

COOPERATION IN RADIOACTIVE WASTE MANAGEMENT WITH THE RUSSIAN FEDERATION SUPPORTING THE INITIATIVE

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An important objective of the IAEA's activities is to facilitate and strengthen international co-operation for the sound and safe management of radioactive waste and spent nuclear fuel.

The Russian Federation has been facing a number of complicated environmental problems in the management of radioactive waste and spent fuel. They have arisen from past activities in the production of nuclear weapons, use of nuclear energy for peaceful purposes, and the reductions in nuclear arms. Radioactive waste accumulated in the Russian Federation by 1995 amounted to more than half a billion cubic meters with a total activity of about two billion curies (7.4×10^{19} becquerel, or Bq). In addition around 8500 tonnes of spent nuclear fuel were stored with a total activity of around four billion curies (1.5×10^{20} Bq).

To better assess the situation, the Nordic countries requested the IAEA to organize a seminar on International Cooperation on Nuclear Waste Management in the Russian Federation. At this seminar, held in 1995, the participants recognized the need for setting up a contact group of experts to assist in coordinating their efforts. Such coordination would help avoid redundancy and duplication in their efforts, assure that priorities are properly assessed and made

known to the international community, and provide points of contact to facilitate cooperation.

The decision to establish a Contact Expert Group (CEG) was taken in September 1995 by a group of interested countries and international organizations. The IAEA was asked to perform the duties of the CEG Secretariat, which started its operation in April 1996. The Terms of Reference of the CEG state as its goals and objectives "to enhance safety of waste management in the Russian Federation and its environs" and "...to promote international cooperative efforts aimed at resolving radioactive waste management issues, including radiation safety, environmental, technical, legal, organizational and financial matters".

The CEG has thirteen members and two observers. Members are Belgium, Finland, France, Germany, Netherlands, Norway, Russian Federation, Sweden, United Kingdom, United States, the European Union, the International Institute for Applied Systems Analysis, and the International Science and Technology Center; observers

are Japan and the Nordic Environment Finance Corporation.

OVERVIEW OF CEG ACTIVITIES

Among the CEG's major achievements has been the establishment of a database for cooperative projects. It contains detailed information on some 200 projects. In addition to this detailed information, Project Description Forms (PDFs) report on the status of projects under 19 major topics as submitted by countries and international organizations participating in the CEG. (*See box, page 65.*) The database has been used, particularly during the initial stage, as a useful instrument for avoiding unnecessary duplication and overlap and to improve project planning.

Another important action has been, and remains, the prioritization of cooperative projects and tasks. This was first done in 1996-97 by the Russian Federation to help concentrate efforts and financing on the most urgent practical areas. The prioritization represented a compromise list of projects reflecting interests of ministries and organizations involved.

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This initial work showed that the scope of cooperation between the Russian Federation and CEG member countries and organizations on a bilateral and multilateral basis was quite broad and useful. However, as the CEG concluded at its meeting in January 1997, the most important high-priority projects were not yet or not sufficiently covered at that time. The CEG recommended to its member countries and organizations to concentrate their efforts on cooperation in the field of spent fuel management of the technological chain of nuclear submarines and icebreakers (spent fuel unloading, transportation to the shore, intermediate storage, transportation to the Mayak reprocessing plant, storage at Mayak).

After having reviewed reports by Russian ministries, institutes and organizations and the results of a number of specialized studies sponsored by CEG members, the Expert Group decided that it should immediately act to focus international cooperation with the Russian Federation on the situation in its North-West region. In that region, 15 out of 20 "Russian High Priority Projects" are associated with the radioactive wastes accumulated or being generated in the region. However, none of these 15 projects has been fully covered by financing from Russia or from Russia and its cooperative partners.

At the time, the Government of the Russian Federation had approved a Federal Waste Management Programme for 1996-2005, which when realized, was supposed to solve the country's most important

problems. However, its realization was planned over a rather long period of ten years, which caused serious concerns. Many problems required more immediate attention to avoid associated potential safety and environmental risks (for example, spent fuel kept at partially decommissioned submarines, over-filled waste tanks, and the potential threat of resumption of sea dumping).

The actual situation seemed to become even more alarming because of well known economical difficulties. State financing of the Russian Federation waste management programmes in 1996-1998 was at the level of about 10% of planned figures for the Programme.

To raise awareness of these problems, the CEG prepared an "international expert opinion" on the waste management situation in the North-West region of the Russian Federation. It was forwarded to the IAEA Director General, and upon the Group's request, submitted as an information paper to the IAEA Board of Governors in December 1997.

