

REVIEW PROCESS AND LICENSING FOR RESEARCH REACTOR DECOMMISSIONING ACTIVITIES IN ROMANIA

Marin DINCA

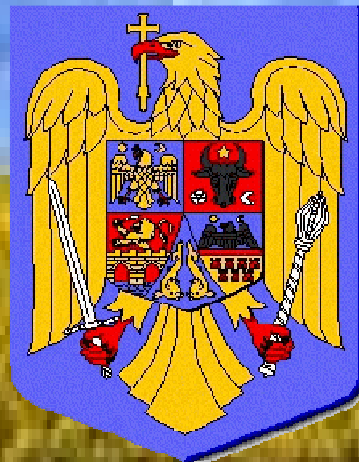
(marin.dinca@andrad.ro)

Responsible for Decommissioning of Nuclear Facilities

National Agency for Radioactive Waste - ANDRAD

Ministry of Economy and Finance

ROMANIA



Outline

- **National Authorities**
- **CNCAN responsibilities for decommissioning of RR**
- **ANDRAD responsibilities for decommissioning of RR**
- **Licensee responsibilities for decommissioning of RR**
- **Legal Framework**
- **Decommissioning Strategies**
- **Decommissioning Plan**
- **Spent Fuel Management**
- **Conclusions**

National Authorities

-**National Commission for Nuclear Activities Control – CNCAN** – which by law is an independent regulatory body in the field of nuclear activities that has the empowerment to offer regulation, authorization and control for nuclear activities. CNCAN was established on January 8, 1990 through reorganization of a former regulatory body. CNCAN is coordinated by Prime Minister's Cabinet.

CNCAN must to review and approve decommissioning plan (DP) and to issue the license for decommissioning of the nuclear facility.

- **National Agency for Radioactive Waste – ANDRAD** – is the competent authority for disposal administration of spent nuclear fuel and radioactive wastes and coordination of the **decommissioning** of nuclear facilities and of the management of spent nuclear fuel and radioactive wastes. Government Ordinance (GO) No. 11/January 30, 2003 and Government Decision (GD) no. 1601/ December 23, 2003 established the ANDRAD's foundation and organization. ANDRAD is subordinate to MEF from April 2007.

ANDRAD must to review and endorse the decommissioning plan prior to be approved by CNCAN.

CNCAN responsibilities for decommissioning of RR

- Issues** regulations for decommissioning and waste management.
- Review and approves** the radiological characterization plan and radiological characterization report.
- Reviews and approves** DP in maximum 60 days from the date of receiving. Reviews and other support documents by DP: Final Safety Report, Radiation Protection Program, Quality Assurance Manual, Emergency Plan.
- Issues** annual conservation licenses and license for decommissioning for maximum 5 years.
- Approves** other activities in the decommissioning period.
- Organize** inspections and controls at the nuclear facility under decommissioning.

ANDRAD responsibilities for decommissioning of RR

- **Prepares the National Strategy** for safe management of radioactive waste and **decommissioning** and monitor its implementation.
- **ANDRAD is responsible** by law for disposal of radioactive waste, inclusive from decommissioning.
- **Endorses** the DP in 50 days from receiving (together with other documentation in relation to decommissioning activity).
- **Proposes specific objectives** for the National Plan for research and development regarding the **decommissioning** of RR.
- **Promotes** through the MEF the necessary GO, GD or laws related to management of radioactive waste, inclusive decommissioning activities.
- **Supports** the issuance of GD for financing the decommissioning activity from state budget.
- **Visits** the place of decommissioning alone or participate at the inspections of CNCAN.

Licensee responsibilities for decommissioning of RR

- **To obtain** the conservation license for the transition period.
- **To obtain** approval from CNCAN for deployment of activities specified in conservation license
- **To prepare** DP and support documents and to send them to ANDRAD and CNCAN and to implement the observations of ANDRAD and CNCAN at specified deadline.
- **To obtain** endorsement from ANDRAD and approval from CNCAN for DP and other documents required for decommissioning process.
- **To elaborate** feasibility studies for financing the decommissioning activity from state budget.
- **To obtain** from CNCAN the license for decommissioning (valid 5 years) based on a proper documentation that contains DP and other documents.
- **To perform** pre-decommissioning and decommissioning activities itself or with authorized contractors.
- **To obtain** from CNCAN the certificate for accomplishment the aim of decommissioning (free release, reuse).
- **To send** the radioactive waste for treatment, long term storage or disposal at dedicated facilities.

