NATIONAL ATOMIC ENERGY AGENCY

NATIONAL REPORT OF POLAND ON COMPLIANCE WITH THE OBLIGATIONS OF THE JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT

Polish 2nd national report as referred to in Article 32 of the Joint Convention

October 2005

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SECTION A. INTRODUCTION

This Report has been prepared, according to the guidelines established by the Contracting Parties under Article 29.2(iii), to fulfil the obligations of the Article 32 of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, signed by Poland on 30 September 1997 in Vienna, and ratified by the President of the Republic of Poland on 9 March 2000. The corresponding instruments of ratification were deposited with the IAEA on 5 May 2000. The Convention entered into force on 18 June 2000. This Report is the second one, following the 1st national report, issued in May 2003 and presented during the First Review Meeting of the Contracting Parties of the Joint Convention held in Vienna in November 2003. The present report is stand-alone document and has been prepared with the aim to update and supplement the information contained in the previous report. It focuses on the changes related to the legislative framework and regulatory control infrastructure that have taken place since the last review meeting. It includes in particular the matters that were suggested during the first review meeting to be addressed in the Polish 2nd national report.
The Report has been prepared for review by the Contracting Parties the implementation by Poland its obligations under the Convention in connection to the Second Review Meeting to be held in Vienna in May 2006.

Facilities concerned

Poland never had neither any nuclear power reactor nor any nuclear fuel cycle facility, except uranium mine, in operation[1]. Mining of uranium ore ended in 1968, and processing was terminated in 1973, being not a source of any waste at present. There are no waste from power reactor operation or spent fuel reprocessing activities in Poland. The radioactive waste originates then from research reactors, scientific and educational institutions, industry and hospitals. This waste come from various applications of ionising radiation used in ca 2400 institutions. The most important of them in terms of generation and management of radwaste and spent fuel have been the facilities described in the **Annex 1**.

Radioactive waste of low and medium activity, produced in Poland, is collected, processed, solidified and prepared for disposal by the State-owned public utility "Radioactive Waste Management Plant" - RWMP founded under Ministry of Economy and acting from 1 January 2002 in Swierk site (30 km from Warsaw); subsequently the waste is disposed of in the National Radioactive Waste Repository (NRWR) in Różan site, operated also by the RWMP. The repository - which came into operation in 1961 - is a near surface type repository, located 90 km from Warsaw on the grounds of an ex-military fort built in 1905. According to present expectations this repository, which is the only one in Poland, may be completely filled by 2015 -2020. Also alpha radioactive waste is temporarily stored in Różan.

Spent fuel from research reactors is stored either at reactor – in case of MARIA RR which is operated by the Institute of Atomic Energy (IEA) in Swierk site, or away from reactor, in 2 separate wet storage facilities – in the case of EWA RR, in which decommissioning activities attained the end of their 2nd stage. Both of these 2 separate facilities, containing water ponds with spent fuel, as well as decommissioned EWA RR, are sited at nuclear research centre in Swierk and operated by the RWMP, where also waste treatment and storage facilities for ILW and LLW are located. High activity spent sealed sources are also temporarily stored in

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[1] The project of the first NPP, planned at Zarnowiec (two units of WWER-440/V213 – construction started in 1985) was abandoned in 1990. No other nuclear power projects have been commenced, however the nuclear option, based on **advanced** power plant technology (as stated in the relevant decision of Parliament), has been kept open since that time. According to recent national electricity supply development plans the first NPP is expected to be put in operation around the year 2020.

RWMP facilities in Swierk. The conditions at the storage facilities are monitored by the users (either by the IEA - in the case the MARIA reactor's spent fuel storage or by the RWMP- in the case of the decommissioned EWA reactor's spent fuel storage), and is under regulatory control of the National Atomic Energy Agency (NAEA), which is the national nuclear regulatory authority (NRA) in Poland .

Main aspects overview

According to the plans which have been valid up to 1991, spent nuclear fuel from research reactors was to be returned to the manufacturer, in that case - the former Soviet Union. However, no formal arrangements for this return has been ever entered into, and as result, no fuel ever left the Swierk site. In spite of some international initiatives recently undertaken in this area, up to now no real programme has yet been developed to solve the problem this way. Instead, in nineties, initiatives have been undertaken in direction to assure a safe intermediate storage of spent fuel for longer time within the country. Investigations and measurements of spent fuel performed in the storage facilities in 1999 and 2000 led to the estimation of the time limit for a safe storage of this fuel in wet condition and to the conclusion that, for some of the longest time stored fuel elements, this limit was close to be exceeded and that immediate commencement of preparation for dry interim storage of these elements was necessary. Based on this assessment and further studies the decision has been taken to use the former reactor shaft in EWA RR building to locate the dry storage facility. First step in this direction was to develop the technology and to start encapsulation of the spent fuel elements into the leak-tight metal cans filled with inert gas. This process was commenced in the beginning of the year 2003 by the MARIA reactor operator (IEA) with fuel from that reactor. In the year 2004 the project was launched to develop technology and to construct a facility in EWA reactor building to start encapsulation of spent fuel from this reactor. This project, co-financed by European Commission, continued through the year 2005, has been one of the activities to improve safety, recommended to Poland at the First Review Meeting for reporting during the next RM. Another one was the improvement of storage conditions and closure of the National Radioactive Waste Repository at Różan. The latter was completed in the year 2004 by the British consortium NNC/Enviros in cooperation with Polish Geological Institute within the project founded by European Commission. More information on these projects are contained in **Annexes 2 and 3** respectively.

