Operational Programs for National Program on Radioactive Waste and Spent Fuel Management in 2012-2015

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ABSTRACT

The Operational programs of radioactive waste (RW) and spent fuel (SF) management are part of the governmental planning instruments in the field of environmental management and planning. This document is subordinate to the Resolution of the National Program of Radioactive Waste and Spent Fuel Management. Its main objectives are to define necessary measures for providing safe and environmentally acceptable management of RW and SF in next 3 – 4 years, to estimate the costs to be covered by the national budget and to support decision making that has to provide sufficient technical, financial and human resources when required. Slovenian environmental and nuclear legislation integrate strategic planning of radioactive waste management with environmental protection planning. Operational programs implement the requirements of the Resolution on the 2006-2015 National Programme for Managing Radioactive Waste and Spent Nuclear Fuel and adjust its requirements according to the current situation. They are prepared by ARAO, the provider of service for general interest for managing radioactive waste and spent fuel, and are adopted by the national government.

Proposal of operational programs for the final period of National Program 2012-2015 was prepared in 2011. It was presented to the Ministry of Infrastructure and Spatial Planning – Energy Directorate, after obtaining the Decision from the Ministry of Agriculture and Environment that strategic impact assessment of Operational programs is not required.

The document for the period 2012-2015 presents two main operational programs:

1. Activities of public service agency ARAO: management of institutional radioactive waste, construction and operation of LILW repository, post-closure monitoring and maintenance of repository for uranium mine tailings, strategic planning and advising,

2. Management of radioactive waste at the waste producer sites: medical RW, NPP RW&SF, closure of uranium mine, research reactor decommissioning program.

Proposed operational programs 2012-2015 are complemented by the analysis of current status of RW&SF management in Slovenia, a brief summary of National Program and its realisation in 2006-2011, financial requirements and resources, supportive measures, performance criteria, and a time table.
1 INTRODUCTION

In Slovenia, all waste management activities are regulated by environmental legislation which defines the waste as by-products that accumulate in time because they do not have any further use. Sustainable waste management is based on three main principles:
- waste minimization including reduce, reuse, and recycle approach,
- polluter pays principle, usually implemented as a waste management and disposal fee,
- transparent and reliable waste management implementing the public right to information, participation in decision making and access to justice in all aspects of waste management.

Important aspects of waste management are also:
- record keeping of waste amounts and waste producers and regular reporting to the competent Ministry,
- licencing for waste management activities,
- providing waste management facilities and ensure their operation.

Accomplishment of above mentioned principles is ensured by systematic planning and continuous control of management results. They include operational activities such as collecting, transport, treatment and disposal of waste, and measures for decreasing the environmental impacts of these activities and measures for prevention and reduction of waste production [1].

The same principles are valid for management of radioactive waste as well. Slovene legal system regulates the management of the radioactive waste and spent fuel (RW & SF) separately from other forms of hazardous and non-hazardous waste, thus following the provisions of European Council Directive on waste [2]. Radioactive waste and spent fuel management are generally defined in Ionising Radiation Protection and Nuclear Safety Act [3], and in particular in Rules on radioactive waste and spent fuel management [4]. Nevertheless, the link to waste management in general is preserved in the national strategic planning procedures and documents.

Radioactive waste management in Slovenia is provided as compulsory governmental public environmental service and is therefore a part of public sector. That means that all activities are performed for the sake of public interest, are coordinated at the state level, are financed by the public finance, are not market oriented, and have to be transparent. Agency for Radwaste Management – ARAO is a public service agency responsible for collecting, transport, treatment, storing and disposal of institutional radioactive waste and SF, disposal of radioactive waste and SF from nuclear facilities for energy production and monitoring and maintaining the uranium mine and milling waste disposal site. Its task is also to keep pace with development in science, technology and policy in the field of radioactive waste management to be able to provide advisory support to local and national policy makers. ARAO is also assigned for preparation of technical and strategic studies for National programme of radioactive waste management and for preparation of operational programmes. National program of radioactive waste management integrates the mission of ARAO and responsibility of radioactive waste producers with national environmental and safety objectives.
2 NATIONAL PLANNING SYSTEM IN SLOVENIA

Slovenian adopted the system of development planning for strategic long-term planning [5, 6]. Development planning is one of the activities dealing with the governmental development policies. It integrates and coordinates sector planning of respective developmental policies and planning of program budget (Table 1). It defines main objectives, sets priorities, and proposes measures for their achievement. In principle all activities financed from the state budget have to be included into the system of developmental planning. Basic factor is the affiliation as a budget direct or indirect spending units of the holder of the activity [7].