Following the CEG recommendations and in order to facilitate international cooperation directed at solving the most urgent problems in the region, the IAEA has brought the matter to the attention of its Member States and relevant international,

PROJECTS OF THE CONTACT EXPERT GROUP

Number & Project Title	Number of Projects
1 Normative and methodological documents	9
2 Radiological investigations of radioactive waste storage, dumping and disposal sites	20
3 Measures for improving and monitoring radiological situation of radioactive waste storage, dumping and disposal sites	24
4 Storage of low-level liquid radioactive waste	1
5 Storage of solid radioactive waste	7
6 Storage of spent nuclear fuel	9
7 Storage of high-level radioactive waste	1
8 Treatment of low-level radioactive waste	13
9 Treatment of solid radioactive waste	6
10 Treatment of high-level radioactive waste and spent nuclear fuel	12
11 Handling and transportation of spent fuel	19
12 Disposal of radioactive waste and spent nuclear fuel	24
13 Training in radioactive waste management	7
14 Centres for radioactive waste management	7
15 Radioactive waste management at nuclear power plants	15
16 General cooperation in waste management	9
17 Decommissioning of nuclear facilities	7
18 Safety analysis of waste management facilities	5
19 Other waste management related topics	6
Total Projects: 201	

particularly financial, organizations.

At its meeting in Augusta, USA, in 1998, the CEG again considered the importance of concentrating international support to solve the most pressing waste and spent fuel management problems in the Russian Federation. A listing of Initial (First Priority) Projects was defined. It contains three new CEG projects and four of the 20 high priority projects identified by the Russian Federation. The projects focus on spent nuclear fuel and radioactive wastes resulting from decommissioning submarines of the Russian Northern Fleet in the North-West region:

- Modernization of the facility for the treatment of liquid radioactive wastes at the repair yard RTP "Atomflot";
- Decommissioning of the floating service ship *Lepse*;

- Construction and commissioning of an interim storage for spent nuclear fuel at Mayak;
- Creation of metal-concrete casks for storage and transport of spent nuclear fuel deriving from nuclear submarines;
- Improvement of the environmental situation at Andreeva Bay;
- Creation of a repository for radioactive wastes in the North-West Region of Russia;
- Design and construction of a specialized facility for the defuelling of nuclear submarines, withdrawn from service in the Northern Fleet.

The CEG recommended that work on projects already in progress should not only be continued, but accelerated. It also identified a number of projects considered to be of the highest priority, but which were only at the stage of assessment and/or study. The CEG strongly recommended a more active programme for implementing these projects.

PRIORITIZING THE TASKS

The CEG recognizes that there are also severe problems along the eastern coast of the Russian Federation related to the decommissioning of submarines of the Pacific Fleet. Therefore at its meeting in Murmansk (November 1998), the CEG discussed and approved a List of Highest Priority Tasks for the whole Russian Federation, which need to be undertaken to address the problems of spent nuclear fuel and radioactive wastes.

- Development, fabrication and delivery of metal-concrete containers for storage and

transportation of solid spent nuclear fuel and containers for storage of radioactive waste;

- Interim storage for spent nuclear fuel of nuclear propulsion reactors at Mayak;
- Securing the removal of spent nuclear fuel and liquid and solid radioactive wastes from floating and on-shore storages (Andreeva Bay, Sysoeva Bay, Gremikha sites);
- Reconstruction of tankers available in the Northern and Pacific fleet for their use as containers-carriers with submarine spent nuclear fuel and containers with radioactive wastes from isolated sites to points with railroad connections;
- Decommissioning of the *Lepse* vessel and other floating vessels - storages of spent nuclear fuel and radioactive wastes;
- Creation of unloading complexes and radioactive waste containers-collector sites at the submarine decommissioning plants to accelerate the discharging of spent nuclear fuel from decommissioned (but still floating) submarines;
- International safety assessment and, if positive, construction of a radioactive waste final repository at Novaya Zemlya.

This listing covers the most important elements of the waste and spent nuclear fuel management technological chain: spent fuel unloading, transportation to the shore, intermediate storage, transportation to the Mayak reprocessing plant, storage at Mayak, and disposal of wastes.

Most of the submarines that have been taken out of service still contain their fuel on board. With existing facilities

and installations, the spent fuel and waste management will take many years during which the risk of potential accidents will increase. This also includes facilities still containing spent fuel or waste. Measures are required to accelerate the fuel unloading and removal and its safe transport to secure facilities.