In situation when, in spite of suspending of the first NPP construction project, the nuclear option have been kept open, the development of the programme for management of spent nuclear reactor fuel, including final radwaste disposal within Polish territory was considered as preliminary condition for the possible future revival of the nuclear power industry in Poland. The radioactive waste management, because of the importance of the problem as well as the high costs of appropriate investments, required that a special programme in the form of Strategic Governmental Programme (SGP) was established by the Council of Ministers and successfully performed in the years 1997 - 1999. The Programme, co-ordinated by the National Atomic Energy Agency, concerned both current and future problems of management of radioactive waste and spent fuel, already existing and resulting from the future atomic energy developments in Poland, including possible future nuclear power stations. The Programme comprised the following topics:

- legislation (the modernisation and actualisation of regulations)
- techniques and technology (the conception of closing down Różan repository, safe storage of spent fuel from research reactors, elaboration of new technologies for radioactive waste processing and management),
- siting (search for the sites for new repositories of radioactive waste – both near-surface and geological ones)
- prognosis (the analysis of radioactive waste and spent fuel management, assuming the option of nuclear power in Poland),
- public information (the information for the society about radioactive waste management),

The SGP outcomes, that were described in the 1st national report, are included in **Annex 4.** Governmental Strategic Programme: "Radioactive waste and spent fuel management in Poland" provided, apart from the solving of several current problems of securing the continuity of safe and effective radioactive waste management, the basis for further decisions concerning the nuclear power programme. The fundamental question whether is it possible, in Polish conditions, to solve the problem of highly radioactive waste disposal was answered affirmatively. The Programme gave the basis to formulate the general policy for radioactive waste and spent fuel management, provided for legislative framework and relevant organisation in this area, as well as resulted in guidelines on possible technical solutions of some of particular issues.

Outcomes from the first review process

Poland received 118 written questions from 11 countries and approximately 15 verbal questions on its report and presentation during the First Review Meeting of the Joint Convention. The following key observations, made on Poland's report, responds and presentation, were noticed as a good practice:

- Stage 1st and stage 2nd decommissioning of the EWA research reactor has been successfully completed (for details see **Annex 5**)[2],
- A comprehensive register of sealed sources has been established; users must notify the Regulatory Authority each time there is a change in inventory; centralized register of spent sealed sources is maintained
- All border crossings are equipped with frame detectors and portable equipment for monitoring the presence of radioactivity.

I was stated that Poland belongs to countries generally meeting the objectives of the Convention to maintain a high level of safety in the management of spent fuel and radioactive waste. However in all countries short-comings in arrangements for management of spent fuel and waste were recognized and plans were in place to secure improvements. For Poland these were plans for:

- remediation of interim storage radwaste facilities at Różan and development of safety case for closure of this repository,
- development of facility for interim storage of encapsulated spent fuel on the site of the decommissioned EWA research reactor.

Another still remaining areas for improvements, identified for a number of countries, were: remediation of historic waste sites, centralised interim storage of spent sealed radioactive sources, siting of facilities for interim storage of spent fuel and siting of new radwaste repositories, further development of regulatory guidance on management of SF and RAW.

Contributors to the Poland's National Report

The National Atomic Energy Agency prepared this report with and incorporating contributions from:

- Radioactive Waste Management Plant
- Institute of Atomic Energy

[2] The spent fuel unloading, decontamination and the majority of dismantling works of EWA reactor were performed in the years 1996-1999.

SECTION B. POLICIES AND PRACTICES

This section covers the obligations under Article 32 (Reporting), paragraph 1.

Text of Article 32:

In accordance with the provisions of Article 30, each Contracting Party shall submit a national report to each review meeting of Contracting Parties. This report shall address the measures taken to implement each of the obligations of the Convention. For each Contracting Party the report shall also address its:

i. ***spent fuel management policy;***
ii. ***spent fuel management practices;***
iii. ***radioactive waste management policy;***
iv. ***radioactive waste management practices;***
v. ***criteria used to define and categorize radioactive waste.***

Spent fuel management policy

The management of spent nuclear reactor fuel, that means all practices involving reprocessing, handling, storage or disposal of spent nuclear fuel, including facility decommissioning, is permitted after undertaking the measures defined in appropriate regulations, aimed at ensuring the safety and protection of human life and health, as well as protection of property and the environment. This rule applies in particular also to the longer-term management and ultimate disposal of the spent fuel that have already been accumulated from the operation of research reactors and may arise from the future nuclear programmes in Poland.

