THE IMPROVEMENT AND IMPLEMENTATION PROCESS OF THE RADIOACTIVE WASTE MANAGEMENT LICENSING SYSTEM IN RUSSIA

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ABSTRACT

Within the framework of the Technical Assistance for the Commonwealth Independent States (TACIS) programme, the EU has undertaken a number of projects aimed at providing assistance to the Russian nuclear safety authority (GAN) in assessment of nuclear safety improvement programmes.

In particular, this paper addresses the safety of radioactive waste management activities. The aim of the project was to provide technical and management experience to the Russian regulatory body in the development of technical basis for defining and developing rules and procedures for licensing of facilities and activities, linked to radioactive waste management.

The Agenzia Nazionale per la Protezione dell'Ambiente (ANPA) of Italy, the Centro de Investigaciones Energeticas, Medioambientales y Technologicas (CIEMAT) of Spain and the Institut de Protection et de Sûreté Nucléaire (IPSN) of France, were the western partners. The Scientific and Engineering Centre on Nuclear and Radiation Safety of Gosatomnadzor of Russia (SEC NRS) was the russian Technical Safety Organisation (TSO) in this project.

In carrying out the project, it appeared that, in general, normative basis (nuclear laws, safety guides etc…) and licensing procedures have been developed by GAN last years, but, particularly concerning radioactive waste management, some important steps is still needed to develop a modern legislative system meeting the international standards.

There are all possible types of radioactive waste (RW) sources in the Russian Federation. The inventory of the RW that has been accumulated is significant. The problems due to the 'historic' RW remain urgent and they should be solved in any case, not depending on further prospects of the nuclear power development in Russia.

In a general way, licensing approaches and licensing procedures have been developed by GAN these last years.

There are however problems in this area of GAN activity due mainly to the fact that most of nuclear facilities were built in the former Soviet union, when neither licensing, nor any other equivalent procedures existed. Nuclear facilities have to be licensed now, but it is difficult for operators to prepare the documentation necessary for licensing, and for the GAN to review it, in a short time. It is still to be noted that, amongst the existing problems, there is neither life cycle stage licensing procedure for RW near-surface disposal facilities nor acceptance criteria for packages to be disposed of on such

centres. Closures activities for disposals are of course not described since they are the last chapter of such a procedure.

On this basis, it was identified as the main objective of this project to achieve a draft proposal of an updating of the licensing system, prepared by the the local TSO Organization, in support to GAN, taking into consideration western practice and experiences.

The high co-operation spirit established in carrying out this project, allowed the achievement of the defined objectives, in particular three new safety documents on radioactive waste management have been drafted and will soon be implemented. Another important achievement of the project has been the start of a dialog between the Regulatory Body and Operators already in the step of development process of regulatory document.

INTRODUCTION

Within the framework of the TACIS programme, the EU has undertaken to fund a number of projects aimed at providing assistance to the Russian nuclear safety authority (GAN) in assessment of safety improvement programmes.

This particular project addressed the safety of radioactive waste management activities.

GAN currently needs support in developing technical basis and procedures for licensing, specifically in the area of the radioactive waste management (RWM). The main aim of this project has been the assistance to the Russian regulatory body in the development of technical basis for defining and developing rules and procedures for licensing of RWM facilities and activities.

Taking into consideration the present situation in Russia, where the Regulatory basis for RWM have been substantially established, the project objectives were addressed to support the GAN in reviewing the already established licensing procedures and, according the current needs, to focus the activities to some specific support for technical licensing aspects.

Partners of the western TSOs consortium were the Agenzia Nazionale per la Protezione dell'Ambiente (ANPA) as leader, the Centro de Investigaciones Energeticas, Medioambientales y Technologicas (CIEMAT) of Spain and the Institut de Protection et de Sûreté Nucléaire (IPSN) of France.

All these organizations are, in their home country, acting as technical support for their respective safety authorities. In particular ANPA is itself the Italian Nuclear Safety Authority with responsibility for the national policy of the RWM including the licensing.

PROJECT IMPLEMENTATION

The scope of the project was defined under three main objectives:

a. Reviewing the present Russian situation on the RWM and procedures for the relevant safety controls.
b. Transfer the know-how of the EU Member States on licensing procedures for RWM.
c. Development of specific requirements, criteria and procedures for the improvement of the licensing system for RWM in the Russian Federation.