Legal Framework

- **The Romanian law No. 111/1996** on safe deployment of nuclear activities, regulation, authorization and control of nuclear activities.

As stated in Chapter II, Authorization Conditions, art.8 , paragraph (6), “the authorization phases of the nuclear facilities shall, as applicable, be the following:

- a) designing;
- b) siting;
- c) production;
- d) construction and installation;
- e) commissioning;
- f) test operation;
- g) operation and maintenance;
- h) repair or modification;
- i) **conservation;**
- j) **decommissioning**

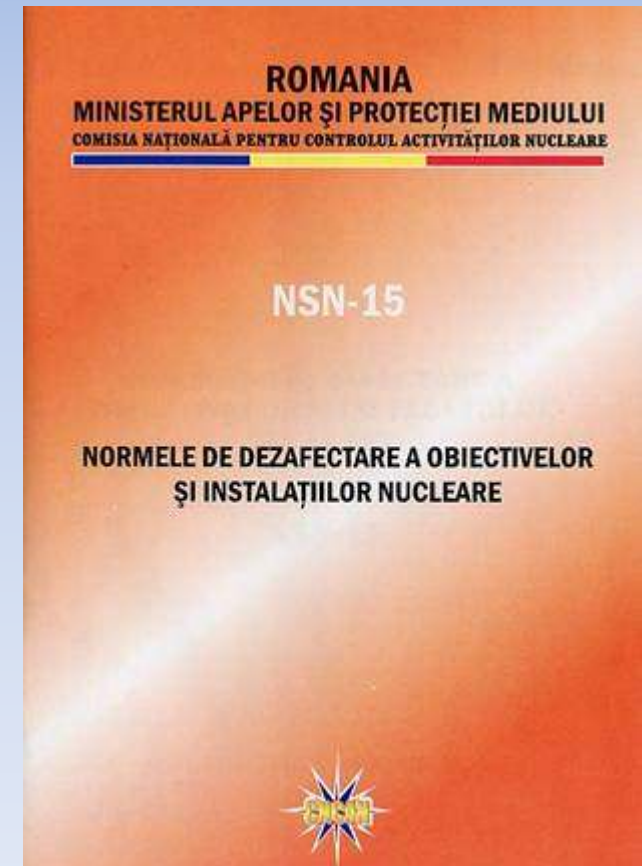
- The Romanian law No. 57/2006 on peaceful utilization of nuclear energy provides that the **decommissioning of research reactors** is approved by GD.

Legal Framework (cont.)

NSN-15 - “Norms on Decommissioning of Nuclear Installations” approved by Order No. 1815.09.2002 of the CNCAN (regulatory body) President, published in the Official Bulletin No. 867/2.12.2002, in force from January 1st, 2003, are applicable for decommissioning of the following nuclear installations:

- Research reactors;**
- Subcritical assemblies;
- Radioactive waste treatment plants;
- Interim storage of spent nuclear fuels;
- Interim storage of radioactive waste.

These norms establish the requirements and steps necessary for licensing for decommissioning of nuclear installations with the purpose of release them from licensing regime.



Legal Framework (cont.)

- Provisions of NSN-15 -

- The owner of any nuclear installation issued a Decommissioning Plan in the next 3 years from release of regulation. For nuclear installation under conservation (such as VVR-S RR), the term was 6 month.
- NSN-15 regulation imposed the obligation to have a DP for the first licensing, construction, operation or decommissioning. Till decommissioning of a nuclear facility, DP is revised and submitted for reviewing at ANDRAD and CNCAN at every 5 years.
- Every change in the provisions of DP must be approved by ANDRAD and CNCAN.
- At every 3 months a report of activity must be sent to CNCAN on the period of implementation of decommissioning.
- At the end of every year an annual report is sent to CNCAN on the period of implementation of decommissioning.