The safe, secure, stable and protected storage of spent nuclear fuel, after its unloading from the nuclear reactor or from the fuel pool at the reactor and before its handing over for reprocessing or for disposal as radioactive waste, is the responsibility of the Government, acting by means of dedicated governmental bodies. The development of technologies and capacities for longer-term management, including final radwaste disposal within Polish territory, is also the responsibility of the Government and constitutes a primary goal of spent fuel management strategy. Moreover, it is being considered as the preliminary condition for the possible future revival of the nuclear power industry in Poland. First step towards this goal was the launching of the Strategic Governmental Programme, performed in the years 1997-1999. The results of the Programme, endorsed by the Government, led to the following conclusions and formulation of the policy goals:

- there are potential sites within the Polish territory for a future deep geological repository, which is prerequisite for final disposal of spent nuclear fuel as high level radioactive waste,
- the accumulated spent fuel from research reactors' operation , that have been kept until now in the wet-storage, soon have to be placed in the dry-storage, the first step of which, until the dry storage facility will be available, is encapsulation of fuel assemblies/rods into the leak-tight metal cans filled with inert gas,
- the design and engineering works should be continued with aim to accommodate former EWA reactor building structure for the purpose of dry-storage of spent fuel from research reactors,
- the research works on the deposit of homogenous clay rocks and 3 salt dams, which fulfil siting criteria for deep repository and were chosen for further examination, should be continued,
- developments in the potential regional disposal issue or in the return of spent RR fuel to the manufacturer should be monitored; however they cannot be considered as the real basis for a policy option until relevant formal international contracts are concluded.

To achieve the goals related to interim dry storage of accumulated spent fuel, EU PHARE Project entitled „Development of the technology and procurement of equipment for encapsulation of spent nuclear fuel from Polish research reactors" has been established. The project aims at assessing the possibility and implementing a new storage route for SNF. This route consists of placing each of SNF elements into dry conditions inside a capsule cartridge (so called encapsulation process), itself to be stored in dedicated container installed inside the shaft of decommissioned EWA reactor, which provides shielding. Main efforts focused on developing the dry store concept, encapsulation technology, procurement of relevant materials, equipment and instrumentation as well as testing of encapsulation technology.
The project is supported by investment (design and construction of the hot cell as well as adaptation of former EWA reactor building for SNF encapsulation and dry storage) financed from the state budget. It is expected that the project and accompanying investment will be finished by the end of June,2006.

Spent fuel management practices

In Poland, spent nuclear fuel (SNF) has been generated from the operation of two research reactors (RR) named EWA and MARIA. The EWA RR had been operated for 37 years. The reactor was shut down in 1995 and decommissioned. Various types of fuel were used during operation of both RR:

- Ek-10 fuel type in 1958 – 1967 (EWA RR)
- WWR-SM fuel type 1967 – 1995 (EWA RR)
- WWR-M2 fuel type 1990 – 1995 (EWA RR)
- MR-6 fuel type 1974 onwards (MARIA RR)

The WWR-SM and WWR-M2 fuel were constructed in the form of single or triple fuel assemblies (SFA).
From 1974 to 1998, MARIA RR was fuelled with uranium containing 80% U-235. Later, from April 1999 up to June 2002, there was transition period to fuel with lower U-235 enrichment (36%) which is now the only used.
All the nuclear fuel, used in Polish RRs, has been manufactured in the Russian Federation. The return of spent fuel to this country has been not arranged, so far. Therefore storage of spent fuel assemblies or rods in Poland constitutes the only practicable management route at least for the short- and medium- term.
SFA and rods are stored in two water ponds located in Świerk (facilities no 19 and 19A) and in the MARIA RR pool. In the beginning of 2003 the encapsulation process of MR-6 MARIA RR spent fuel was commenced by its operator - the Institute of Atomic Energy in Swierk. The encapsulated SNF (in amount of ca.130 SFA in the years 2003-2005) have been temporally placed back in the MARIA RR pool, waiting to be handed-over to the Radioactive Waste Management Plant (RWMP) – the State owned organization established 1 January 2002 by the provisions of Atomic Law under the Ministry of Economy. The RWMP operates the SNF storage facilities no 19 and 19A as well as the decommissioned former EWA reactor facility, planned to serve for dry storage of all SNF from Polish RR.

Radioactive waste management policy

The management of radioactive waste, that means all practices involving processing, handling, storage and disposal of radioactive waste, including facility decommissioning, is permitted after undertaking the measures defined in appropriate regulations, aimed at ensuring the safety and protection of human life and health, as well as protection of property and the environment. The collecting the radioactive waste after its handing-over by users, and safe, secure, stable and protected interim storage, treatment and conditioning for disposal as well as final disposal of radioactive waste is the responsibility of the Government, acting by means of dedicated governmental bodies. The results of the Strategic Governmental Programme, performed in the years 1997-1999, endorsed by the Government, led to the following conclusions and formulation of the policy goals:

- the operation of the present national radioactive waste repository in Różan should be continued as long as possible, provided that all safety conditions are fulfilled,
- the conception for the closure of the current disposal facility in Różan has been prepared, however the decision to close the repository depends on technical possibilities of site operation and on the further acceptance by local community, as well as on the availability of another disposal site that could serve as the new national repository,
- the selection of the most promising regions was performed with a prospect of a new near surface repository siting. As a result of the analysis of these areas, 19 sites situated in 12 communes were chosen for geological research *in situ*. Efforts should be continued to obtain acceptance from the public and local authorities for the siting of the repository, that was not gained within the time frame of the Programme,
- constant effort should be maintained to upgrade waste management technologies which are presently in use; as regards a future solution of long-lived radioactive waste problem, the transmutation method seems to be the most promising far-sighted option.

