

Russian legislation system and Norwegian experience from cooperation on radioactive waste management in Russia

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INTRODUCTION

Norwegian Radiation Protection Authority has been involved in the implementation of the Norwegian Plan of Action run by the Norwegian Government to ensure appropriate environmental protection and nuclear safety in the decommissioning of nuclear-powered submarines from the Russian Northern Fleet and other dangerous obsolete objects like “Lepse”. One of the objectives of this work is to ensure that the procedures used for the decommissioning of nuclear -powered submarines and radioactive waste management are appropriate and consistent with relevant policies and guidelines adopted by international agencies and/or in other countries. NRPA is an advisor for the Norwegian Ministry of Foreign Affairs on radiation protection and nuclear safety issues.

The Russian Federation state regulatory process imposes strict requirements on operators to demonstrate adequate safety, environmental and human health protection. Practically, however, there is little experience in Russia of how to assess coherently and combine all the different issues within an overall process that leads to informed decision making. Regulatory requirements and related assessments tend to focus either on safety (prevention of accidents), protection of human health (in normal operations and in the event of accidents) or protection of the environment as distinct from human health, not on the whole problem.

The programme of work on Lepse being carried out by the NRPA and the Federal Nuclear and Radiation Safety Authority of Russia (Gosatomnadzor, GAN), falls within the framework of environmental co-operation between the Norwegian and Russian Federation governments. The technical and other support of the Swedish Nuclear Power Inspectorate, the Swedish Radiation Protection Authority and the European Commission is also acknowledged.

This paper explores the components of the regulation connected to the environmental impact assessment and nuclear safety. Our experience from the Lepse project provides practical focus to the work and it is hoped that the results can be useful more broadly, both in the Russian Federation and elsewhere.

SPENT NUCLEAR FUEL AND SITUATION IN NORTHWEST RUSSIA

In connection with realization of the Start II agreement a lot of nuclear submarines from the North fleet are taken out from the Navy and are transferred for disposal. Economical difficulties in Russia do not allow speeding up clean-up process. Previously unloaded spent fuel is stored at temporary technical floating bases. Damaged SNF is stored on the floating technical bases “Lotta” and “Lepse”. According to the Russian plans most of SNF will be reprocessed at PO “Mayak”. However badly damaged SNF and SNF with a complicated composition cannot be reprocessed. Such fuel is intended to be stored in the NW region in

special facilities. According to assessments about 3,500 damaged and non-reprocessing spent fuel assemblies are now accumulated in the region, but there are still no long-term storage facilities for SNF operate in the region.

The main problems connected with SNF are the following:

- Old and outdated equipment for SNF unloading;
- All SNF coastal storage facilities are full, many of them in very poor condition;
- Very poor state of the floating technical base “Lepse”;
- Lack of means for transportation of SNF from damaged coastal storage facilities and submarines into a better storage;
- Lack of long-term storage facilities for damaged and non-reprocessing SNF in the region;
- The temporary storage facility for SNF at the PO “Mayak” is full.

FUNDAMENTAL PRINCIPLES IN WASTE MANAGEMENT

Responsible radioactive waste management requires the implementation of measures that will afford protection of human health and the environment, which is the one of the most important principles. Fundamental safety principles have been developed by IAEA and are listed below.

1. Protection of human health
2. Protection of the environment
3. Protection beyond national borders
4. Protection of future generations
5. Burdens of future generations
6. National legal framework
7. Control of radioactive waste generation
8. Radioactive waste generation and management interdependencies
9. Safety of facilities

Safe radioactive waste management requires clear allocation of responsibilities and the national government should take responsibility for international matters. Responsibilities of the regulatory body are:

- a. To enforce compliance with legal requirements
- b. To implement the licencing process
- c. To advise the government

All projects shall be managed in such a way as to secure an acceptable level of protection for human health and environment. In Russia the regulatory function is with Russian Federal Supervisory Authority for Nuclear and Radiation Safety (Gosatomnadzor - GAN), but still Ministry of Atomic Energy and Ministry of Defence play significant roles in radioactive waste management. It is necessary to ensure that the regulatory system in Russia is comprehensive and coherent but not fully develops in connection to SNF disposal. Our experience shows that legislation connected to both military and civilian area should be improved.

REGULATORY LEPSE PROJECT

According to Russian legislation all operations on board «Lepse» or in other projects must be licensed by GAN. The solution needs well-developed technology and leading companies in this area are working on the technical solution. At the same time the general situation in Russia makes it difficult for authorities to get all necessary support and help.

Considering the agreements between NRPA and GAN, the Russian Federation and the Kingdom of Sweden, radiation protection and nuclear safety organisations from these three countries have agreed to start implementation of a Project "On safety regulatory support to the Lepse Project" called the "Regulatory Lepse Project" as a pilot regulatory cooperation which can be expanded to other areas.

