAFT documentation. Each working group will consist of a Working Group Leader, a Deputy Leader, a Secretary and a number of participants who will actively contribute to the work undertaken by the working group.

Members of the Working Group will possess real experience of the practical and regulatory aspects of dealing with management of radioactive materials of all types. Each participant will be part of an application working group as well as of one of the cross-cutting groups. This ensures that care is taken of interdependencies and that feedback is provided between the groups.

Figure 1: Organisational Structure of the CRAFT Project
d) **Participants**

The CRAFT project is open to professionals from Member States who undertake technical activities related to safety assessment or predisposal management of radioactive waste. Participants can be from regulatory bodies, facility operators or developers, technical support organizations or research organisations. They will be expected to actively contribute to the project by participating in technical discussions, applying methodologies to real problems and taking part in the development of the complimentary safety reports. Participants will be able to participate in CRAFT working groups. In addition, they will have the opportunity during the topical sessions of Coordinating Meetings to give oral or poster presentations describing the safety-assessment related work that they have undertaken within their own national programmes or related projects.

**5.2 WORK PLAN**

A number of test cases have been identified for use in the CRAFT project. These are shown in Table 1

**Other areas of interest:**

1. If there is general interest then South Africa has decommissioning facilities (e.g. Pu glove boxes, U conversion facility) available for application of the SADRWMS methodology. There is also interest in safety assessment for the decommissioning of research reactors.

2. Interest in safety assessment for temporary storage then disposal of LLW and ILW. No treatment just receipt of conditioned waste. Interest in post-closure safety assessment.

3. Interest in limitations of calculations of SAFRAN; including environmental impact; normal and accident situations.

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Facility Type</th>
<th>Description</th>
<th>Information/ data available</th>
<th>When?</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa, NECSA - Pelinda site</td>
<td>DSS storage</td>
<td>Non-purpose built store containing a variety of sources, including medical and industrial. Possibly include conditioning of sources for storage.</td>
<td>All</td>
<td>After August 2010 (World Cup!)</td>
<td>Need to confirm with operator.</td>
</tr>
<tr>
<td>South Africa, Building P-2400</td>
<td>Liquid waste treatment facility</td>
<td>LLW and ILW from research reactor and radiopharmaceutical production. A safety assessment is to be submitted shortly. A whole safety case could be developed for this facility. Includes solidification, chemical treatment, evaporation, ion-exchange. Already have cooperation with operator.</td>
<td>All</td>
<td>After August 2010</td>
<td>None</td>
</tr>
<tr>
<td>Sweden, Studsvik</td>
<td>ILW liquid and solid treatment</td>
<td>Have tested old SAFRAN version for this facility. Would like to use same facility with new version, and All, including safety assessment immediately available.</td>
<td>All, including safety assessment</td>
<td>Immediately available.</td>
<td>Waiting for new version of SAFRAN.</td>
</tr>
<tr>
<td>Facility Name</td>
<td>Facility Type</td>
<td>Description</td>
<td>Information/ data available</td>
<td>When?</td>
<td>Limitations</td>
</tr>
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</tr>
<tr>
<td>facility</td>
<td>compare safety assessment results. SSM will support the proposal. Includes solidification, chemical treatment, ion-exchange and hot cells.</td>
<td>report.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thailand, proposed</td>
<td>Waste processing (treatment, conditioning)</td>
<td>LLW. DSS.</td>
<td>No design as yet. Information available from 2012-13</td>
<td>Timing. Operator is willing.</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>Spent fuel store</td>
<td>Spent fuel in transport/storage/disposal containers in long-term storage.</td>
<td>?</td>
<td>Begin immediately?</td>
<td>Discuss with Japan</td>
</tr>
<tr>
<td>Brazil, Ipen.</td>
<td>Storage of LLW.</td>
<td>Variety of sources, including DSS. IAEA performed a safety assessment for facility.</td>
<td>Can use IAEA safety report</td>
<td>From 2012 onwards.</td>
<td>Need operator approval</td>
</tr>
</tbody>
</table>
5. Interest in classification stage of predisposal management for waste from NPP, and the interdependencies between different waste streams and technologies.

6. Interest in performing a safety assessment using limited personnel. Need a simplify methodology? Example the Managua DSS storage facility in Cuba, which is under refurbishment and needing to obtain licence. Can do in the next couple of years.

7. Interested in regulatory review process for a waste processing facility.

The following outline work plan was proposed for the project:

<table>
<thead>
<tr>
<th>Dates</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>By end plenary Apr 2010</td>
<td>Select 3 appropriate application cases.</td>
</tr>
<tr>
<td>By end Aug 2010</td>
<td>Gather SA information and data for each AC.</td>
</tr>
<tr>
<td></td>
<td>Get approval from all parties for each AC.</td>
</tr>
<tr>
<td>By end Nov 2010</td>
<td>Each working group meet at each AC site to view the facilities, discuss SA with operator/regulator, and continue development of SA report.</td>
</tr>
<tr>
<td>By 1st plenary of new project (Apr 2011?)</td>
<td>Have SA completed for AC1 (simplest) for presentation at plenary. Regulatory review group to commence review SA report for AC1.</td>
</tr>
<tr>
<td>By end Jun 2011</td>
<td>Complete regulatory review for AC1.</td>
</tr>
<tr>
<td>By 2nd plenary of new project (Jun 2012?)</td>
<td>Have AC2 SA completed for presentation at plenary. Regulatory review group to commence review of SA report for AC2.</td>
</tr>
<tr>
<td>By end Sep 2012</td>
<td>Complete regulatory review for AC2.</td>
</tr>
<tr>
<td>By 3rd plenary of new project (Nov 2013?)</td>
<td>Have AC3 SA completed for presentation at plenary. Regulatory review group to commence review of SA report for AC3.</td>
</tr>
<tr>
<td>By end Mar 2014</td>
<td>Complete regulatory review for AC3.</td>
</tr>
</tbody>
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5.3 PROPOSED PROJECT OUTCOMES

It is envisaged that the main outcomes of the project will be:

- A series of complimentary safety reports to DS284
- Application of the SAFRAN tool
REFERENCES