To achieve the goals related to Rózan repository, EU Phare Project entitled "Improvement of storage conditions and closure of the National Radioactive Waste Repository-Różan" has been established and implemented.
General objective of the project was to increase the safety of the Różan repository and its further operation until 2020. Main efforts focused on the preparation an up-dated safety report for renewal of the licence for the operating phase and the safety report for closure and post-closure phase of the repository. All reports have addressed the issue of the contamination of the groundwater by tritium and maybe, in the longer term, by other radionuclides. Brief description of the results of the Project is given in **Annex 3.**

Radioactive waste management practices

The responsibility for all radioactive waste management is delegated to the Radioactive Waste Management Plant. The diagram of the radioactive waste management system is shown in **Fig. 1**. RWMP performs the collection, segregation, treatment, conditioning and interim storage/final disposal of all radioactive waste arising in the country.

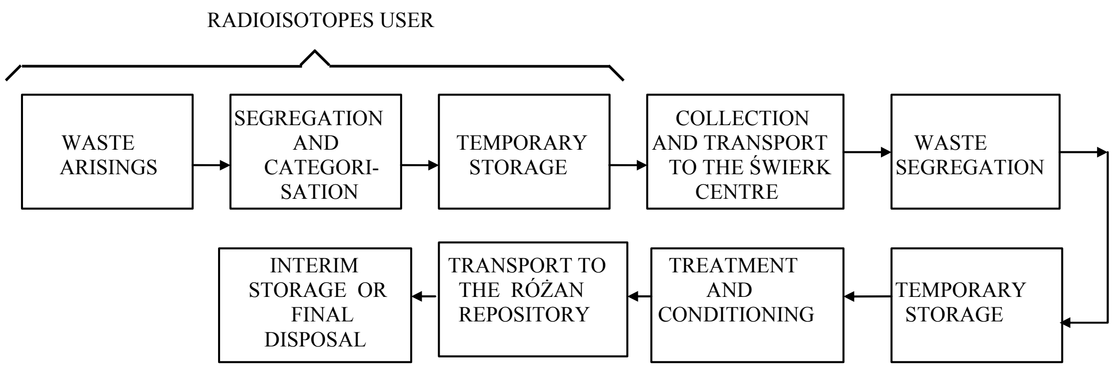

Fig. 1. The diagram of the radioactive waste management system in Poland

It is also in charge of the transport of conditioned waste to the National Radioactive Waste Repository in Różan (NRWR) and the operation of this repository. The users are responsible for their proper segregation and categorization before they are collected by RWMP
R&D in radioactive waste management area are performed by various research groups from the Institute of Atomic Energy (IEA) and from other scientific institutes.

Waste arisings

Radioactive waste comes from research reactors, scientific and educational institutions, industrial organizations and hospitals. At present, there is one 30 MW_t reactor working in the Świerk Centre - MARIA operated by the Institute of Atomic Energy. First Polish reactor – EWA was decommissioned to the 2-nd stage according to IAEA classification. More then two thousand radiation sources users are scattered over the country. Only low- and intermediate level waste is produced. Most of spent high activity gamma sources are transported back to the supplier abroad, but number of them, mainly of Soviet origin, still remain at the user's premises.

Waste treatment and conditioning

The low-level liquid wastes were treated with use of mixed synthetic inorganic sorbent composed of barium carbonate and copper ferrocyanide. Decontamination factor achieved was 30. Precipitate obtained was further subjected to the cementation. Intermediate level waste, as well as waste arising from decontamination are evaporated and evaporator bottom is solidified with cement. The solid waste is sorted. About 60% of total volume of the waste was subjected to the bailing technics with use of hydraulic press. Volume reduction factors obtained were ranging from 3 to 5 depending on the type of waste. Ion-exchange resins were conditioned by dewatering and mixing with polyester resin. The solid and conditioned wastes were packed into the standard metal drums, zinc - plated or varnished on both sides.
Radium sources are immobilized with glass and placed into brass containers. Subsequently, the brass containers are located in the storage containers and transported to the repository. A storage container for spent radium sources is shown in **Fig.2**.

