Waste Safety Standards Committee

36th Meeting

19 November 2013

Agenda Item W.10.4

PRISMA
The PRISM FOLLOW UP

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NSRW

IAEA
International Atomic Energy Agency
PRACTICAL ILLUSTRATION AND USE OF THE SAFETY CASE CONCEPT IN THE MANAGEMENT OF NEAR-SURFACE DISPOSAL APPLICATION
PRISM - Objectives

To share experiences and communicate good practice concerning:

- The components and experiences of the Safety Case and their evolution over the facility lifecycle;

- The decision that have to be taken at the different stages in the facility lifecycle using safety case.
PRISM Project

• Kick-Off Meeting in March 2009

• Final Meeting in December 2012

• Meetings
  • 4 Plenary meetings (+1)
  • 6 Technical meetings
Participants

• **Professionals** from Member States who undertake technical activities related to the safety of near-surface radioactive waste disposal facilities.
  - Technical specialists in issues related to safety assessment or the Safety Case
  - Responsible for the management / operation
  - Regulatory body of waste disposal facilities.

• Expected to contribute to the project by taking an **active part** in plenary discussions and task activities, including contributing to project reports.
RESULTS
PRISM Report

IAEA Safety Standards
for protecting people and the environment

Disposal of Radioactive Waste

Specific Safety Requirements
No. SSR-5

IAEA Safety Standards
for protecting people and the environment

The Safety Case and Safety Assessment for the Disposal of Radioactive Waste

Specific Safety Guide
No. SSG-23

IAEA International Atomic Energy Agency

PRISM:
The International Project

on

PRACTICAL ILLUSTRATION AND USE OF THE SAFETY CASE CONCEPT IN THE MANAGEMENT OF NEAR-SURFACE DISPOSAL

Overview Report

DRAFT WORKING MATERIAL
PRISM Report

FOREWORD

1 __Introduction
2 __PRISM Project: Objectives, Scope and Organisation
3 __Key Aspects and Uses of the Safety Case
4 __Safety Case and Disposal Facility Evolution
5 __Components of the Safety Case Process
6 __MASC Matrix - Matrix of Arguments of Safety Case Matrix
7 __Specific Consideration: Design
8 __Specific Consideration: Waste Acceptance Criteria
9 __Specific Consideration: Management of Uncertainties
10 __Conclusions
11 __References (Other Tasks complete report)
Chapter 4: **Safety Case and Disposal Facility Evolution**

- **Need for Action**
- **Disposal Concept**
- **Site Selection and Design**
- **Construction**
- **Operation**
- **Closure**
- **Passive Institutional Control**

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**Role and Responsibility**

- **Government**
- **Regulator**
- **Operator**

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Interest parties involvement throughout the process is encouraged.
Masc Matrix

• In the PRISM project it was recognized that, during the implementation of a disposal facility program, safety case components may have different levels of relative importance at different stages in the facility life cycle.

• A tool has been developed that addresses the development of the Safety Case components throughout the facility’s life cycle. This tool has been designated as the *Matrix of key Arguments in the Safety Case*, also referred to as the "MASC Matrix".
## Components of the Safety Case

### Main decision-making steps:

<table>
<thead>
<tr>
<th>NEED FOR ACTION</th>
<th>DISPOSAL CONCEPT</th>
<th>SITE SELECTION AND ENGINEERING DESIGN</th>
<th>CONSTRUCTION</th>
<th>OPERATION</th>
<th>CLOSURE</th>
<th>PASSIVE INSTITUTIONAL CONTROL PERIOD</th>
<th>POST-LICENSING</th>
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<tbody>
<tr>
<td>- Decision: Go for disposal or/and Decision for reassessment of an existing facility</td>
<td>- Decide on the disposal concept and the Safety Strategy in a given environment (conditions)</td>
<td>- Decision: choose the site and associated design</td>
<td>- Decision for construction (operator)</td>
<td>Decision: Authorization and/or license for construction (authorities)</td>
<td>Decision to operate (operator)</td>
<td>Decision: Authorization and license for operation (authorities)</td>
<td>- Decision to close</td>
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<td>Safety Case Context</td>
<td>Management</td>
<td>Stakeholder &amp; Regulatory Process</td>
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<td>Optimisation</td>
<td>Safety Strategy</td>
<td>System Description</td>
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<td>Uncertainties</td>
<td>Safety assessment</td>
<td>Integration of Safety Arguments</td>
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<td>Limits, Control &amp; Conditions</td>
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- **1**: not relevant to the decision at hand
- **2**: of value but is not significant
- **3**: significant
- **4**: mandatory
### Main decision-making steps:

**NATIONAL STRATEGY**

- Clear Communication and Integration of Plans for Addressing Unresolved Issues

**RADIOLOGICAL IMPACT AND PERFORMANCE**

- Importance of Engineering/Science

**IMPORTANCE OF ENGINEERING/SCIENCE**

- Finance Considerations

**INTERNATIONAL GUIDANCE**

- International Commitments

### Masc Matrix

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### NEED FOR ACTION

- Decision: Go for disposal or/and Decision for reassessment of an existing facility
Where are we after PRISM?