The implementation of the project consisted in the following steps:

- Analysis of the present situation in Russia concerning the RWM.
- Analysis of the present status of the RWM regulatory normative basis in Russia.
- Analysis of the present licensing procedures currently applied in Russia in RWM and disposal.
- Supply a package of information on the licensing procedures currently applied for facilities and installations dealing with RWM in the EU Member States (this with particular reference to the national approach in Italy, France and Spain).
- Permanence of Russian experts at western TSOs offices with the objectives to transfer direct information on licensing procedures and to allow direct experience with Operators of RWM facilities.
- Identify specific requirements, criteria and priorities in order to improve the national licensing system for the RWM in the Russian Federation.
- Definition of the content of the documentation package (Safety Report) that a Russian operator dealing with RWM should supply to GAN in applying for the relevant licence for specific waste management facilities (e.g. safety objectives, reference standards, technical contents, safety assessments,..).
- Review and comment on a draft proposal for improving the licensing system prepared by the Local TSO to be submitted to the Russian regulatory body GAN.

PRESENT RUSSIAN RADIOACTIVE WASTE MANAGEMENT SITUATION

The SEC NRS prepared the Report: *Analysis of present Russian situation on the radioactive waste management*, to get a detailed picture of the current situation in the Russian Federation. The Report represents, in fact, the first experience of a complete inventory of RW volumes, RWM activities and practices in Russia.

Review of the results

The greater part of the RW in the Russian Federation are generated and stored in the plants and enterprises of the Atomic Energy Ministry (MINATOM of Russia) and the Defence Ministry of the

Russian Federation. The RW generated due to the radionuclides usage in medicine, science and technology are processed and stored in the system of regional specialised enterprises 'Radon'.

At present, none of the **nuclear power plants** of the Russian Federation has a complete set of facilities for RW conditioning. Evaporation of liquid RW is carried out at all NPP. The resulting concentrate obtained is stored in metal containers without conditioning or it is solidified by bituminization. Solid RW are placed in special storage facilities without pre-treatment. There are compaction facilities at three NPPs and facilities for incineration of solid RW in two NPPs. The storage for liquid and solid RW and spent nuclear fuel (SNF) are close to its filling limit. Facilities for liquid and solid RW treatment at Balakovo and Smolensk NPP are at present under construction. A facility for treatment of liquid effluents is also planned at Leningrad NPP.

Table I shows the spent fuel and the liquid and solid RW stored at NPPs.

Table I - Liquid and Solid RW and Spent Nuclear Fuel in Russian NPP Storage Facilities

NPP	**Liquid RAW**		**Solid RAW**		**Spent Nuclear Fuel**
	Volume m^3	Activity $Ci \cdot 10^2$	Volume m^3	Activity $Ci \cdot 10^2$	Mass t
Balakovo	1.650	8	7.288	0,35	277
Beloyarsk	5.449	14	14.300	0,025	250
Kalinin	2.783	8	5.082	0,64	209
Kola	5.241	190	7.038	0,42	137
Kursk	35.238	135	21.643	1,8	2701
Novovorenezh	6.620	22	28.180	1,8	204
Bilibino	6.87	2	2.152	0,7	104
Smolensk	11.725	40,6	10.630	0,92	1155
Leningrad	11.923		15.724		~2000
Total	**81.316**	**419,6**	**112.037**	**6,655**	**7.037**

Concerning **spent fuel**, at present RBMK-1000 and EGP spent nuclear fuel is supposed to be stored in on-site long-term storage. At present, about 6,000 t of RBMK spent nuclear fuel are stored in on site facilities (Leningrad, Kursk and Smolensk NPPs). WWER-1000 spent fuel is also stored at the site (at Balakovo, Kalinin, the 5-th Unit of Novovoronezh NPP). This situation is determined by the lack of reprocessing facilities for WWER-1000 spent nuclear fuel. Reprocessing of SNF from WWER-440, BN-350, BN-600 and nuclear ship reactors is carried out at the Industrial Enterprise (IE) 'Mayak'.

Up to recent time RW arising from the **nuclear ships** operation and utilisation was generally dumped into specially allocated sites of seas. This resulted in that ship-building and ship-maintenance

plants as well as naval bases have not been equipped with facilities for RW conditioning, excepting the repair-technological plant of nuclear fleet in Murmansk region where there is a liquid RW decontamination. In the region of Bolshoi Kamen town there is under construction a processing facility for the RW coming from the Far East Fleet. Spent nuclear fuel is stored in coastal storage facilities and floating bases. Table II shows the RW situation relevant to nuclear ships.

Since 1946, 118 **research nuclear reactors** and facilities for criticality research have been put in operation in the research organisations. Many of these reactors and facilities have been already stopped and out of operation.

Table III shows the total volume and activity of RW stored in **reprocessing facilities**.