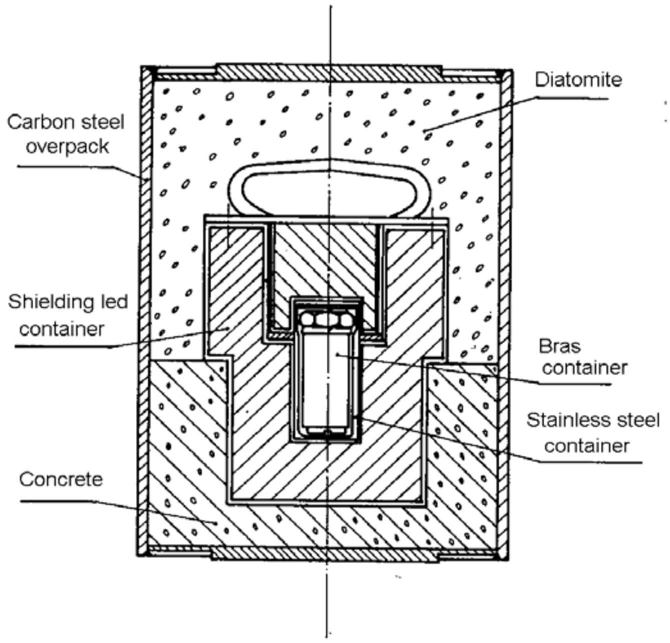

Fig. 2. Storage container for spent radium sources

Smoke detectors containing plutonium sources are dismantled and plutonium sources separately immobilized in 1 dm^3 metal box with use of polyester resin. Metal boxes are subsequently placed in 50 dm^3 zinc-plated metal drum and grouted. Other parts of the smoke detectors in which plutonium contamination did not exeed the clearence level, are released from the radioactive material restrictions.
A new facility for purification and concentration of radioactive effluents has been commissioned. This 3-stage reverse osmosis unit – JP3RO consists of two different types of membrane modules: SU-720R and SU-810 (TORAY). JP3RO unit can be used separately

for purification of low salt content effluents mainly water from primary reactor circuit or combined with evaporator.

Waste storage and disposal

The National Radioactive Waste Repository (NRWR) in Różan is a superficial type repository operated since 1961. It is considered as a disposal site for low- and medium level waste containing short-lived beta and gamma isotopes and as a temporary storage for long-lived waste.
According to acceptance criteria only solid or conditioned waste can be disposed off at the Różan repository.
In the first decade of NRWP operation, the concrete facility no 2, 3 and partially no 1 (see **Fig.3**) were filled with the waste. This waste was not segregated, only partially conditioned and packed in different packages (metal drums, wood cases, glass). No backfill material was used.
Since 1968 short lived low- and medium level waste containing beta and gamma isotopes are disposed in the part of moat adopted for that purpose (see **Fig. 4**). The floor and slopes of the moat were covered with 20 cm thick concrete layer. Waste is placed layer by layer and free space between packages are filled with concrete. Long-lived waste is placed in facility no 1 with the intention of retrieval.

Criteria used to define and categorize radioactive waste.

Radioactive waste is classified into **three categories** according to its activity level or surface dose rate: low-, medium- and high level radioactive waste. These categories are further sub-divided into **sub-categories** according to the half-live of radioactive isotopes contained in the waste, or according to its thermal power.
Disused (spent) sealed radioactive sources form an **additional category** of radioactive waste. Those sources are classified into the following sub-categories of spent sealed radioactive sources according, to the level of their activity: low-, medium- and high-level, which are further subdivided according to the half-life of contained radionuclides into short-lived and long-lived sub-categories.
For **low-level** waste max. $AC<10^4$ x value from third column in **Annex 6** for particular isotopes.
For **intermediate-level** 10^4 x value $<AC<10^7$ x value.
For **high-level** – $AC>10^7$ x value.
The <u>low, intermediate and high level waste</u> is subsequently classified into sub-categories:

- **Transition waste** which will decay within the period of three years below the value given in third column of **Annex 6** ,
- **Short-lived waste** – waste containing radionuclides of half-life < 30 years with the restricted long-lived radionuclides concentration to 4000 kBq/kg in individual waste packages and to an overall average of 400 kBq/kg in the total waste volume,
- **Long-lived waste**: waste whose long lived radionuclides activity exceeds 400 kBq/kg.

The <u>spent sealed sources</u> are grouped into three subcategories:

- **Low level** - if the activity of the source exceed the value given in **Annex 6** – second column, but is below 10^8 Bq,
- **Intermediate level**: if the activity is in the range $10^8<A<10^{12}$ Bq,
- **High level**: if the activity of the source $A>10^{12}$ Bq.

