

TERMS OF REFERENCE

INTERNATIONAL PEER REVIEW OF DECOMMISSIONING PROGRAMME AND ACTIVITIES

1. Objective

The objective of the proposed international decommissioning peer review services is to provide an independent review of activities associated with the planning and implementation of decommissioning of nuclear facilities. It aims to assist the organization requesting the peer review to identify opportunities for improvement to their decommissioning project planning and execution based on the international safety standards, good international practice and other relevant recommendations in this field.

The purpose of the international peer review is also to facilitate the sharing of good practices identified in the review and to inform the development of the international standards and recommendations.

2. Scope

The decommissioning review is a flexible service, and can be tailored according to the request of the host organization.

Upon request of the host organization, the peer review may cover the following topics:

- An underpinning review across the whole scope identified in Appendix A
- A full depth review of any Topic Area taken from Appendix A

The review will address consistency of the decommissioning practice at the facility with the international safety standards, good international practice and other relevant recommendations. The peer review process will use broad professional judgement, supported where appropriate with reference to detailed documentation from the International Atomic Energy Agency (IAEA). Good practices appropriate for wider sharing will be identified.

3. Basis for the review

The review, the identification of the key issues and the findings/conclusions will be based on and informed by reference material such as:

- The host organization self-assessment
- The host organization reference documentation
- Relevant technical issues arising during the peer review;
- IAEA reference documentation, including safety standards and technical/safety reports;
- IAEA conferences and other relevant international meetings and forums;

- IAEA reports on decommissioning issues and trends;
- Results from other IAEA review missions;
- National report to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

4. Modus operandi

The decommissioning peer review will be initiated on a formal request from the host organization to the IAEA Deputy Director General of Nuclear Safety and Security, with a copy to the Permanent Mission of the host country in Vienna, clearly stating the scope and objective of the proposed peer review, the time considerations involved and the responsible point of contact in the host organization.

Upon receipt, the IAEA will review the request and the proposed scope, objectives and timing. A responsible IAEA Coordinator will be nominated, who will be the IAEA contact point. A formal response to the requesting host organization, copied to the Permanent Mission, will be prepared.

The appointed contact point within the host organization is responsible for:

- Being the sole representative of the host organization and all other relevant host country organizations to communicate with the IAEA Coordinator;
- Providing all the documentary information prior to the evaluation to the IAEA Coordinator;
- Ensuring the appropriate review questionnaires are answered and returned to the IAEA at least two-months prior to the review mission;
- Making all the arrangements within the host organization/country needed for the review mission;
- Collating all comments from the host organization and any other host country organizations related to the draft mission report, specific comments on the usefulness of the safety standards and generic comments on the experience of the mission; and
- Compiling the action plan for the host organization following the review mission.

The IAEA Coordinator is responsible for:

- Liaising with the host organization through the appointed contact point;
- Agreeing the Terms of Reference with the host organization;
- The coordination of all IAEA activities relating to the review mission;
- The establishment of the review team;
- Coordination with the review team leader and the review team; and
- The development of questionnaires for submission to the host organization in advance of the review.

The overall peer review process consists of five phases:

(a) Preparation and initiation - A preparatory meeting between the Agency and the requesting host organization will be held to further clarify the: (i) the terms of reference; (ii) the scope of service; (iii) the work plan; (iv) appropriate sources or reference material.

(b) Initial information - This phase includes self assessment by the host organization on the basis of questionnaires to obtain information about the host organization's decommissioning programme and its implementation. The questionnaires are developed on the basis of IAEA safety standards and other relevant IAEA documentation on decommissioning, together with other relevant good practices, and will cover the scope agreed with the host organization, taking account of the framework outlined in Appendix A. The questionnaire responses will be used by reviewers from the international review team for the preparation and conduct of the mission.

(c) Review mission - The review mission will be carried out through review of written documents provided by the host organization, presentations by the host organization (eg in response to issues raised following review of the questionnaire responses), visits to facilities, and discussions with the host organization and any other relevant national competent authorities and organizations involved in decommissioning as agreed with the host organization. During the review the team will visit appropriate site/facility areas and will meet with local experts to exchange views and experience on specific issues related to the review. The preliminary conclusions of the mission will be presented to the host organization at the end of the mission.