Table II - RW stored in the Technological Maintenance ships and "Atomflot"

Type of waste	**Annual generation of waste**	**Total capacity of storages,**	**Inventory of storages**	
	Tons(pieces)/year	**Tons**	**Tons**	**%**
Spent ion exchangers	10	105	75	75
Containers with incinerable solid radwaste, pieces	20	100	250*	250
Containers with combustible solid radwaste, pieces.	45	100	10	10
Liquid radwaste, m^3	400	1400	400	29

**) The surplus containers with solid radwaste are stored in auxiliary rooms at "Atomflot"*

At present, 400,000 sealed radioactive sources are inventoried, which were used for medical, scientific and technical purposes in the Russian Federation. Spent sealed radioactive sources, as well as all **industrial waste** (not from NPP) are transported to the specialised 'Radon' enterprises, where they are processed by conditioning and incineration. RW arising from decontamination works are stored in the same specialised enterprises. Storage capacities of most of the specialised enterprises are entirely, or almost entirely, used. The radionuclides composition is quite various, but short-lived isotopes and isotopes with intermediate (approximately 30 years) half-life, are the major radionuclides. Additionally, there are some amounts of alpha-radioactive long-lived isotopes including transuranic elements stored as past practices. Table IV shows the storage status of the Radon facilities. Figure 1 shows the position in the Russian territory of the Radon facilities.

Table III - Radioactive waste stored in site of radiochemical plants

Type of waste	Volume , m^3	Activity, Ci	Storage technology
Liquid HLW	$2,5 \cdot 10^4$	$5,7 \cdot 10^8$	Steel containers
Vitrified HLW	$9,5 \cdot 10^3$	$2,0 \cdot 10^8$	Interim storage for the waste vitrified at "Mayak"
Liquid LLW and ILW	$4,0 \cdot 10^8$	$7,0 \cdot 10^8$	Containers, reservoirs, natural and artificial lakes and pools
	$4,6 \cdot 10^7$	$2,0 \cdot 10^9$	Deep geological porous formation-collectors in sites of Siberian Chemical Facility (Tomsk) and Mining-Chemical Facility (Krasnoyarsk)
Solid LLW and ILW		$1,2 \cdot 10^7$	Concrete storage at the plants
Total	**$4,5 \cdot 10^8$**	**$3,0 \cdot 10^9$**	

Table. IV – RW storage at "Radon" enterprises

Enterprise (region)	Volume m^3	% of capacity	Activity, Ci
Moscow	178.000	100	
	4.500	90	
	500	10	
total			1.017.000
St.-Petersburg	53.810	89	95.890
Volgograd	408	34	10.800
Nizhniy Novgorod	700	70	14.189
Groznii	903	43	1.500
Irkutsk	560	70	55.648
Kazan	582	97	1.746
Samara	432	72	2.127
Murmansk	300	50	4.500
Novosibirsk	804	67	235.461
Rostov	360	60	5.635
Saratov	522	30	3.221
Ekaterinburg	2.511	93	126.940
Bashkir	380	95	2.500
Chelyabinsk	1.512	76	5.579
Khabarovsk	897	69	6.200
Total	**247.681**		**1.588.936**

During 1996-1998 some general measures aimed at increasing the radiation safety of RWM activities were carried out in Russia, namely:

- dumping liquid RW into seas has been completely terminated;
- suggestions have been developed on radiological remediation where radiation accidents had place in the past as well as in the areas where underground nuclear tests have been conducted;
- management of RW arising from operation and decommissioning of nuclear ships;
- management of RW arising from the nuclear weapons fabrication in 'Mayak', the Siberian Chemical Facility and in the Mining Chemical Facility;
- modernisation of the engineering structures at the 'Radon' enterprises;
- development of the whole of legislative documents for the regulation of the RW and SF management in the Russian Federation, including the design of the concept of radiation monitoring, and associated radiation monitoring networks, in the areas of influence of RW and SF management facilities.