Legal Framework (cont.)

- Provisions of NSN-15 -

-If for any cause the decommissioning is stopped, a conservation license will be necessary (issued for maximum 5 years).

-If the decommissioning process will start again, a new radiological characterization and report will be necessary and a new approval of renewed decommissioning plan.

Stages of decommissioning:

Stage 1 – final shutdown of nuclear reactor and in permanent surveillance; nuclear fuel can be stored in the reactor building; are not permitted dismantles of installation, only clean-up.

Stage 2 – nuclear fuel will be evacuated from reactor building; are done activities of decontamination and dismantlement.

Stage 3 – the nuclear fuel is not in the area of decommissioning; are met the clearance levels and then the certificate for removal from authorization conditions.

Legal Framework (cont.)

- Provisions of NSN-15 -

-The license for decommissioning can be issued on intermediary phases and for parts of nuclear installations inside a decommissioning phase based on solid justification. In such a case it is possible to foresee inside the decommissioning plan that should be requested the possession license.

- This should be the case for VVR-S where first license for decommissioning will be issued for first phase (repatriation of HEU spent nuclear fuel- S-36 in 2009, application of isolation concept for storage spent fuel facility (DCNU), elaboration of decommissioning plan for DCNU, obtaining the license for DCNU, continued funding from governmental allocations as national nuclear installations, upgrading of DMDR- DMDR and DNDR- 2008-2011, implementing the work packages from phase 1 for research reactor-2009-2013, repatriation of LEU spent nuclear fuel-EK-10- 2009-2012).

Legal Framework (cont.)

- Provisions of NSN-15 -

The structure of DP as it is given in NSN-15:

1. General Consideration:

**General Presentation of Nuclear Installation;
Reactor Decommissioning Overview;
Cost estimations;
Availability of Funds;**

2. Decommissioning Activities:

**Decommissioning Alternatives;
Facility Radiological Status;
Facility Operating History;
Radiological Characterization of Nuclear installation
Release Criteria**

3. Decommissioning Objectives:

**Activities and Tasks;
Schedule;
Decommissioning Organization and Responsibilities for decommissioning
Training Program;
Contractor Assistance;**

Legal Framework (cont.)

- Provisions of NSN-15 -

The structure is given in NSN-15 (cont.):

**Environmental Impact Assessment;
Technical Specifications;**

4. Safeguards System

5. Physical Protection Program

6. Modification of Decommissioning Plan

7. Archiving of documentation

8. Assignment for elaboration of Decommissioning Plan

Legal Framework (cont.)

- Provisions of NSN-15 -

As provided in Annex 2 of Decommissioning Regulation (NSN-15), the documents necessary to be submitted to CNCAN in order to obtain decommissioning authorization, are:

- Application
- Official decision of person responsible for nuclear installation during decommissioning
 - Proves for technical capabilities and licenses for organizations and persons involved in decommissioning
 - Prove of material and financial resources provided by DP
 - Decommissioning Plan prior approved by CNCAN
 - Official Decision for Permanent Shut-Down of nuclear installation for decommissioning purpose
 - Document for transfer of nuclear fuel from reactor building
 - List of dosimetry equipments
 - List of radioactive sources
 - Waste Management Program
 - Radiation Protection Program
 - Emergency Plan
 - Quality Assurance Manual

Legal Framework (cont.)

- Provisions of NSN-15 -

- Safeguards Procedures
- Physical Protection Program and Procedure
- Approved procedures for reports to CNCAN
- Procedure for final radiological characterization
- Environmental License/Agreement
- Sanitary License
- Prove for payment of taxes

Legal Framework (cont.) - other regulations-

NDR-01, “Fundamentals norms for safety management of the radioactive wastes” elaborated by CNCAN with the Order no. 56/March 25, 2004. The norms represent the adaptation of the IAEA SS No. 111-F: “The principles of radioactive waste management”

NDR-02, “Norms for Free Release of Materials Resulting from Authorized Practices” that establish the clearance levels for materials. For the future decommissioning activities of nuclear facilities there are requested specifically norms for materials, buildings and soil. CNCAN plans to issue specific norms.