- PRISM results already have been used in workshops!
- In the last year the PRISM matrix turned out to be a useful tool to communicate the Safety Case
Where are we after PRISM?

BUT!......
Where are we after PRISM?

“Can we have an example?”

- In many discussions the member states asked for more detailed guidance on what exactly to do at the single steps
- This is connected to basic problems in understanding the necessary technical steps and the required knowledge
Where are we?

Getting examples

Nearly impossible to get detailed national examples!

Please!

Do not ring the doorbell.
Way Forward

- Develop generic examples of a safety case
- Using the PRISM tools
- Following Matrix and Decision steps
Way Forward

• New project (2-3 years)
• Developing two different generic safety cases over the lifetime of a near surface disposal facility
What is the PRISMA Project?
PRISM
Components of an Evolving Safety Case

PRISMA
Safety Case Content
PRISMA Project

• First Plenary Meeting in October 2013

• Participants from 14 member states, participated in the meeting,
Objectives of the First Plenary

• Discussion on the proposed path to define the contents of a safety case

• Agreement and/or adjustment of the Project Structure and path forward

• Definition of the working groups

• Initial results and feedback on content development of a safety case
PRISMA PROJECT

Adding Content to the Components of the Safety Case
The content of a safety case is specific to each site, its national regulatory framework, and the stage of facility development.
Create Example Safety Case Content
  - Developed by Operator Groups
  - Reviewed by a Regulator/Government Team

Where safety case content is developed for each stage of repository development
Project Structure

IAEA Coordinating Secretary

Chairperson

Case Definition Group
Project Structure

IAEA Coordinating Secretary

Chairperson

Case Definition Group

Operator Group

Information
FOR EACH STAGE OF REPOSITORY DEVELOPMENT

Operator Group

Safety Case

Regulator/Government Group
Project Structure

IAEA Coordinating Secretary

Chairperson

Case Definition Group

Regulator/Government Group

Next Phase of Repository Development
A safety case will be produced at each stage.
Documentation of the process

• The Operator teams will DOCUMENT the Basis for the Content of the Example Safety Cases

• The Regulator/Government team will DOCUMENT the criteria and considerations used in evaluating the Example Safety Cases

• All groups are responsible for documenting questions and answers between the groups
# Development of the Safety Case by the Operator Groups

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<td>9</td>
<td><strong>Main decision-making steps:</strong></td>
<td><strong>DISPOSAL CONCEPT</strong></td>
<td><strong>DECISION</strong></td>
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<td>10</td>
<td><strong>Example: Trench Disposal</strong></td>
<td><strong>BASIS FOR THE DECISION</strong></td>
<td><strong>RATIONALE/SUPPORTING DOCUMENTATION</strong></td>
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<td>11</td>
<td><strong>Safety Case Context</strong></td>
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<td>12</td>
<td><strong>NATIONAL STRATEGY</strong></td>
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<td>National Legal Framework</td>
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<td><strong>REGULATIONS</strong></td>
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<td>International Commitments</td>
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<td>16</td>
<td><strong>INTERNATIONAL GUIDANCE</strong></td>
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<td>17</td>
<td><strong>FINANCIAL CONSIDERATIONS</strong></td>
<td><strong>Minimal cost for the amount and type of waste</strong></td>
<td><strong>A formal cost comparison of disposal options</strong></td>
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# Evaluation of the Safety Case by the Government Group

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<td><strong>THE DECISION</strong></td>
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<td><strong>EXAMPLE: TRENCH DISPOSAL</strong></td>
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<td><strong>CRITERIA</strong> for evaluating the Operator's Decision</td>
<td><strong>BASIS FOR THE REGULATOR/GOVERNMENT'S DECISION</strong> to accept or reject the Operator's Choice</td>
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<td><strong>Safety Case Context</strong></td>
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<td>National Legal Framework</td>
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<td>REGULATIONS</td>
<td><strong>Potential for complying with existing regulations</strong></td>
<td><strong>References for the existing regulations</strong></td>
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Expected Deliverables of PRISMA

• A project report describing the PRISMA project, the process of developing example safety case content, and lessons learned.

• Sets of example safety case content supporting repository development decisions

• An improved MASC matrix
  • (at the end of PRISM Plus)

• An improved concept of the safety case evolution