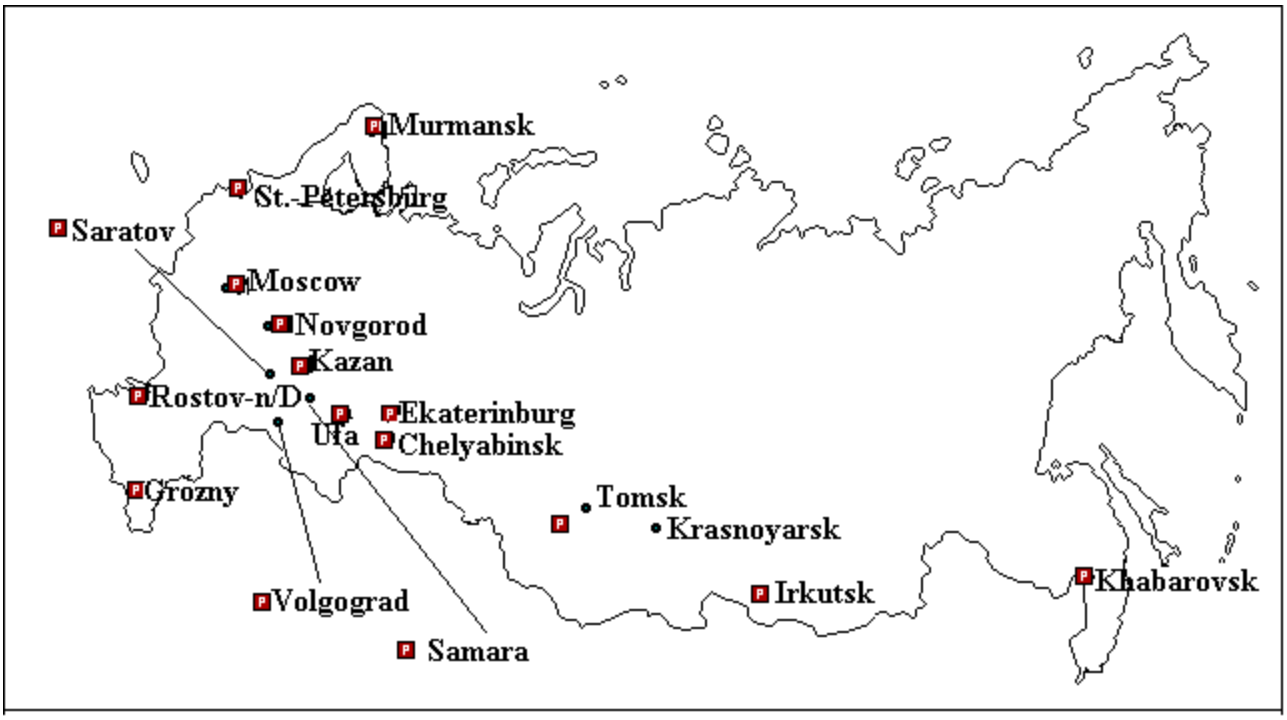

Fig. 1 – Radon Enterprises in Russia

Main issues on RW and SNF management

One of the most serious problems of RW and SNF management in Russia is coming from the Northern and the Pacific regions of the country. In these regions there is lack of modern installations

for RW processing and storage as well as of facilities for the required preparation to export the SNF from its regions.

To solve these problems the following activities have been planned:

- modernisation of SNF reload installations and transport containers,
- modernisation of existing processing facilities for RW and development of new ones,
- design and construction of repositories for long-term storage and disposal of RW,
- design and constructions of facilities for handling of reactor compartments of decommissioned nuclear submarines and nuclear ice breakers.

To solve the existing urgent problems management in the nuclear reprocessing plants, the following activities have been planned:

- equipping the 'Mayak' facilities with plants for the treatment of low and intermediate level liquid RW (Liquid LILRW), in order to cease the discharging of this wastes into ground pools,
- equipping the 'Mayak' facilities with plants for the treatment and conditioning of low and intermediate level solid RW (Solid LILRW),
- new installations in 'Mayak' for vitrification of HLW and ILW which are currently stored in steel containers,
- an underground laboratory at the site of 'Mayak' studies on HLW disposal in deep geological formations,
- step-by-step decommissioning and closure of existing liquid waste deep disposal sites.

- To solve the existing problems at NPP the following activities have been planned:
- equipping all NPP with of installations for conditioning of liquid and solid RW
- building of regional centralised or onsite dry storage for long-term storage of conditioned RW and RBMK spent nuclear fuel,
- manufacture of modern transport containers for transportation of solid or solidified RW and RBMK spent nuclear fuel.

To modernise the 'Radon' enterprises the following activities are planned:

- building new facilities for RW processing, conditioning and storage,
- modernisation of special vehicles for the RW transportation to these enterprises
- creation of the Northwest regional centre (on the basis of the existing Leningrad 'Radon' enterprise) for RWM as a pilot facility ensuring the whole solution of all problems of institutional RWM in all the regions of Russia.

Conclusions

The following conclusions have been drawn from the review and analysis of the radioactive waste management situation in Russia:

1. One of the most important and urgent unsolved problem in the field of radiation safety at all stages of RWM in Russian Federation is the creation of a modern legislative system for the state safety regulation which should meet the international standards.
2. There are all possible types of RW sources in the Russian Federation. The inventory of the RW that has been accumulated is significant.
3. The problems due to the 'historic' RW remain urgent and they should be solved in any case, not depending on further prospects of the nuclear power development in Russia.
4. Specific RW generation rates are not greater than in other highly developed countries.
5. The RWM practices, and applied technologies, existing now in Russia meet, on the whole, the accepted practices in other highly developed countries.
6. In spite of the currently existing favourable results from the developed monitoring and surveillance actions, the practice of injection of liquid RW into porous layers-collectors located in stable geological formations must be given up. Decommissioning and closure of these deep geological disposal must be considered in an appropriate timeframe.