Decommissioning Strategies

In Romania there is in operation the nuclear research reactor TRIGA (dual core) from Pitesti-Mioveni and in transition phase for decommissioning the Russian origin nuclear research reactor VVR-S from Bucharest-Magurele.

- As regarding the **decommissioning strategy for the TRIGA reactors**, the deferred dismantling is preferred. The main argument for this option is the presence of more facilities on the site, whence may have different live time. The final objective of the decommissioning is the green field status of the site, but also the possibilities to use the building for nuclear or non-nuclear activities are not excluded. **Till 2025 all aspects for decommissioning will be well reflected in DP and stage 3 of decommissioning is scheduled for 2055.**

- As regarding the **VVR-S reactor**, after decision of Board of Administration of IFIN-HH from July 2001 and Governmental Decision on April 2002 for permanently shutdown, the first three revisions of DP were developed during November 2002 to April 2003 in **deferred dismantling strategy** with the release of the site to green field level. Revision four and five of DP were developed during May 2003 –December 2003 in **immediate dismantling strategy**. The immediate dismantling strategy was chosen based on the Decommissioning Plan and the Project Management (brown field).

- At present the operator (IFIN-HH) has a **license for conservation** of the reactor and storage of SNF in the pools (one in the reactor hall and four in a special building).

Decommissioning Plan

- a) In 2005 was elaborated by Institute for Nuclear Research the first **conceptual decommissioning plan for TRIGA reactor** that was approved by CNCAN with observations in September 11, 2005. The observations must be accomplished at next revision in 2010.
- b) The IAEA assisted the operator of the VVR-S, IFIN-HH, in the **preparation for decommissioning and development of a final decommissioning plan** since 1995 through two Technical Cooperation (TC) projects ROM/9/017 (1994-1998) and ROM/4/029 (2003-2007).
 - The current TC project ROM/4/029 “**Strengthening the Infrastructure for the Decommissioning of the Research Reactor at Magurele-Bucharest**” has the objective to complete a **final detailed decommissioning plan** and the entire infrastructure required for decommissioning, including completion of pre-decommissioning activities to support the decommissioning programme of VVR-S research reactor. This technical assistance covered expert advice, delivery of equipment and training of the IFIN-HH staff. Revision 6 of DP in immediate dismantling strategy under technical assistance of IAEA began in May 2004.

Decommissioning Plan (cont.)

- The Decommissioning Plan and supporting documents of the VVR-S are elaborated by IFIN-HH and CITON considering the document of the IAEA - Safety Reports Series No 45 for standard format and the content of Romanian Regulation –NSN - 15.
- The revision 8 of the draft decommissioning plan (DDP) was submitted to CNCAN and ANDRAD in July 2007 for endorsement and approval.
- CNCAN asked the IAEA for an expert mission (10 to 14 September 2007) for “Review of the Draft Decommissioning Plan for the VVR-S Research Reactor in Romania” in accordance with the relevant IAEA safety standards and good practice in decommissioning. Expert mission had general observations and specific recommendations that must be implemented.
- The report from IAEA was received to CNCAN in October 16, 2007. CNCAN sent the report to IFIN-HH and ANDRAD at the end of October 2007.
- All chapters were analysed and recommendations were implemented in the revision 9.
- The current version 9 of the DDP reflects the substantial work that has been incorporated by IFIN-HH which has resulted in substantial improvement in the document.
- The decommissioning process is envisaged to last 12 years.

Decommissioning Plan (cont.)

- ANDRAD endorsed the DP, revision 9 with observations that must be implemented till appliance for decommissioning license. Were observations about the clean-up activities that can influence the decommissioning activities and the presentation of a radioactive waste and cost summary more relevant. The address of endorsement was sent to CNCAN and licensee before CNCAN to issue own point of view.
- CNCAN approved the DP, revision 9 with own observation. CNCAN issued a Certificate of approval with the condition to implement the ANDRAD's and CNCAN's observation at minimum six months before appliance for decommissioning license and to submit the DP revised at CNCAN in Romanian and English. Till now the PD and support documents were written in English to facilitate the peer revisions of the expert missions of IAEA.
- The clean-up activity in the near future in the hot cells and some channels in biological shield requires the approval of CNCAN.