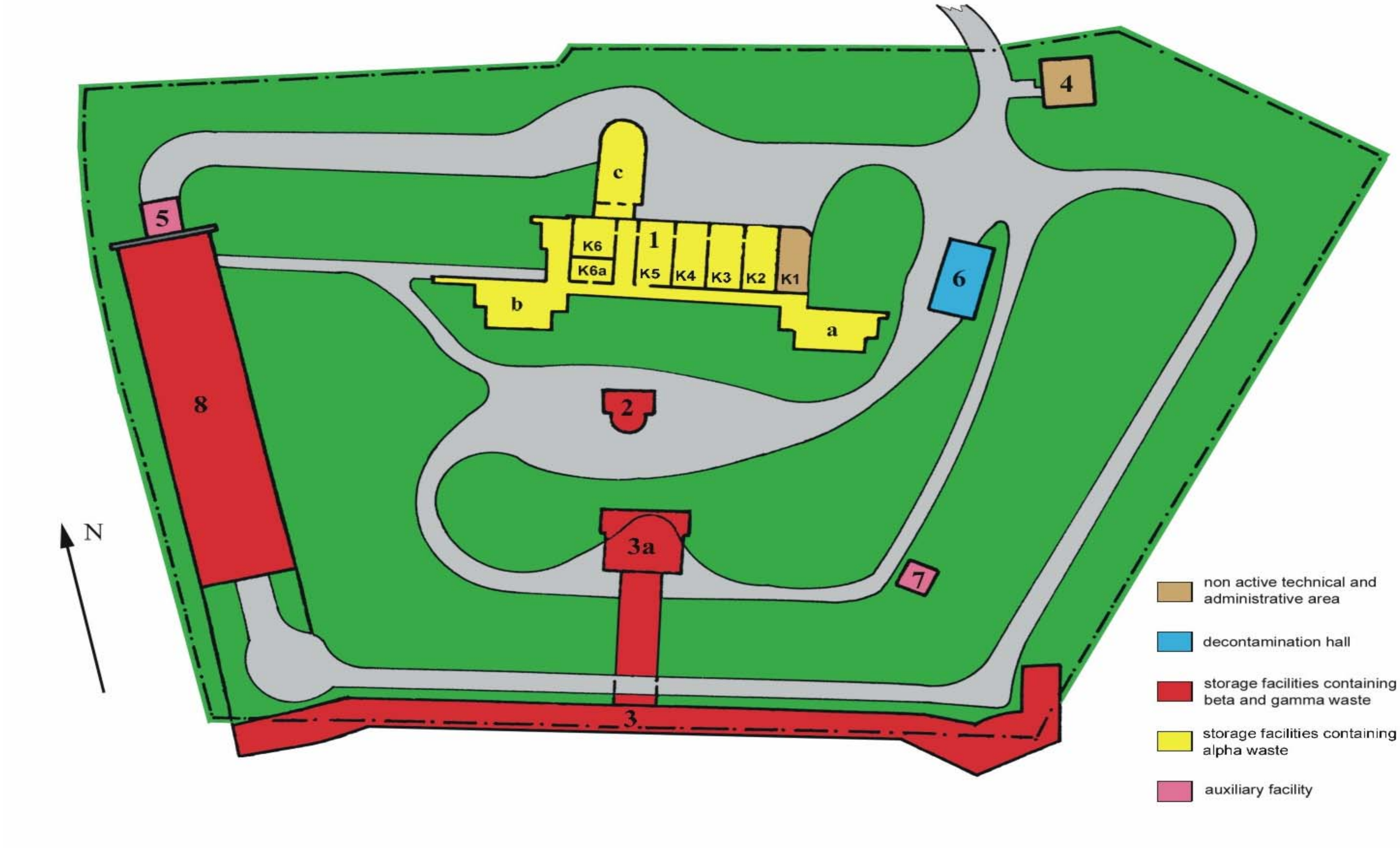

Fig.3. The Radioactive Waste Repository – Różan

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Fig.4. NRWR – Różan, Facility no 8 (moat)

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SECTION C. SCOPE OF APPLICATION

This section covers the obligations under Article 3

Text of Article 3:

1. ***This Convention shall apply to the safety of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors. Spent fuel held at reprocessing facilities as part of a reprocessing activity is not covered in the scope of this Convention unless the Contracting Party declares reprocessing to be part of spent fuel management.***
2. ***This Convention shall also apply to the safety of radioactive waste management when the radioactive waste results from civilian applications. However, this Convention shall not apply to waste that contains only naturally occurring radioactive materials and that does not originate from the nuclear fuel cycle, unless it constitutes a disused sealed source or it is declared as radioactive waste for the purposes of this Convention by the Contracting Party.***
3. ***This Convention shall not apply to the safety of management of spent fuel or radioactive waste within military or defence programmes, unless declared as spent fuel or radioactive waste for the purposes of this Convention by the Contracting Party. However, this Convention shall apply to the safety of management of spent fuel and radioactive waste from military or defence programmes if and when such materials are transferred permanently to and managed within exclusively civilian programmes.***
4. ***This Convention shall also apply to discharges as provided for in Articles 4, 7, 11, 14, 24 and 26.***

Poland has not declared reprocessing to be a part of spent fuel management, pursuant to Article 3(1);

No waste that contains only naturally occurring radioactive material and does not originate from the nuclear fuel cycle has been declared by Poland as radioactive waste for the purposes of the Convention, pursuant to Article 3(2).

Neither spent fuel nor radioactive waste within military or defence programmes has been declared in Poland as spent fuel or radioactive waste for the purposes of the Convention, pursuant to Article 3(3).