Table 1: Comparison of development planning documents as defined by governmental decrees from 2007 and 2010

<table>
<thead>
<tr>
<th>2007</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic documents</strong></td>
<td><strong>Operational documents</strong></td>
</tr>
<tr>
<td>Slovenian Exit Strategy 2010-2013</td>
<td></td>
</tr>
<tr>
<td><strong>Resolutions on National Programs for respective sectors and fields</strong></td>
<td>Operational programs</td>
</tr>
</tbody>
</table>

2.1 RW & SF Planning

Radioactive waste and spent fuel management can’t be regarded as strictly development issue but rather as a routine activity that guarantees health and safety for the environment and inhabitants and the planning procedure is defined in the frame of environmental legislation which is only loosely linked to the national development planning system. Besides, the planning procedure is influenced by Program of NPP Krško Decommissioning and SF & LILW Disposal [8]. Although this is in accordance with planning approach in nuclear sector in the international community this approach can provoke problems with financing of the activities from the state budget.

Systematic planning of national policy of radioactive waste management started in 1999 as a part of separate chapter on ionizing protection in the National Environment Protection Action Programme [9]. In 2004, nuclear legislation defined [3] that national program of RW & SF management should be a supplement to the national environmental protection programme. The Resolution on National Environmental Action Plan 2005-2012 [10] was prepared and adopted in advance and a separate document for RW & SF management covering the period of ten years was adopted by Slovenian Parliament in 2006 [11]. Both resolutions were prepared by the Ministry of Environment and Spatial Planning. According to
its competence ARAO prepared technical background study for the National Programme for Managing Radioactive Waste and Spent Nuclear Fuel. Environmental Action Plan was subjected to the public debate while the supplemented resolution on RW &SF Management was discussed only in the parliament.

Short-term three to four years operational programs for implementation of the Resolution on the 2006-2015 National Program for Managing Radioactive Waste and Spent Nuclear Fuel have to be prepared by ARAO. It has to define the activities and the budget, it includes the analysis of amounts and technology available for RW & SF management, the objectives to be reached in next few years, the requirements and the control milestones in the process.

3 OPERATIONAL PROGRAMS FOR RW & SF MANAGEMENT IN SLOVENIA

Resolution on the 2006-2015 National Programme for Managing Radioactive Waste elaborated objectives and tasks in the field of:
- management of RW & SF in Slovenia,
- long-term planning of activities for safe management of RW & SF according to best available techniques,
- providing the permanent solution for RW in Slovenia.

It also drafted operational programs, defining the measures and their holders, time schedule and financing. Detailed and revised operational programs were prepared by ARAO in 2006, 2008, 2010 and 2012. Operational programs for the final period of Resolution (2012-2015) were finished in April 2012 and presented to the competent Ministry. They are based on the analysis of realization of the objectives of the Resolution by the end of 2011. Basically the document includes the measures for continuous operation of the public services defined in legislation and performed by ARAO, and management of RW & SF before the waste is submitted to ARAO. These issues are covered in two main operational programs (OP), each divided to subprograms with specific objectives, measures, costs and holders for period 2012-2015.

3.1 Operational program of activities of public service agency ARAO

The measures of this OP ensure continuous activities required for fulfilling the tasks of public service defined by legislation [3] and entrusted to ARAO. Specific objectives of this OP are as follows:

1. Provide continuous public service for institutional RW:

The main objective is to reduce the amount of RW, to collect all RW produced in institutions, in case of industrial emergencies and traffic accidents, radioactive sources in temporary storage and from unknown origin. ARAO has to provide the transport and storage for this waste. It has to manage the storage facility as a facility of public infrastructure, and pay all expenses and taxes including compensation for restricted land use to the local community. ARAO keeps the database on all RW in Slovenia and makes required reports to national and international institutions. It is planned that 10 – 15 % of expenses for RW management is paid by the waste producers and the rest is financed by the state budget. The hot cell facility is used for waste treatment and packaging pursuant to the contract between the Reactor Centre of Jožef Stefan Institute and ARAO. The OP is in accordance with the Resolution 2006-2015.
2. Provide conditions for public service of RW disposal – construction of LILW repository:

NPP Krško has the responsibility to take care of LILW before its final disposal and ARAO is in charge of its disposal. The siting for LILW disposal was finished in 2009. The main objective – construction of LILW repository will not be finished by 2015. Specific tasks in the period 2012-2015 are linked to land acquisition, field research of geosphere, hydrosphere and biosphere, ground water monitoring, preparation of investment and project documentation, safety analysis and waste acceptance criteria, environmental report and environmental impact assessment. ARAO also has to pay the compensation for restricted land use and provide transparency of work by communication activities and public involvement. The OP is not in accordance with Resolution 2006-2015 because after the site confirmation in 2009 the activities were slowed down.

3. Monitoring and maintaining of disposal site for waste from uranium mining and milling:

Transfer of both disposal sites to ARAO is planned to take place in 2013, afterwards ARAO will monitor the environment and perform necessary maintenance works on site. ARAO will also pay all taxes and compensation for restricted land use to local community. The OP is delayed with respect to the Resolution 2006-2015, mainly due to problems with ground stability and land sliding on site.

4. Provide technical expertise and relevant documents on RW & SF management to governmental institutions:

Main objective of this OP is to develop and sustain the expertise to support the policy making in the field of radioactive waste management. ARAO is responsible for continuous technical development of human resources, and analysis and evaluation of implementation of waste management strategies, ranging from siting of facilities, analysis of requirements of national and international legislation and preparing the decommissioning programs or other national programs, to public information and involvement in decision making. To successfully carry out these tasks ARAO has to work with IAEA, EC and radioactive waste management institutions in other countries.

3.2 Operational program of RW & SF management prior to submitting them to ARAO

Objectives of this OP include measures for ensuring radiation safety in all phases of radioactive waste production and are implemented on sites of waste origin by the waste producers. The following four operational programs are proposed:

1. Provide a hospital reservoir for body fluids contaminated with radionuclides:

Several hospitals and two university medical centres in Slovenia have Departments of nuclear medicine. They apply open sources, usually very short-lived. The waste can be disposed as standard medical waste after the radionuclides decay below the clearance levels. The objective of OP is to define procedures for temporary storage of contaminated waste and body fluids and to set up a storage place for solid contaminated waste and a temporary storage pool for liquid contaminated waste.

2. Safe storage of LILW and SF in NPP Krško in the context of the operating permit:

Because of the delay of building of the LILW repository it could not be prepared by 2013 as planned in the Resolution [11] and consequently NPP Krško has to provide
additional storage space for the next 10 years, at least. It will also continue to apply the existing volume reduction measures.

There is enough free space for SF storage in the pool but additional safety measures have to be applied according to the results of the final report on stress tests in NPP Krško [12].

3. Closure of uranium mine Žirovski vrh and environmental remediation:

Uranium mine an milling waste is disposed on site in two repositories. Site remediation is finished at one site, but the criteria from the safety report are not completely fulfilled on the other site. The OP defines necessary activities for providing conditions in which ARAO can take over the management of the disposal sites.

4. Preparation of decommissioning program for research reactor TRIGA Mark 2:

The objective of OP is to define the strategy of RW & SF management from the research reactor. The decommissioning plan has to analyse whether to return SF to USA by 2019 and to shut down the reactor by 2016, or to continue with operation.

3.3 Financing of operational programs in 2012-2015

Most of RW & SF in Slovenia comes from electricity production. Costs for management of this waste are covered by a decommissioning and waste management fund which collects the resources from the share of electricity produced in the NPP and sold in Slovenia. Because of high costs of RW & SF management the state budget co-finances the management of institutional RW and finances the operation of ARAO.

RW & SF costs for the period 2012 – 2015 are presented in Table 2. The costs cover transport, treatment and conditioning of waste, temporary storage, radiation safety measures, operation of public service and storage and disposal facilities, knowledge management, administrative procedures and taxes, public communication activities for improving public understanding and acceptance, and compensation for restricted land use.

