



Nordic Seminar on Waste Problems in Russia

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The Nordic countries have been working actively for a long time to co-ordinate their nuclear safety efforts in Russia as far as possible. It was in this context that a Nordic seminar was held earlier this year focusing on the problems associated with waste disposal in Northwest Russia. Particular attention was given to a repository which may be built on Novaya Zemlya.

Considering the extensive experience and involvement of Sweden and Finland in waste management, the Norwegian Radiation Protection Authority wished to discuss the problems associated with Russian plans for waste disposal in Northwest Russia with the other Nordic nuclear safety and radiation protection authorities. With this in view, a one-day seminar and a one-day workshop were held on 17-18 February 1998.

The aim of the seminar was to exchange information on existing plans for the waste management in Northwest Russia, and then to formulate a proposal for the Nordic nuclear safety and radiation protection authorities regarding a joint policy for co-operative projects with Russia in respect of the waste management in Northwest Russia, with a particular focus on temporary storage and final disposal facilities.

Background

There is an acute need for satisfactory storage facilities for spent nuclear fuel which cannot be reprocessed as well as for the other high-level waste accumulating in Northwest Russia. Russia has plans on building a storage facility on Novaya Zemlya and would like to get an international assistance, both technical and financial, to plan and carry out the project. Their preferences in this matter may have been prompted by heavy opposition from local authorities and populations towards mainland storage sites, as well as by the reluctance of the management of the Mayak facility to accept non-reprocessing waste. The Norwegian government has been asked to support a number of proposals for international projects aimed at final repositories for radioactive waste on Novaya Zemlya.

The existing plans originated in a programme formulated by the Russian Federation for the period 1996-2005, titled: *The Federal Programme: The Management of Radioactive Waste and Spent Nuclear Fuel - Treatment and Final Disposal*.

Regarding the disposal of radioactive waste, the programme provides for the construction of a "demonstration" or "research" repository on Novaya Zemlya for waste from the operation and dismantling of nuclear-powered vessels. Russian experts are convinced that storing the waste in a *facility in permafrost bedrock* on Novaya Zemlya will provide an added measure of safety, as the waste will then be completely sealed.

Problem areas

The Nordic nuclear safety and radiation protection authorities have been collaborating quite constructively among themselves for many years. Discussion of the problems surrounding

waste management in Russia in general and a waste disposal facility on Novaya Zemlya in particular led to a shared understanding of what the Nordic countries should aim for in connection with the construction of a facility of this nature. The Nordic countries generally had quite similar views regarding the Russian proposals for storage of spent nuclear fuel and other radioactive waste. A number of considerations of particular relevance to the establishment of facilities as well as for the Nordic involvement in Russia were also discussed. The salient points of the different discussions are outlined below.

Waste management problems are a matter of growing urgency in the Russian Federation. It is not always easy to tell the difference between official waste disposal plans and projects, and concepts which are still on the drawing boards. It is essential to clarify the type of disposal concept under consideration, the type of waste to be accepted, and not least, the type of environmental impact and safety studies which will provide the basis for the various choices to be made. Novaya Zemlya lies in an area where Norway and Russia both have fisheries interests. Norway also maintains a keen focus on the Arctic environment because of its vulnerability.

It is extremely important, therefore, that methods which minimise the risk of contamination to the surrounding area are chosen. The certainty of this must be established on the basis of thorough safety analysis backed by geological studies, etc. Repositories should meet applicable standards and should ensure that the waste is adequately isolated from the biosphere. Packing for transport should also ensure that the risk of contamination is negligible even in the event of accident. Standards of maintenance in Russia, not to mention former practices, should also be taken into account.

International efforts and "complete" solutions regarding storage and disposal facilities based on commercial considerations may influence Russian officials to choose solutions without adequate assessments or the involvement of relevant authorities in Russia and neighbouring countries.