Certificate of approval the DP of VVR-S, revision 9



GUVERNUL ROMANIEI
COMISIA NAȚIONALĂ PENTRU CONTROLUL
ACTIVITĂȚILOR NUCLEARE
Bd. Libertății nr. 14 București 5, CP 42-4
Telefon (021) 410 05 72
Fax (021) 411 14 36

CERTIFICAT DE APROBARE
CNCAN_PD_VVR-S_01_2008

În temeiul art. 27 din Legea nr. 111/1996 privind desfășurarea în siguranță, reglementarea, autorizarea și controlul activităților nucleare, republicată și a Reglementărilor naționale de securitate nucleară și radiologică,
Ca urmare a analizării documentației înregistrată la C.N.C.A.N. cu nr. 3857 din 12 mai 2008,
Constatând că sunt îndeplinite prevederile legale,

COMISIA NAȚIONALĂ PENTRU CONTROLUL ACTIVITĂȚILOR NUCLEARE
APROBĂ
PLANUL DE DEZAFECTARE
AL REACTORULUI DE CERCETARE VVR-S, REV. 9, MAI 2008

transmis de către:

Institutul Național de Cercetare Dezvoltare Pentru Fizică și Inginerie Nucleară - Horia Hulubei

din Magurele, strada Atomistilor, nr. 407, județul Ilfov,
Telefon: 404 23 00, fax: 457 44 40, persoană juridică înmatriculată la Camera de Comerț și Industrie cu numărul J23/1945/2002, având Codul Unic de Înregistrare: 3321234.

în conformitate cu documentația prezentată, Reglementările naționale de securitate radiologică și prevederile impuse în anexele nr. 01, 02 care fac parte integrantă din prezenta aprobare.

PRESEDINTE,
VAJDA BORBALA




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Echipa de lucru responsabilă pentru acest document

Spent Fuel Management

- TRIGA – LEU Fuel Strategies: all TRIGA-LEU fuel is loaded now in SSR reactor. The spent fuel discharged from reactor till May 2016 may be send in USA till 2019, after wet storage in the storage pool. If this strategy is not possible, after wet storage in the spent fuel storage pool for 20 to 30 years, it is considered a dry storage that it is under development and, finally deep geological disposal in a future National Repository that will be commissioned by ANDRAD around 2055.
- The last pent fuel TRIGA-HEU elements were sent back in USA in July 2008.
- As Romania get international technical assistance through Russian Research Reactor Fuel Return Program, USDOE – IAEA – Russian Federation – Romania, dedicated to return the S-36 spent fuel from VVR-S to Russia, the implementation of this arrangement is underway and it is expected that the shipment can be completed in 2009 on phase I of decommissioning.
- The future of spent fuel EK-10 is not defined yet and this is the reason that interim storage facility will be separated from decommissioning area and separate authorization will be issued after completion and approval of a DP.

Conclusions

- The decommissioning of nuclear research reactors is considered in national laws and regulations. Regulations are under revision and completion as new requirements are necessary to be put in practice.
- Must be considered in regulation all aspects from initial decommissioning plan and the evolution of decommissioning plan over the lifetime of a nuclear facility.
- Regulatory framework, decommissioning plan with supporting documents and funds are considered the basics for a successful decommissioning activity.
- The financing of decommissioning activities is assured by legislation.
- The regulatory body is independent by law from other authorities and operators from nuclear field.
- ANDRAD assure the safety deployment of decommissioning activities by coordination , having the responsibilities that are considered to the Government by provisions of WS-R-5.
- The decommissioning of VVR-S is the most important activity in the next years in Romania. It is a challenge for IFIN-HH, CNCAN and ANDRAD. The help of IAEA was inestimable.
- The transition phase is used for clean-up, refurbishment, procurement of equipment etc.
- The DP of VVR-S was endorsed by ANDRAD and approved by CNCAN.

THANK YOU FOR YOUR ATTENTION