About 40% of costs are covered by state budget and special financial fund covers about 60%. Contribution of waste producer is minor – 1.35%, but their costs of managing the waste at their premises are not taken into account. Costs covered by EU programs are not presented as they represent less than 0.5% of total costs. Almost 90% of financing from state budget and 100% of financing from the special financial fund goes to ARAO.

3.4 Supporting measures

For successful realization of operational programs some preconditions have to be fulfilled. The most important is to provide continuous operation of professional non-profit organization, in our case ARAO, which works in public interest. Nationally and internationally harmonized nuclear legislation which is also harmonized with environmental and construction legislation is required. Reliable technical information must be provided to public and measures for public participation in policy and decision making concerning RW & SF management must be implemented.
Table 2: Operational programs for RW & SF management in 2012-2015, the responsible institutions and the planned cost

<table>
<thead>
<tr>
<th>Operational program</th>
<th>Responsible institution</th>
<th>Costs 2012-2015 (in 1000 EUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>State budget</td>
</tr>
<tr>
<td>1. Activities of public service agency ARAO</td>
<td></td>
<td>2.835</td>
</tr>
<tr>
<td>• Provide continuous public service for institutional RW</td>
<td>Agency for Radwaste Management</td>
<td>1.750</td>
</tr>
<tr>
<td>• Provide conditions for public service of RW disposal from facilities for energy production – construction of LILW repository:</td>
<td>Agency for Radwaste Management</td>
<td>4.592</td>
</tr>
<tr>
<td>• Monitoring and maintaining of disposal site for waste from uranium mining and milling:</td>
<td>Agency for Radwaste Management</td>
<td>1.286</td>
</tr>
<tr>
<td>• Provide technical expertise and relevant documents on RW &amp; SF management to governmental institutions</td>
<td>Agency for Radwaste Management</td>
<td></td>
</tr>
<tr>
<td>2. RW &amp; SF management prior to submitting them to ARAO</td>
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<td>0</td>
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<td>• Provide a hospital reservoir for body fluids contaminated with radionuclides:</td>
<td>University Medical Center Ljubljana</td>
<td>N.A.</td>
</tr>
<tr>
<td>• Safe storage of LILW and SF in NPP Krško in the context of the operating permit</td>
<td>NPP Krško</td>
<td>0</td>
</tr>
<tr>
<td>• Closure of uranium mine Žirovski vrh and environmental remediation</td>
<td>Public Company for the Close-out of Uranium Mine</td>
<td>575</td>
</tr>
<tr>
<td>• Preparation of decommissioning program for research reactor TRIGA Mark 2</td>
<td>Institute Jožef Stefan</td>
<td>710</td>
</tr>
<tr>
<td>Total costs 2012-2015</td>
<td></td>
<td>11.748</td>
</tr>
</tbody>
</table>

4 KEY ISSUES

Slovenia has set a sound planning strategic procedure for RW & SF management which integrates radioactive waste management and management into the environmental context. However, the planning on operational level came to a standstill, the operational programs have not been adopted yet and ARAO who drafted four versions hasn’t received any inputs from the decision makers. The reason for this might be a poorly defined relation between the general environmental legislation and the specific nuclear legislation. By applying the logic that most of RW & SF is a by-product in the nuclear fuel cycle most of the activities were
coordinated by the ministry competent for energy, which changed from Ministry of Economy (1993-2000), to Ministry of the Environment, Spatial Planning and Energy (2000-2004), Ministry of the Economy (2004-2012), and Ministry of Infrastructure and Spatial Planning (2012- ). Due to application of the term “operational programs” on different planning levels, from national strategic level to local community implementation level, the policy makers obviously had different expectations on this document. Consequently the operational programs have not been adopted since 2006 and a revision of the national programme is already approaching.

European Council Directive [13] was adopted in the meantime. The national framework required by this document includes also the national programme for the implementation of spent fuel and radioactive waste management policy, and the financing scheme(s) for RW & SF management. These requirements are also basic requirements for Slovene national and operational programs. We propose the revision of Slovene nuclear legislation to meet the requirements of the directive and to avoid unnecessary duplication of procedures defined in the environmental legislation.

REFERENCES

[8] Program of NPP Krško Decommissioning and SF & LILW Disposal, revision 1, ARAO and APO, 2004  