The scope of the Regulatory Lepse Project is co-operative activities and support in the field of safety regulation, licensing and supervision of the Lepse industry project implementation.

The objective for the Regulatory Lepse Project is that handling of the Lepse vessel with spent nuclear fuel and radioactive waste on board is in conformity with the current Russian regulation and licensing procedures and in accordance with applicable rules and standards in the field of the radiation protection and nuclear safety.

The main steps in the work plan of the Regulatory Lepse Project were:

- Gathering and analysis of the current legal and regulatory basis for the Lepse project implementation.
- Development of the regulatory documents needed for the Lepse project implementation.
- Review of the licence application and analysis of the documents on nuclear safety and radiation protection, including peer review with participation of independent experts.
- Preparation, manning and carrying out of inspections with participation of representatives of the authorities from the countries concerned.

REGULATORY REQUIREMENTS AND GUIDANCE

Regulation in Russian Federation

The following Russian Federal Laws have been identified as the most relevant in relation to radioactive waste management and management of spent nuclear fuel and especially for Lepse project:

- **On The Environmental Protection;**
- **On Sanitary-Epidemiological Well-Being of Population;**
- **On Radiation Protection of Population;**
- **On The Use of Nuclear Energy;**
- **On Especially Protected Natural Territories;**
- **On Ecological Review (Expertise);**

The objectives of the legislation of the Russian Federation in the area of environment protection are based on the interest of humans. Russian Federation has not any special regulation connected to the disposal of high level waste (HLW) and spent nuclear fuel (SNF).

Responsibilities in Russian Federation

The responsibility for the quality of the Safety Analysis Report (SAR) and EIA in Russian Federation lies with the operator. On the basis of the EIA and SAR, decisions on acceptance of proposed activities will be made having regard to risk to the environment and population health and potential for irreversible or critical changes in the environment during the whole life cycle of the proposed activities. Previously The Ministry of Environment Protection, later the Committee of Environment Protection (Goscomecologia) and now just as one of the departments within The Ministry of Natural Resources is responsible for decisions, though it relies on many institutions and organisations for information and advice.

At the same time, Gosatomnadzor performs licensing and develops norms and rules (regulations) based on the mentioned Laws and legal acts in the use of nuclear energy and environmental protection. Submission of a set of documents providing nuclear and radiation safety assurance of the facilities or declared activity is an obligatory condition for an operator to receive a licence. Among these documents, a SAR is one of the most important to be submitted. The key content has to do with reducing the chances of accidents rather than assessment of the impacts of any releases that may occur.

On the basis of our co-operation on the Lepse project it was recognised that specific regulatory documents are required for Lepse unloading operations because of the unusual character of the task. The responsibility for such documents lies with the regulatory authority for nuclear safety. However, it was also recognised that involvement of other organisations in discussions and exchange of information should prove beneficial.

Three documents were finally produced setting out:

- Set of Documentary requirements
- Quality Assurance Programme requirements
- Safety Analysis Report requirements

Set of Documentary Requirements

This document has been designed to advise the responsible operator of the Industrial Lepse Project on what documents are to be supplied to Gosatomnadzor in support of an application to transfer the Spent Fuel Assemblies (SFA) on board Lepse to an interim storage facility. It clearly sets out the scope and regulatory context of the planned operations, and includes separate annexes on separate activities as follows:

- design of the SFA unloading installation,
- manufacture of the SFA unloading installation,
- construction of the interim storage facility for nuclear materials (casks with SFA),
- operation of the interim storage facility for nuclear materials (casks with SFA), and handling of nuclear materials,
- management of the SFA during their transport from the Lepse storage vessel, and
- management of radioactive waste during its transfer from the Lepse storage vessel.

Quality Assurance Programme Requirements

This document has been designed to advise on what requirements Gosatomnadzor puts on a Quality Assurance Programme to be implemented by the responsible operator of the Industrial Lepse Project.

A key feature of the requirements is the clear identification of QA responsibilities, bearing in mind that a variety of organisations rendering services to the operator will be involved in the work.

Safety Analysis Report Requirements

This document has been designed to advise the responsible operator for the Industrial Lapse Project on issues to be addressed in a Safety Analysis Report for the transfer of SFA on board Lapse to an interim storage facility and the structure of such report.

It is the most important of the three regulatory documents. Apart from setting out the relevant principles and safety criteria and describing the safety system components, a series of annexes provides recommendations on how safety should be analysed and includes a minimum list of initiating events which should be considered.

