

Norwegian Russian Regulatory Cooperation on RTG

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1. INTRODUCTION

Several hundred radioisotopic thermoelectric generators (RTGs) have been used along the Russian Federation's Arctic coast to power remote lighthouses. Similar RTGs were also used as power sources in other remote locations in the Russian Federation and elsewhere in the Former Soviet Union. The safety and security issues associated with these RTGs are becoming better documented, partly as a result of the IAEA's programme of assistance to Georgia following a series of incidents involving such sources. The RTGs typically contain one or more strontium-90 radionuclide heat sources (RHSs) of the order of thousands of TBq, making them Category 1 sources as defined in the international Code of Conduct on the Safety and Security of Radioactive Sources.

In 1993 there were almost 200 RTGs in lighthouses in the Murmansk and Arkhangelsk regions of the Russian Federation. Due to the remoteness of these lighthouses and other factors, maintenance and security of the RTGs has been less than to be desired. While there is no evidence of any attempt to interfere with RTGs with malevolent intent, there have been incidences of theft in which the shielding materials were stolen (presumably for their value as scrap metal) and the RHSs abandoned.

2. NORWEGIAN ACTION PLAN FOR NUCLEAR SAFETY AND SECURITY

Between 1995 and the end of 2004, the Norwegian Government's Action Plan for Nuclear Safety and Security has provided support worth more than €130 million to help improve nuclear safety and security in north-west Russia. Through this Action Plan, Norway has contributed to major projects including the decommissioning of nuclear-powered submarines of the Northern Fleet and rehabilitation of the Andreeva Bay technical base.

The Action Plan has also financed the removal of more than 60 RTGs from lighthouses on the Kola peninsula and their replacement with solar panels and nickel-cadmium battery packs is under way. After inspection and preparatory work, the RTGs were transferred by helicopter, boat and road to a temporary storage point at ATP Atomflot near Murmansk. They were then transported by road and rail to the dismantling point at ARC Izotop in the Moscow region, where the RHSs were removed. The RHSs were then transported by road and rail to PA Mayak, where they are currently stored pending disposal.

Independent consultants working on behalf of NRPA reviewed the environmental impact assessment (EIA) carried out by Russian contractors (separate presentation on that will be given later). The reviewers found some scope for improvement of the EIA, but identified no environmental concerns that would have required Norway to stop funding the project. They concluded that the 'do nothing' option was not realistic – if the RTGs were to be left in situ then significant security improvements would be necessary – and that the approach being

adopted presented a low probability of significant environmental impact under both normal and accident conditions, provided proper control measures are maintained.

3. REGULATORY SUPPORT PROJECTS

In parallel with the industrial projects mentioned above, NRPA has been providing support to regulators in the Russian Federation. The major goal of the Regulatory Support Project is to support Russian regulatory bodies when developing guidelines and requirements for planning, licensing and implementation of the industry projects. The general objective is that the industrial projects in north-west Russia be managed in such a way as to efficiently secure an acceptable level of protection of human health and the environment, as required by Russian Federation Law, taking into account international guidance and recommendations as well as other national best practice, as applicable within the Russian Federation. In addition to the industrial projects mentioned above, major regulatory support projects have included general work to compare applications of and approaches to EIA in the Russian Federation and western countries and specific support in relation to regulation of the possible unloading of spent fuel and radioactive waste from the *Lepse* service vessel.

NRPA's main partners in the Regulatory Support Project are Gosatomnadzor (GAN) – now incorporated into the new Nuclear, Industrial and Environmental Regulatory Authority of Russia (NIERA) – and the Federal Authority “Medbioextreme” – now the Federal Medical–Biological Agency (FMBA). NIERA is responsible for nuclear safety regulation and nuclear safety assessment in the civilian sphere. NIERA's responsibilities also include Environmental Impact Assessment and environmental protection related to radioactivity. FMBA regulates human health protection, for workers and the public. In addition, FMBA regulates environmental aspects, but only when it is of relevance to radiation doses to humans, e.g. through foodchain pathways. FMBA also has responsibilities for regulating activities at the Andreeva Bay technical base. Nuclear safety and safety assessment for defence-related activities are regulated by Ministry of Defence (“military GAN”) and the Federal Atomic Energy Agency (Minatom – now Rosatom).