LICENSING PROCEDURES FOR RWM

As a second step, the document *Present status of the regulatory structure in Russia and licensing procedures currently applied for radioactive waste management and disposal facilities* was prepared by SEC NRS.

This report brought relevant information for the evaluation of the parts of these procedures, which could be improved in light of western practices.

Another important objective of this step was the preparation of a package of information on licensing procedures applied for facilities and installations dealing with RWM and disposal in the EU member states, with particular reference to the national approach in Italy, France and Spain. References have been made to licensing processes of existing EU installations, taking care to select those, which better fit to the Russian situation.

In the framework of these activities, to achieve the important aim of transfer the know-how of the EU Member States on licensing procedures for RWM, three different teams from SEC NRS spent a few days respectively in CIEMAT (Spain), IPSN (France) and in ANPA (Italy) offices. Information on licensing procedures and waste management was provided during technical sessions in the Headquarters and direct contacts with operators on nuclear sites were arranged in order to give a direct access to the field experience and to show the practical implementation of the safety relevant aspects evaluated during the licensing process.

Review of the current licensing system in Russia

Regulating activities in the field of use of nuclear energy in the Russian federation are expressed for the first part through laws. The most important of them are the following:

- Law of the Russian federation "on Safety" (1992)
- Law of the Russian Federation "on the Use of Nuclear Energy" (1995)
- Law of the Russian federation "on Radiation Safety" (1996)
- Law of the Russian federation "on Environmental Protection"
- Law of the Russian federation "on Sanitary and Epidemiological Safety" (1991)
- Law of the Russian federation "on Mining"
- Law of the Russian federation "on Ecological Review" (1995)
- Law of the Russian federation "on Radioactive Waste Management" (draft).

The second stage of regulations is performed through Decrees of the President and the Government related to:

- Federal executive Bodies Authorised to carry out the State regulation of Safety in the use of Nuclear Energy (1995)
- Licensing of Activity in the field of the Use of Nuclear Energy (1997)
- Development and Approval of Federal Norms and Regulations in the field of Use of the Nuclear Energy (1997)

Other safety-related regulations are in the fields: Nuclear and Radiation safety, Radiation safety, Fire protection and Technical safety.

Concerning regulation for **radioactive waste management** all domestic and foreign legal acts and standard-technical documentation, including IAEA and ICRP recommendations have been analysed during last years. Particular attention was given to the system of the normative documents on RWM: RADWASS of IAEA.

After careful investigations, the system RADWASS was chosen as a prototype for Russian system of radwaste management normative regulation. Specific features of radwaste management and legislation in the Russian Federation are taken into account.

The developed structure covers all aspects of radwaste management safety and consists of 22 normative documents, including 10 normative documents of federal norms and regulations and 12 safety guides (for comparison, RADWASS covers 55 documents).

The system adopted in Russia foresees 3-level hierarchy of the normative documents:

Level 1. " Safety Fundamentals"

- describe basic safety strategy of radwaste management, safety objectives, fundamental safety principles and requirements.

Level 2. "Safety Requirements"

- describe the requirements which should be followed up to ensure safety of specified activity.

Level 3. "Safety Guides"

- describe recommendations on methods for fulfilment of safety requirements. Safety guides include documents as general state standards (GOSTs), industrial standards (OSTs) etc…

A description of the complete set normative documents for RWM is showed in Fig. 2.

The state body governing the use of the nuclear energy is the Ministry of Nuclear Industry of the Russian federation (Minatom of Russia).

The competence, rights, duties and responsibilities of GAN are determined in the Provisions of GAN, approved by the President of the Russian federation in 1992 and amended in 1993 and 1995.

The general objectives of GAN are the following:

- participation in the development of the state safety regulation system for nuclear activities,
- development, approval and enforcement of norms and regulations on nuclear activities,
- licensing of nuclear activities,
- organisation and supervision of safety of production and use of nuclear energy, nuclear materials and radioactive substances, handling of nuclear materials, radioactive substances and RW, ensuring non-proliferation, physical protection of nuclear materials and other nuclear facilities as well as control of fulfilment of international agreements,
- organisation of scientific researches on justification of principles and criteria, norms and regulations for safe nuclear energy use,
- informing state authorities and the population on changes related to nuclear and radiation safety situation on nuclear facilities.

The main stage of the licensing procedure is the review of the safety application and the verification that design, technical and organisational standards used by the applicant meet the safety requirements established by the federal norms and regulations in the field of nuclear energy. Review of safety application is performed by SEC NRS.

The final review report is approved by the Director of SEC NRS. On the basis of the final document, the responsible department of GAN prepares the proposal for licensing or refusing the licensing of the concerned activity.