At its meeting in Norway (May, 1999) the CEG -- in considering the situation regarding waste management and spent nuclear fuel in the Russian Federation as alarming and requiring significantly broader and timely international support -- decided to approach the Summit meeting of the leaders of the G7/G8 countries in Germany on the problems with nuclear waste and spent nuclear fuel in Russia and to appeal for consideration of concerted assistance in solving them.

During 1999, the CEG focused considerable efforts on reviewing and interpreting the Russian strategy for radioactive waste management. The aim was to assist potential donors in prioritizing their support. At the CEG's meeting in Helsinki in May 2000, the Russian delegation presented a valuable report of the government's new Federal Programme on Nuclear and Radiation Safety of Russia for the period 2000 to 2006.

PROJECT STATUS REPORTS

Based on reports to the CEG's project database, important progress has been observed in a number of areas.

- *Cooperative project on the expansion and upgrading of the treatment facility for low*

level liquid radioactive waste in Murmansk, Russia. This project aims to increase the treatment capacity from 1200 m³ per year to 5000 m³ liquid radioactive waste, including high-salinity wastes from the Northern Fleet. The construction and installation of equipment continues. Construction is close to completion. The project cost is estimated to be US \$5.9 million.

A cementation plant is required in order to obtain permission to operate the treatment facility. The plant's construction has been initiated, financed by Norwegian and US sources. Test operations of the plant were scheduled for this year.

■ **Cooperative project to build four specially designed railway wagons.** All necessary documents between Kvaerner Maritime and the Russian coordinator NUKLID were signed and accepted during the past two years, and contractual procedures were worked out between NUKLID and the carriage-making factory Tver. The railway wagons have been fabricated and the project is completed.

■ **Cooperative project for the repair of tanks for liquid radioactive waste at Zvezdochka yard, Severodvinsk.** While the project is on schedule and on budget, it was reported in 1999 that one of the storage tanks leaked. However, that particular tank was not part of the renovation project financed by Norway. Fortunately the contents of the corroded tank could be channelled into newly renovated tanks. The project was completed both on time

and within budget. The opening ceremony took place in September 1999.

■ **Cooperative project for the creation of a prototype radioactive waste disposal facility at the Bashmachni peninsula at the Novaya Zemlya Archipelago (co-operating parties are the European Union (EU), Germany, Sweden, Russia, and Norway).** The submitted proposal addresses the issues relating to the safety and environmental impact of a repository for radioactive waste on Novaya Zemlya. The objectives of the first phase are to undertake an independent review of the feasibility and safety of an underground disposal facility for low- and intermediate level waste on Novaya Zemlya; to identify unresolved issues relating to this; and to design a programme of experimental work that would address those issues. Russia, having elaborated plans for storage of radioactive waste on Novaya Zemlya, has reaffirmed its interest in support from foreign partners regarding an assessment of the project. (A preliminary plan for project financing estimated costs at US \$800,000). An international consortium has been established to assess the Russian plans for Novaya Zemlja as a disposal site. The European Union, Germany, Sweden, Russia and Norway agreed to undertake the assessment in 1999.

Two review meetings took place in December 1999 and March 2000. In May 2000 a Draft Report on the Status of the Concept and on Inventory was prepared.

■ **Cooperative project for the development and manufacture of a prototype transportable interim storage container for damaged and undamaged spent naval nuclear fuel (co-operating parties: USA, Norway, EU, Russia).** The first multipurpose cask was delivered in October 1999. Testing continues and licensing is now being secured. On receipt of these licenses, the US Department of Defense Cooperative Threat Reduction Program will purchase enough casks to handle the disposition of the spent nuclear fuel from 15 submarines being dismantled.

NEED FOR GREATER SUPPORT

Since its creation in 1996, the CEG has worked to contribute to improve coordination, and greater understanding and awareness of, cooperative projects supporting the resolution of urgent radioactive waste problems in the Russian Federation.

While important progress has been made in many areas, the problems remain serious and greater levels of support are required to resolve them. The situation is a matter of international concern from social, environmental, and economic perspectives, and beyond the capabilities of any single country to address.

The CEG's next meeting, scheduled in Cherbourg, France in October 2000, will continue to focus on efforts to encourage, justify, and strategically plan approaches for achieving higher financial support internationally to solve the highest priority problems of safety and ecological significance. □