(d) Reporting the outcome of the peer review - The draft report will be prepared within one month after the completion of the mission and will be sent to the host organization for fact checking. A response is expected within two weeks of receiving the draft report. The final report will be issued within two months after the completion of the mission.

(e) Follow-up mission - A follow-up mission is available upon request by the host organization. Its objectives are to review progress in implementing improvements resulting from mission recommendations or suggestions; and to provide further reviews in areas where significant changes have occurred since the mission or in other areas as requested.

5. Review team

The IAEA will convene an international team of experts to perform the review according to these terms of reference agreed with the host organization. The team will comprise of qualified and recognised international experts and Agency staff with experience in planning and undertaking decommissioning of different types of nuclear facilities. The IAEA will formally request the host organization to review and agree the composition of the proposed review team prior to conducting the review. The host organisation will nominate a liaison officer to the review team, who will assist the team on matters of host organisation procedures and arrangements during the mission.

Once the scope of the review has been confirmed, an appropriately experienced team leader will be selected and appointed. The team leader will be an internationally recognised expert in the field, and not normally an IAEA staff member. The team leader is responsible for:

- Advising on the composition of review team;

- Developing the detailed work plan for the review mission, in association with the IAEA Coordinator;
- Assigning tasks and responsibilities to team members;
- Leading the review mission;
- Ensuring that the team works in a consistent and cohesive manner;
- Ensuring that the objectives of the review are met;
- Ensuring consensus between team members and resolving any issues which might arise;
- Collating the preliminary draft report of the review based on the contributions from the team members and submitting it to team members for comment;
- Developing the draft report based on the team members comments and agreeing the draft for submission to the host organization through the IAEA Coordinator;
- Making appropriate changes to the draft report, in consultation with team members, based on comments received from the host organization; and
- Agreeing the final report for submission to the host organization through the IAEA Coordinator.

6. Reporting

The results of the peer review will be documented in a final report that will contain the observations, good practices, recommendations and suggestions of the review team. The report will reflect the views of the team member experts and not necessarily those of their respective organizations or Member States or the IAEA. The report will be provided to the host organization within two months after the completion of the review for consideration and appropriate action. The distribution of the report is initially restricted to the IAEA, review team members, the host organization and the Permanent Mission. Any further distribution at the time is at the discretion of the host organization. Ninety days after the final report is issued it is automatically derestricted unless the host organization requests otherwise. In the interests of transparency the host organization is encouraged to allow publication of the report by the IAEA.

7. Host organization documentation for review

The host organization should make any relevant reference material available to the Agency in English, where appropriate sufficiently in advance (typically two months) to allow preparation of the experts for the mission. This documentation will cover:

- (a) Documents to be subject of review by the team (provided prior to the mission);
- (b) Additional documents reviewed and discussed during the mission;
- (c) Other relevant national documents that need to be considered, e.g. national legislation and regulatory requirements and criteria.

8. Reference IAEA documentation

The peer review will take account of the IAEA documentation presented in the Appendix B.

9. Funding of the peer review

The peer review activities will be funded by the host organization. The costs for the services (i.e. for meetings and visits associated with providing the peer review) will be limited to the travel costs and per diem expenses payments of the peer review team (external experts and IAEA staff) and external expert fees in line with IAEA procedures.

The costs of official publication of the final report of the peer review (see Section 5 above) will be covered by the host organization.

Structure for a Review of Decommissioning Planning and Implementation

I. Background Information for the Review

Noting that these issues are beyond the operator's direct responsibility, operators are asked to provide relevant information as background to the review.