SECTION D. INVENTORIES AND LISTS

Text of Article 32, paragraph 2:

" This report shall also include:

- ***i.*** ***a list of the spent fuel management facilities subject to this Convention, their location, main purpose and essential features;***
- ***ii.*** ***an inventory of spent fuel that is subject to this Convention and that is being held in storage and of that which has been disposed of. This inventory shall contain a description of the material and, if available, give information on its mass and its total activity;***
- ***iii.*** ***a list of the radioactive waste management facilities subject to this Convention, their location, main purpose and essential features;***
- ***iv.*** ***an inventory of radioactive waste that is subject to this Convention that:***
    1. ***is being held in storage at radioactive waste management and nuclear fuel cycle facilities;***
    2. ***has been disposed of; or***
    3. ***has resulted from past practices.***

    This inventory shall contain a description of the material and other appropriate information available, such as volume or mass, activity and specific radionuclides;
- ***v.*** ***a list of nuclear facilities in the process of being decommissioned and the status of decommissioning activities at those facilities.***

List of spent fuel facilities

- spent fuel storage facility no 19 (water ponds)
- spent fuel storage facility no 19A (water ponds)
- nuclear research reactor MARIA

Above listed facilities are located at Świerk Centre. Spent fuel storage facilities are operated by the Radioactive Waste Management Plant (RWMP). Nuclear research reactor MARIA is also located at Świerk Centre and is operated by the Institute of Atomic Energy (IEA).

The spent fuel storage facility No 19 consist of 4 cylindrical ponds placed in an underground concrete structure. Two of them are used for storing highly radioactive waste items and one is used for EK-10 spent fuel rods. The facility has been operated since 1958.

The spent fuel storage facility No 19A consist of a half-underground concrete structure with two rectangular ponds. Each pond is lined with 6 mm stainless steel sheet mounted in 1999-2000. The facility is equipped with 10 tons crane and device for handling of spent fuel. One pond is used for spent fuel assemblies (SFA) storage while the second may be used in case of emergency.The capacity of those facilities is sufficient for storage of all spent fuel rods and assemblies from the operation of two Polish research reactors MARIA (RR) and EWA (RR)

Spent fuel inventory

The spent nuclear fuel elements are currently being wet stored in pools as follows:

- EK-10 fuel type, 2595 rods in the storage facility no 19
- WWR_SM and WWR-M2 fuel type, 2095 SFA WWR-SM and 445 SFA WWR-M2 in the facility no 19A
- MR-6 and MR5 fuel type 332 SFA in MARIA RR

Characteristics of the spent fuel currently stored under in ponds at Świerk is given below.

Spent fuel from Polish research reactors

Parameter	EWA Reactor			MARIA Reactor	
Fuel Type	Ek-10	WWR-SM	WWR-M2	MR-5,MR-6	MR-6
Fuel Operation	1958-67	1968-95	1988-95	1974-2002	2002-2005
Number of fuel assemblies	2595	2095	445	288	44
Dimensions Length, Diameter	595 mm 10 mm	865 mm 32 mm	865 mm 32 mm	1377 mm 70 mm	1377 mm 70 mm
Fuel composition	UO_2 in Mg	UAl_x in Al	UO_2 in Al	UAl_x in Al	UO_2 in Al
Cladding Material Thickness	Al 1.0 mm	Al 0.9 mm	Al 0.76 mm	 0.8 mm	 0.6-0.66 mm
Initial % U-235	10%	up to 36%	up to 36%	up to 80%	up to 36%
Average burn-up	15%	~45%	40%	35%	40% max.
Cooling time (years)	38-46	10-36	10-16	3-30	0-3
Mass in single SF element (g) U Mg Total mass of assembly	 80.2 13.0 171.0	 88.1 910	 108 910	 ~324 6500	 ~450/~350 7135
Total activity of spent fuel (TBq)	340	4700	1100	8070	

Kr-85	3,5E+12	1,5E+14	3,6E+13	3,7E+14
Sr-90	1,0E+14	2,1E+15	4,9E+14	3,5E+15
Cs-134		7,1E+12	1,7E+12	4,5E+14
Cs-137	1,3E+14	2,3E+15	5,3E+14	3,6E+15
Eu-154		4,6E+13	1,1E+13	
Pu-238	5,2E+9	3,1E+13	7,6E+12	
Pu-239	1,1E+9	1,8E+12	4,5E+11	
Pu-240	1,1E+14	1,5E+12	3,6E+11	
Pu-241	5,2E+11	9,0E+13	2,2E+13	1,5E+14
Am-241	9,1E+10	4,8E+12	1,2E+12	4,8E+11
Total	**344E+12**	**4732E+12**	**1100E+12**	**8070,5E+12**

List of radioactive waste management facilities

Radioactive liquid waste storage farm (Building No 35 A and B - Swierk site):

- 1 tank – 300 m^3 for low-level waste,
- 6 tanks – 50 m^3 for intermediate level waste,
- 2 tanks – 4 m^3 for liquid waste from decontamination,
- 3 tanks – 1,6 m^3 for liquid iodine waste.