Structure of Safety Regulations System for RWM

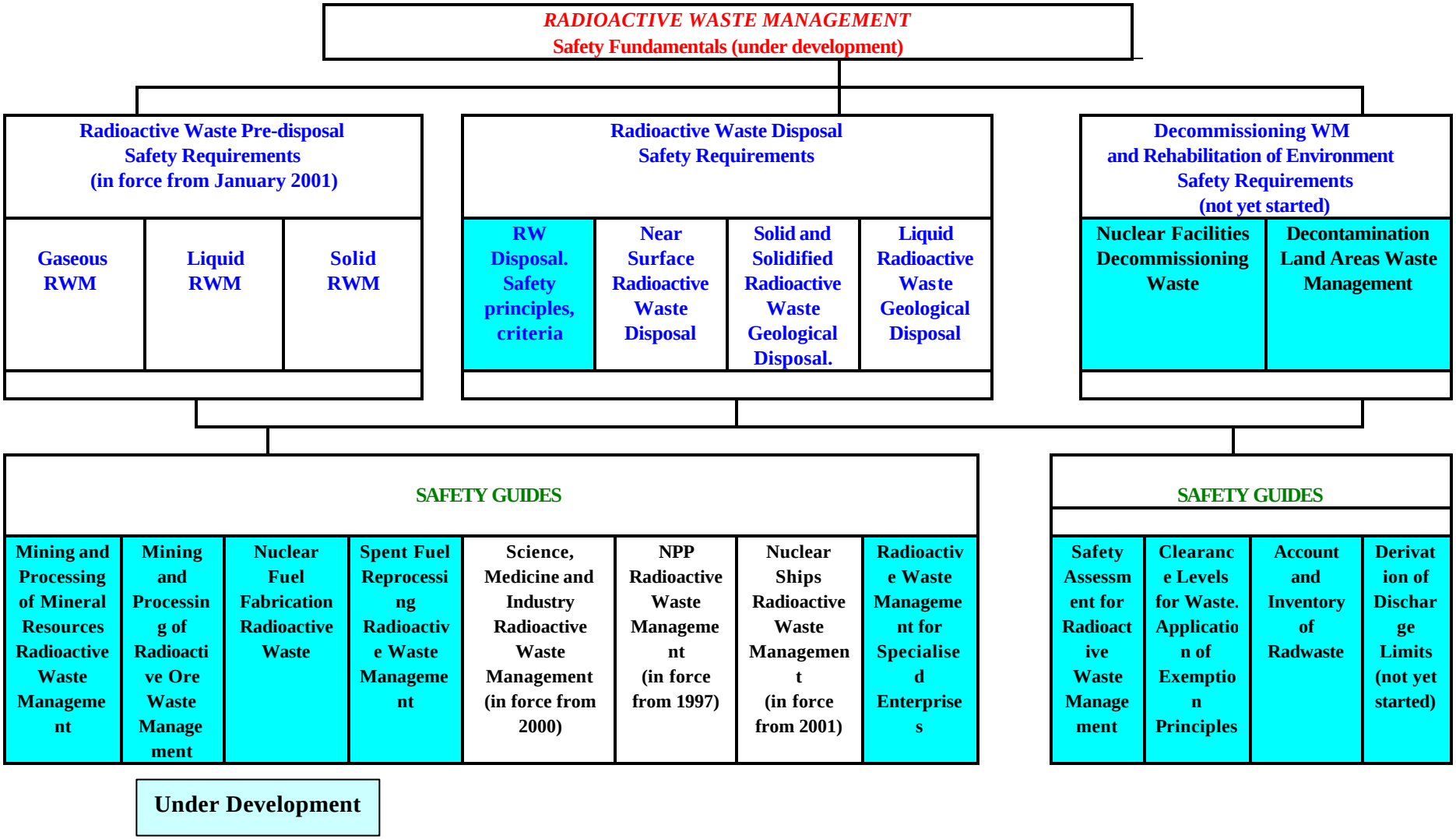

Fig. 2 - Structure of Safety Regulations System of RWM

Conclusions

It appears, in a general way, that licensing approaches and licensing procedures have been developed by GAN these last years.

There are however problems in this area of GAN activity due mainly to the fact that most of nuclear facilities were built in the former Soviet union, when neither licensing, nor any other equivalent procedures existed. Nuclear facilities have to be licensed now, but it is difficult for operators to prepare the documentation necessary for licensing, and for the GAN to review it, in a short time.

Another problem is that requirements on the type and the content of safety validation documentation that operators have to make available during licensing are of up-to-date level, whereas the design documents were developed much earlier, between 1960 and 1980. Moreover, during the operation on most of the facilities, modifications with regard to the original design have been implemented, modifying thus the safety-related features. There is consequently a problem of conformity of the safety documentation of the operators with the real state of the facility since these documents have not always been updated.