1. Government and regulatory policy and requirements

- 1.1. The national policy and legal framework for decommissioning
- 1.2. Regulatory framework, requirements and criteria for decommissioning: (includes decommissioning, clearance for materials and buildings, site release criteria, waste management and other related issues)
- 1.3. Regulatory oversight of decommissioning

II. Topic Areas

2. General requirement for a Decommissioning Plan

The Decommissioning Plan will contain all the topic areas identified in this structure. The IAEA Standards also have general requirements for such a Plan

3. Facility description

- 3.1. Buildings and system description
- 3.2. Facility/project boundary
- 3.3. Site attributes, e.g.: location: surrounding population and land use: meteorology, geology, seismology, hydrology and natural resources
- 3.4. Radiological baseline survey
- 3.5. Facility operating history

4. Decommissioning strategy

- 4.1. Description of selected strategy (including start point, end point and key phases)
- 4.2. Alternatives considered
- 4.3. Rationale for chosen strategy
- 4.4. Planned use of facility and site during and after decommissioning

4.5. Multi-facility site interactions

5. Transition from operations to decommissioning

6. Stakeholder involvement and socio-economic considerations

6.1. Stakeholder involvement

6.2. Socio-economic considerations

7. Radiological characterization

7.1. Identification, location and qualification of contamination: structures, systems and equipment, surface soil, sub-surface soil, surface water, ground water

7.2. Measurements made and analysis performed; nuclide vectors and fingerprinting

7.3. Statistical approaches

7.4. Comparison with guideline values

7.5. Conclusions and summary

8. Funding

8.1. Cost estimation

8.2. Funding sources and mechanisms (including approaches to project contingencies and long term financial risk/security)

9. Decommissioning approach, technologies and techniques

9.1. Decommissioning approach: key stages and outline schedule

9.2. Decommissioning techniques: containment, dismantling, decontamination (for structures, systems and components, soil and underground and surface water as appropriate)

9.3. Decision-making methods in the selection of decommissioning techniques

10. Materials management during decommissioning

10.1. Identification of radioactive waste types, waste streams and associated quantities, and radiological, chemical and physical properties

10.2. Pretreatment (including segregation and options for re-use/re-cycle), treatment and conditioning, handling and storage, transport and disposal of radioactive wastes: application of disposal acceptance criteria