4. REGULATORY SUPPORT FOR THE DECOMMISSIONING OF RTGS

NIERA has recognised that there is a need for upgrading the regulatory framework for the safe decommissioning and disposal of RTGs in the Russian Federation, taking account of the magnitude of the problem and the high hazard associated with the RTGs, as well as the lack of experience in this area. NRPA is therefore supporting NIERA in a regulatory project being carried out in parallel with the ongoing industrial project. Other technical organisations are also involved, and the work is coordinated with other western support. The project is intended to relate to RTGs throughout the Russian Federation.

The aim of the project is to upgrade the existing regulatory framework of the Russian Federation for the safe decommissioning and disposal of RTGs, with foci on the following priority areas:

1. regulatory requirements and regulations,
2. requirements for data, safety assessment and quality assurance

3. supervision over radiological safety, and
4. emergency preparedness.

Other areas of interest, such as preparation and certification of the personnel, on-going compliance monitoring and information for the public are also being considered and may be given closer attention at a later stage.

4.1. Regulatory infrastructure

The major initial focus of the project is to ensure that the basic regulatory infrastructure for the control of RTGs is in place and effective.

The first task in this area is to clarify the roles and responsibilities of the different organizations involved – particularly operators and regulators – with respect to the safety and security of RTGs. The aim is to ensure that there is clear allocation of responsibilities, consistent co-ordination of regulatory control and compliance requirements, effective transfer of responsibility at each stage in the overall management process and transparency within the Russian regulatory regime. Indications are that there are currently gaps in these areas. This task will need to address both the roles and responsibilities relating to RTGs in situ, but also those relating to the other stages involved in decommissioning, including the transport of complete RTGs and of RHSs, the dismantling of RTGs, and the storage and ultimate disposal of RHSs.

In line with the Code of Conduct requirement of a national register of Category 1 and 2 sources, the operating organization is developing – through a parallel industrial project – a database containing comprehensive information related to each RTG, e.g. location, description, key characteristics (including size of radioactive source) and associated potential hazards. The database will also provide an assessment of vulnerability specific to each RTG. Based on analysis of information from this database, NIERA will consider whether the types of data held are adequate for all locations and RTGs, and thus identify gaps in information to be filled through the industrial project.

A major task in this area will be to identify Russian Federation regulations relevant to the control of RTGs and to consider – taking into account international recommendations and national best practice in other countries – whether existing regulations need to be supplemented or modified and/or whether new regulations need to be developed. Again, this review will need to consider safety and security measures at the various stages of the RTG life-cycle: use, recovery, transport, decommissioning, storage and disposal. Any regulations identified through this process as requiring modification or ‘missing’, and which fall within the remit of NIERA, will then be modified or developed.

Specific aspects of the regulations to be reviewed within this task will be the requirements for assessment of safety and security, and for EIA, in relation to RTGs, provision for inspection and enforcement actions by the regulator, and requirements for emergency preparedness.

4.2. Application and enforcement

Once the basic regulatory infrastructure has been updated, it is proposed that further assistance will be provided in relation to some specific aspects of NIERA's role within the infrastructure.

Accordingly, support will be provided to NIERA in developing an assessment capability, independent of the operators, sufficient to perform its two main functions related to assessment of safety and security, and to EIA, for the various activities involving RTGs, namely:

- developing regulatory guidance for operators on conducting assessments that satisfy regulatory requirements for each stage of the RTG life-cycle: use, recovery, transport, decommissioning, storage and disposal; and
- critically reviewing and evaluating safety and security assessments and EIAs submitted by operators in support of licensing and authorization applications at different stages, as a basis for regulatory decision-making.

This independent capability will feed into the more general regulatory function of evaluating licensing and authorization applications against the updated regulatory requirements.

Support will also be provided to adapt existing inspection procedures, or develop new ones, to be applied to the various stages of an RTG's life cycle in accordance with the updated regulatory requirements. This will aim to provide a system for tracking and recording inspection procedures developed and monitoring of the risks. The audit trail would ensure compliance with regulation and help identify promptly any irregularities, or potential problems.

Finally, support will be provided for the development of regulatory guidance on requirements for emergency planning in relation to accidents or illegal actions involving RTGs at any stage of their life-cycle, and to improve the capabilities of NIERA (and its TSOs) to fulfil their functions in the event of such an emergency.

4.3. Project timescales

The initial work is being carried out in 2005. The priority for 2005 is to have the tasks to strengthen the regulatory infrastructure sufficiently advanced to allow the application and enforcement tasks to proceed during 2006.

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