Spent Nuclear Fuel in Russia

During discussions with the regulators and operators the situation around the management of SNF from Lapse become more clear after while. As it was mentioned before Russian Federation does not have any regulations regarding disposal of HLW and SNF. Badly damaged fuel from Lapse has to be store for long term. Similar situation is with HLW at Mayak. Still it is not decided yet that HLW has to be disposed of. Lately Russian Federation has changed existing law and now allow for import of SNF into Russian Federation. At the same time big efforts have been done in order to build containers for long term storage of damaged SNF.

ENVIRONMENTAL AND PROTECTION REQUIREMENTS

Environmental protection and related considerations of major projects development has increasingly been the subject of international discussion and agreement. The interpretation of these important principles and their inclusion within treaties, legislation, regulations and regulatory guidance is complicated. On the other side planning and optimisation of radioactive waste management operations is a complicated task involving scientific, technical and social issues. There are many factors, which have to be balanced.

The main principles and methods of carrying out EIA in Russian Federation and Norway coincide in many points. It is concluded that ecological safety as a central part of the ecological, natural and resources legislation has been established. Norms for this have been included in other areas of legislation and legal acts, such as legislation on the sanitary-epidemiological well-being of population, public health, radiation safety.

The regulatory requirements need to be in place before industrial projects start, since they are part of the industrial project specification. However, these requirements should not be so prescriptive as to unnecessarily constrain the identification of safe and practical options. Regulatory development needs to allow for and match the industrial project development, in stages.

Western support is supposed to promote an open dialog between different authorities and stakeholders in Russian Federation. Our experience shows that different authorities in Russian Federation have different requirements and that means different issues are important to each of them and in addition the communication between different authorities is not the best one. Often each authority has own independent review process.

The basic principle of EIA is knowledge prior to decision making and action on the basis of the knowledge about environmental consequences of an activity as early as at the stage of planning. The purpose or purposes of the EIA should be made very clear. If this includes demonstration of regulatory compliance, then the specific regulations should be identified as well as any quantitative or qualitative criteria.

A regulatory basis exists to address environmental and related issues, and although there is much experience with EIA in radioactive waste management, some aspects can be improved by learning from other practices. Part of the need for change arises because EIA has come to mean different things to different people. Many people reading EIA documentation are left unsatisfied that the right issues have not been addressed; what gets included seems to depend on who is doing the assessment rather than the purpose of the assessment. There should be more focus on the scoping phase of the EIA in order to achieve the agreement what it should be included in assessment. This suggests that work should be more directed towards treating EIA as an interactive process, involving all those with an interest in the purpose and the results and this is not a case in Russian Federation. Of course there must be practical limits to the level of interaction; it is simply to say that, at this point, more emphasis is required on stakeholder involvement than in the past. Details of what this means will depend on the context to individual EIAs.

Taking decisions is part of the licensing process. The main basis for safety approval is the Safety Analysis Report, which is also one of the most important documents within the EIA process.

The second important document within the EIA process is the EIA report which supposed to be approved by appropriate authority. This is also the case in Russian Federation, where through our work it was recognised that the principles and review criteria for both documents could be different, depending of which authority has the responsibility.

CONCLUSIONS

Norway and Sweden are interested to provide direct support in solving safety problems in Russia. At the same time both countries recognise that support should be given also to authorities to build up the safety culture through the legislation system.

The Regulatory Lepse Project in the same way as the industry cooperation for Lepse is a pilot project between authorities from different countries. About two years cooperation between NRPA and GAN and one year of cooperation in Regulatory Lepse Project has shown that objectives and understanding of the responsibilities of radiation protection and nuclear safety authorities in different countries are the same. However, the implementation of safety regulation in different countries is different. The work described above and planned for the future is intended to allow authorities and experts within all the relevant organisations to learn from each other, and in this particular case, to promote safety management for Lepse operations.

The working methods developed within the regulatory Lepse project have been particularly effective and can be applied to other radioactive waste management problems in the Russian Federation. The experience gained is also relevant to developments in other countries and to the development of international recommendations.

Discussions among the various interested parties led to the recognition within the regulatory Lapse project that there is an overlap of nuclear safety, environmental and human health protection issues, all of which affect overall regulatory supervision of Lapse unloading operations. The co-ordination of these overlapping issues was seen to be an important but difficult matter, bearing in mind the wide range of engineering, environmental, radio-hygiene and non-radiological impact considerations, and the corresponding regulatory frameworks. All authorities and operators and stakeholders should be encouraged to take a holistic view of these difficult problems, and not to manage them on the basis of one issue.

The regulatory issues raised here are complicated, but this should not be used to justify taking no action. As example we could look at the Lapse project. Continuing care and maintenance of the Lapse takes up valuable resources and, ultimately in particular this case, no action carries the highest environmental risk. On the other hand Russia would like to import SNF from other countries for long term storage without having all necessary infrastructure.

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