10.3. Application of clearance values and clearance of material from control (strategy and demonstration of compliance)

10.4. Management of non-radioactive hazardous materials

11. Safety assessment

11.1. Safety assessment framework

11.2. Hazard analysis: identification, screening and evaluation

11.3. Engineering analysis

11.4. Identification of safety measures

12. Availability of support services

12.1. On site services: infrastructure, engineering, waste management, etc

12.2. Other external specialist services

13. Management organization

13.1. Project management organization, roles, responsibilities and interfaces

13.2. Resources to plan, implement and monitor decommissioning (including staffing and recruitment plan)

13.3. Work planning and scheduling, task management, cost monitoring and control

13.4. Management of contractors and contracted services

13.5. Skills assessment, experience, qualification and training

13.6. Regulator interface

13.7. Performance indicators

14. Management for safety and environment

14.1. Responsibilities for safety and environment

14.2. Safety culture

14.3. Nuclear safety programme

14.4. Radiation protection programme (including optimization of protective measures)

14.5. Industrial safety programme

14.6. Environmental Impact Assessment

14.7. Environmental protection and monitoring programme (on and off site)

14.8. Emergency arrangements

15. Management system

15.1. Quality management system and programme

15.2. Application of national and international technical standards (ISO etc)

15.3. Procedures

15.4. Document control and records (including long term provisions)

15.5. Control of measuring and test equipment

15.6. Corrective action programme

15.7. Lessons learned programme (decommissioning and general)

15.8. Audit, review and surveillance

16. Surveillance and maintenance

16.1. Equipment and systems requiring surveillance and maintenance

16.2. Schedule for surveillance and maintenance

16.3. Continued surveillance and institutional control (for deferred stages)

17. Physical security and safeguards

17.1. Organization and responsibilities

17.2. Physical security programme and measures

17.3. Safeguards programme and measures

18. Completion and final survey

18.1. Final survey and report

18.2. Restricted release measures and their implementation

List of IAEA Reference Documents related to Decommissioning

<u>Safety Standard Series</u>		
SF-1	Safety Fundamentals	2006
SS 115-1	International Basic Safety Standards for Protection against Ionising Radiation and for the Safety of Radiation Sources	1994
GS-R-1	Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport	2000
GS-R-3	The Management System for Facilities and Activities	2006
WS-R-2	Predisposal Management of Radioactive Waste, Including Decommissioning	2000
WS-R-5	Decommissioning of Facilities Using Radioactive Material	2006
WS-G-2.1	Decommissioning of Nuclear Power Plants and Research Reactors	1999
WS-G-2.2.	Decommissioning of Medical, Industrial and Research Facilities	1999
WS-G-2.4.	Decommissioning of Nuclear Fuel Cycle Facilities	2001
WS-G-2.5	Predisposal Management of Low and Intermediate Level Radioactive Waste	2003
WS-G-2.6	Predisposal Management of High Level Radioactive Waste	2003
WS-G-2.7	Management of Waste from the Use of Radioactive Materials in Medicine, Industry, Agriculture, Research and Education	2005
WS-G-5.1.	Release of Sites from Regulatory Control upon Termination of Practices	2006
WS-G-6.1	Storage of Radioactive Waste	2006
RS-G-1.7	Application of the Concepts of Exclusion, Exemption and Clearance	2004
<u>Safety Report Series</u>		
SRS No. 26	Safe Enclosure of Nuclear Facilities During Deferred Dismantling	2002
SRS No. 31	Managing the Early Termination of Operation of Nuclear Power Plants	2003
SRS No. 36	Safety Considerations in the Transition from Operation to Decommissioning of Nuclear Facilities	2004
SRS No. 44	Derivation of Activity Concentration Values for Exclusion, Exemption and Clearance	2005
SRS No. 45	Standard Format and Content for Safety Related Decommissioning Documents	2005
SRS No. 50	Selection of Decommissioning Strategies	2007
<u>Technical Report Series</u>		
TRS No. 375	Safe Enclosure of Shutdown Nuclear Installations	1995
TRS No. 386	Decommissioning of Nuclear Facilities Other Than Reactors	1998
TRS No. 389	Radiological Characterisation of Shutdown Nuclear Reactors for Decommissioning Purposes	1998
TRS No. 395	State of the Art Technology for Decontamination and Dismantling of Nuclear Facilities	1999
TRS No. 399	Organization and Management for the Decommissioning of Large Nuclear Facilities	2000
TRS No. 401	Minimisation of Radioactive Waste from Decontamination and Decommissioning of Nuclear Facilities	2001
TRS No. 411	Record keeping for the Decommissioning of Nuclear Facilities: Guidelines and Experience	2002
TRS No. 414	Decommissioning of Small Medical, Industrial and Research Facilities	2003
TRS No. 420	The Transition from Operation to Decommissioning of Nuclear Installations	2004
TRS No. 421	Management of Waste Containing Tritium and Carbon-14	2004
TRS No. 440	Dismantling of Contaminated Stacks at Nuclear Facilities	2005
TRS No. 441	Management of Problematic Waste and Material Generated During the Decommissioning of	2006

Nuclear Facilities		
TRS No. 444	Redevelopment of Nuclear Facilities after Decommissioning	2006
To be published	An Overview of Stakeholder Involvement in Decommissioning	
To be published	Managing the Socio-economic Impact of the Decommissioning of Nuclear Facilities	
To be published	Managing the Large Amounts of Decommissioning Material of Low Radioactivity	
To be published	Long Term Preservation of Information for Decommissioning Projects	
Technical Documents (TECDOC)		
TECDOC 1394	Planning, Organizational and Management Aspects of Decommissioning: Lessons Learned	2004
TECDOC 1476	Financial Aspects of Decommissioning	2005
TECDOC 1478	Selection of Decommissioning Strategies: Issues and Factors	2005
Other IAEA Publication		
NEA/IAEA/EC	A Proposed Standardised List of Items for Costing Purposes in the Decommissioning of Nuclear Installations	1999

Note: Not all documentation will be relevant to every situation, but the above represents a list of the principal IAEA documentation covering decommissioning and related waste management. Other IAEA documentation applies to closely allied fields such as radiation protection, emergency planning, transport and other aspects of waste management and disposal.