It is still to be noted that, amongst the existing problems, there is neither life cycle stage licensing procedure for RW near-surface disposal facilities nor acceptance criteria for packages to be disposed of on such centres. Clo sures activities for disposals are of course not described since they are the last chapter of such a procedure.

IMPROVEMENTS IN THE RUSSIAN LICENSING SYSTEM

In a general way, licensing approaches and licensing procedures have been developed by GAN these last years.

By considering the high status of development and experience in the Western TSO's countries on the safe management of RW (safety related documentation, safety assessment methods, QA, Qualification and Control programs, record keeping system, etc.), and also taking into consideration the urgent task in Russia to complete the development process of safety regulatory system, the Russian and Western Team identified, as main objective for the Project, the improvement of the regulatory technical basis, namely drafting relevant safety regulatory documents.

With the reference to these general objectives, SEC NRS drafted the following three safety documents:

1. Characteristics of solid RW packages for storage and/or disposal (waste acceptance criteria).
2. Requirements for preparation of a Safety Analysis Report for a Conditioning facility.
3. Requirements for preparation of a Safety Assessment of a near surface disposal facility.

In order to improve the common understanding of these documents, it was also suggested to strengthen the relationships between GAN and Operators during the development process of these safety-related guidelines.

On March 2000, the three draft guides were distributed among 10 different Organizations responsible for RWM (both of waste coming from the nuclear fuel cycle and of waste coming from industrial applications). All the contacted Organizations (GAN Department, different Institutes of Minatom, Radon and Rosenergoatom) sent their comments to the three draft, and the participation to the final meeting of some representatives of these Organizations, allowed the direct discussion of these comments.

Recommendations on Establishing Waste Acceptance Criteria for Storage and Disposal

The first draft Safety Guide on Waste Acceptance Criteria presents a set of qualitative waste acceptance criteria, and it is intended to give guidelines for establishing specific criteria for storage and disposal of RW.

Waste requirements or criteria are the most important of the technical requirements to be met in order to qualify them for transport, long term storage or disposal. The aim is to form a basis for specifying subsequent quantitative limits for the waste form and packages, which are intended to be stored or disposed. The RW requirements contained in the document are relevant to physic - chemical characteristics, mechanical properties as well as radiological contents.

Requirements for the Content of a Safety Analysis Report Related to RW Conditioning Facilities

The aim of this document is to provide some guidelines for the preparation of the Safety Analysis Report (SAR) of a waste conditioning facility that represents the reference basic document that an applicant has to submit for approval to the Regulatory Authority in the frame of a plant licensing process.

The SAR is a detailed report of all aspects of a plant related to safety. As the most complete compilation of plant specific information relevant to safety, SAR serve as the basis for assessments of the overall safety status of the plant, as well as for modifications and improvements of plant hardware, procedures and operation. It serves as a basis for the derivation of technical specifications limiting conditions for operation.

The SAR represents the principal technical communication between the applicant and the Regulatory Authority. Each applicant should provide in the SAR information needed to enable the RA to determine that, for the operations to be performed, the operating procedures, the plant and equipment, collectively provide reasonable assurance of protection of the health and safety of the operating personnel, public and environment. A thorough, independent review of the information contained in the SAR allows the Regulator to reach a judgement concerning the adequacy of plant safety independent from the designers, constructors and operators of the plant. For these reasons the completion of a SAR has been considered a main criterion for assessing the completeness, adequacy and maturity of the licensing system.

The guide provides detailed description of areas and content to be covered in the SAR.

Requirements to the Format and Content of a Safety Assessment Report for a Near Surface Radioactive Waste Disposal Facility

Near surface disposal is an option used in Russian Federation for disposing LLW. The objective of this guide is to provide recommendations on how to meet the requirements for assessing the safety of repositories.

The document presents a complete list of paragraph and subparagraph, with substantiation of the content. Before construction of any repository, the Operator performs a comprehensive and systematic assessment of the safety of the planned repository throughout its operating lifetime and the period following closure. The regulatory body shall review this Safety Assessment.

It is then considered of great importance to provide Operators of near surface disposal facilities with guidelines concerning all the aspects to take into consideration in carrying out performance assessment of disposal facilities.

During the discussions of this draft some problems were identified in connection with performing safety assessments as envisaged in the guide, for present facilities. Problems like: not exact knowledge of the source term (radiological content of conditioned waste, physic-chemical and mechanical characteristics of conditioned waste), lack of methodology of carrying out quantitative assessments, not sufficient site information, lack of relevant regulatory framework etc…

Western TSO's recognized the difficulties in particular with the implementation of such methodologies to existing facilities, and suggested the Russian TSO to follow more specific procedures between existing facilities and new one.