During the discussion, the point was made that *geological conditions* are a crucial factor in waste disposal. The safety of waste disposal facilities must be analysed very closely. In countries where waste disposal, particularly the disposal of spent nuclear fuel, is studied, a great deal of emphasis is placed on geological factors. Rock stresses and water flow are given particular attention in the design of storage and disposal facilities. In respect of final disposal in permafrost, three alternatives should be recognised:

- (A) Stable permafrost throughout the repository
- (B) Permafrost which fluctuates in the repository
- (C) Permafrost above the repository

The specific characteristics of the individual site are of pivotal importance.

The demands placed on *waste management* will depend to a large degree on the type of waste. The normal practice is to give the waste an initial treatment (conditioning, packaging) where it is produced. Temporary storage and final disposal of spent nuclear fuel and other high-level waste call for a different type of barrier than that required for the temporary storage of short-lived low-level waste. The types of barriers formed in the treatment process or employed at the storage and disposal facilities will depend closely on the manner in which the

waste was first treated. Initial treatment methods also depend on whether the waste will be stored temporarily or disposed directly.

The type of waste is also a significant factor in determining the type of disposal facility and its design. All such factors must be considered. Particular care must be taken in analysing various pollution scenarios.

The safety analysis is a very complicated process which should be repeated from time to time during the process of licensing a facility and for the entire lifetime of the repository. The safety analysis documents must be updated at regular intervals and the benefits of new knowledge incorporated, including new advances in geology, etc.

In keeping with internationally recognised principles, the documentation necessary for licensing a nuclear waste disposal site must include not only a safety analysis report for the repository in question, but it must also describe the role of the facility within a complete waste management system.

The safety analysis consists of a safety report, with associated documentation and background reports. With respect to the long-term safety of final disposal facilities, international standards have grown out of the safety analysis reporting procedures of a number of countries.

As regards the process of developing a system of regulations in Russia, much work still remains in some areas, while regulations in other areas conform to or may even exceed IAEA recommendations. On the other hand, strict standards are not always observed. The prevailing lax attitudes towards maintenance, and highly bureaucratic, inflexible and inefficient system of co-operation in Russia may have a negative effect on the assistance provided by the Nordic countries.

Conclusion and further action

The Nordic countries see definite advantages in co-ordinating Nordic efforts in Russia. Co-ordination of Nordic activities will prevent unnecessary duplication, hold costs down and keep efforts focused. Russia is a huge country with many unresolved challenges. Nordic co-ordination at various levels reinforces co-operative efforts with Russia and improves our chances for influencing Russian authorities to take Nordic interests into account. There was widespread agreement among the Nordic authorities that the essence of our involvement in Russia is "help for self-help". Despite its problems, Russia has extensive resources and a wealth of its own expertise. Our assistance should function as a catalyst for the development of a Russian waste disposal system.

Novaya Zemlya may be considered uninhabited territory. The psychological significance of this circumstance is likely to make it easier to achieve general political assent from the population of Northwest Russia for a site on Novaya Zemlya than for one on the mainland. However, a storage facility located in this area will entail transport of radioactive waste through the southern reaches of the Barents Sea for years to come.

Permafrost is the source of a major complex of uncertainties surrounding a waste disposal facility on Novaya Zemlya. Western know-how concerning construction operations in permafrost is available, so an international assessment of Russian construction plans is possible.

It is important for the Nordic countries to become thoroughly acquainted with Russia's plans. It is possible on the basis of international treaties and conventions to obtain further information on Russian waste disposal plans in Northwest Russia. Updated information may be obtained directly from the Russian authorities responsible for or involved in the planning and construction of radioactive waste disposal facilities, particularly those on Novaya Zemlya. The Nordic countries agree that if Russia wants it, they can provide advisory help in developing these plans further, and that they can also provide assistance for specific projects as well. Future Nordic co-operation with Russia on the disposal of radioactive waste should be given high priority due to our close geographic proximity and concern for our own safety. At the same time, there is general agreement that waste management, including the disposal of radioactive waste, is Russia's own responsibility.