Particular interest has been shown from the Russian Operators on the establishment of such a guide, declaring that they are already working, also through international co-operation, to be prepared in performing safety assessment and environmental impact studies on their operating facilities. In this context they also consider of the primary importance the issue by Regulatory Authority of the relevant radiological limits and criteria.

Visits to Western TSOs Headquarters

To transfer the know-how of the EU Member States on licensing procedures for RWM, three different teams from SEC NRS spent few days respectively in CIEMAT (Spain), IPSN (France) and in ANPA (Italy) offices. The programs of the visits included presentations on national regulatory framework and activities with particular attention given to examine licensing aspects of existing RWM activities. Technical visits to RW operating facilities have been performed showing the application of the safety relevant aspects evaluated during the licensing process.

Information on licensing procedures and waste management was provided and direct contacts with nuclear operators have been arranged in order to give a direct access to the field experience.

IN SUMMARY

The co-operation established among all the participating organizations in this project allowed the achievement of all the general objectives defined for the project.

Even if the activities were carried out in a tight schedule, all of them were fulfilled in time and content, in a more and more co-operation spirit of all the participants.

During the activities of the Project it has been possible to readdress the original requirements, particularly by considering that during last years a big effort has been done in Russian Federation concerning nuclear safety regulation and licensing procedures.

The following key points were derived as a result of the project analyses:

1. A first important issue is the necessary completion by the GAN and SEC NRS of the waste inventory, including contaminated grounds, and better characterization of this waste in terms of radionuclides, activity, physic-chemistry characteristic, toxicity and volume. It should allow to define a global general strategy and an associated schedule for waste management and site remediation in Russia and a hierarchy in the different potential risks linked to this existing waste and to the existence of contaminated areas (past waste management activities).
2. There are a number of complicated and serious problems in Russia due to the RW that were accumulated in the previous period of the former USSR. These problems due to the 'historic' RW remain urgent and they should be solved in any case, not depending on further prospects of the nuclear power development in Russia.
3. The most important on going activity in the field of radiation safety at all stages of RWM in Russian Federation is today the creation of a modern legislative system for the safety regulation, which should meet the international standards.
4. It appeared, in a general way, that licensing approaches and licensing procedures have been developed by GAN these last years. However, some differences with the Western approach, particularly concerning the logical sequence of steps and timing, were recognized. The importance of a stepwise licensing procedure was stressed by Western TSO's also in order to facilitate a dialog between Regulatory Body and Applicant.
5. One existing problem is due to the fact that most of nuclear facilities were built in the former Soviet union, when neither licensing, nor any other equivalent procedures were existing. Nuclear facilities have to be licensed now, but it is difficult for operators to prepare the documentation necessary for licensing, and for the GAN to review it, in a short time. GAN has developed the requirements related to the type and content of the safety validation documentation which have to be provided by the operators in the frame of the licensing procedures but has not yet developed all the requirements for Safety Reports, in particular for radwaste treatment facilities.
6. Another problem is that requirements on the type and the content of safety documentation that operators have to make available during licensing are of up-to-date level, whereas the design documents were developed much earlier, between 1960 and 1980. Moreover, during the operation on most of the facilities, modifications with regard to the original design have been implemented, modifying thus the safety-related features. There is consequently a problem of conformity of the safety documentation of the operators with the real state of the facility since these documents have not always been updated.

7. The three priority areas identified for the preparation of the relevant Safety Guides are considered a critical step to achieve practical results towards the improvement of the licensing system for RWM in Russia.

   The three regulatory documents, drafted in the framework of this project, represent the basic guidelines documents for RWM:

   - waste acceptance criteria for storage and disposal;
   - SAR for waste conditioning facilities;
   - Safety Assessment for disposal facilities.

   They provide clear indication to the applicants on the safety objectives in RWM and on the way they have to build the corresponding safety reports.

8. The preparation level of the draft safety guides have been considered by all the participating organization, including the Beneficiary GAN, more than satisfactory and they represent a significant step forward the participation of Russia to international frameworks in RWM, as for instance the Joint Convention on the Safety of Spent Fuel management and on the Safety of Radioactive Waste Management.
9. A dialog from the regulator with the operators has been started showing very positive results, this has to continue in parallel with the procedural "iter" to formally issue the Safety Guides in order to have common and clear understandings of the safety requirements and their application. This approach has to be considered another important achievement of this project.
10. It was agreed that application of the requirements illustrated in the Safety Guides to existing radwaste facilities is very important also to get feedback from the experience gained during the application itself. By considering the actual situation on RWM in RF, there was unanimous agreement on the need to start this application as soon as possible.
11. Availability from Western consortium was manifested to continue to provide support in the following steps of the GAN-SEC NRS activity related to regulation and licensing of radwaste management. This in accordance with EU strategy and programs.