Radioactive Waste Treatment Station (Building No 35- Swierk site)

- evaporator: 300 dm^3/h evaporated water, natural circulation, steam healing,
- chemical treatment station: 1200 m^3/y,
- reverse osmosis: 1 m^3/h,
- bailing equipment (hydraulic press) – 12 T, volume reduction factor 3-5, 10 drums of 200 dm^3 each per shift,
- cementation plant – 8 drums of 200 dm^3 per shift.

Temporary waste storage facility (Building No 93- Swierk site) *used for :*

- storage conditioned waste before shipment to the National Radioactive Waste Repository,
- smoke defectors,
- storage of waste for decay,
- spent sealed sources in shielding containers,

Total surface: 400 m^2

Decontamination building (No 26- Swierk site)

- decontamination hall (small size equipment),
- smoke detectors dismantling area,
- laundry.

National Radioactive Waste Repository – Różan (NRWR)

Różan site is near-surface type repository covering (3.045 ha) operated since 1961 and is the only repository in Poland. This repository is sited on the area of former military fort constructed in 1905-1908.
There are further concrete structures as well as a part of the dry moat surrounded the repository used as a-storage or disposal facilities .

NRWR is considered as a storage facility for long lived waste and as a disposal site for low- and intermediate level, short-lived waste. Capacity of the Różan repository is sufficient for the waste arising in Poland up to 2015-2020.

Radioactive waste inventory

Waste being held in storage at radioactive waste management and nuclear fuel cycle facilities

Activity of nuclear materials stored at the National Radioactive Waste Repository – Różan (1.01.1961 – 30.09.2005)

Isotope	Initial activity (MBq)	Activity on 30.09.2005 (MBq)	Volume (m^3)
Pu-238	975 633	935 652	60,940
Pu-239	3 879 019	3 877 659	302,380
Th-230	13 627	13 622	45,600
Th-232	28 665	28 665	69,511
U-235	3 250	3 250	4,797
U-236	153 479	153 479	0,780
U238	1 259 765	1 259 765	183,687
Total	6 313 438	6 272 092	667,695

Category of waste: long-live, low-level waste.
Type of waste:

- smoke detectors
- spent sealed sources
- solid waste
- chemical compounds

Waste disposed or stored at the National Radioactive Waste Repository – Różan (1.01.1961 – 30.09.2005)

Waste	Initial activity (GBq)	Activity on 30.09.2005 (GBq)	Volume (m^3)	Mass (t)
Waste disposed (short-lived)	192 023,639	20 111,794	2 918,77	2 793,78
Waste stored (Facility no 1, long-lived)	42 698,145	14 024,180	830,69	833,63
All facilites total)	234 721,784	34 135,974	3 749,46	3 627,41

Waste category: low and intermediate level short- and long-lived waste.

For the activity of particular isotopes present in the waste stored / disposed at the National Radioactive Repository – Różan in the period of time 1.01.1961 – 30.09.2005 – see **Annex 7**

Waste stored in interim storage facility of Radioactive Waste Management Plant at Świerk

Izotope	Initial activity (MBq)	Activity on 30.09.2005 (MBq)
Ce-144	1 316 230	291 530
Ce-141	319 012	443
Cs-137	313 210	300 597
Nb-95	289 542	13 128
Zr-95	146 458	11 213
H-3	100 000	85 399
Ru-106	65 192	36 737
Cs-134	52 235	31 417
Cr-51	24 700	23 019
Ru-103	17 980	2 124
Sb-125	9 226	7 979
Zn-65	8 782	1 118
Sb-124	7 100	2 543
Co-60	5 175	3 862
Sb-122	1 586	0
Mn-54	1 315	136
Eu-154	260	250
Eu-152	160	138
Mo-99	144	0
Sr-90	30	28
Total	**2 678 337**	**811 659**

Category of waste: low- and intermediate level, short-lived waste.
Type of waste: spent ion-exchange resin
Mass: 3000 kg

Disused SRS stored in interim storage facility of Radioactive Waste Management Plant at Świerk

Source	Initial activity (GBq)	Activity o 30.09.2005 (GBq)
Cs-137	312 790	308 354
Co-60	198 900	174 339
Co-60	177 600	156 175
Co-60	169 000	149 148
Co-60	92 500	63 720
Co-60	68 000	46 023
Co-60	66 970	5 957
Co-60	1 360	1 163
Co-60	1 170	961
Total:	**1 088 290**	**905 840**

Category of waste: high level, short-lived disused SRS

Nuclear materials stored in interim storage facility of Radioactive Waste Management Plant at Świerk

Nuclear materials	Mass
Sources Pu-Be	192,29 g
Depleted U	416,50 kg
Th (chemical compounds)	1,03 kg
U nat (chemical compounds)	3,00 kg

Category of waste: long lived, low-level waste.

SECTION E. LEGISLATIVE AND REGULATORY SYSTEM

This section covers the obligations under the articles 18, 19 and 20 and summarizes the legislative and regulatory system existing in Poland, including national safety requirements, the licensing system, the inspection, assessment and enforcement process and the allocation of responsibilities for the safety of spent fuel management and radioactive waste management. Also the considerations in deciding whether to regulate radioactive materials as radioactive waste has been addressed.

ARTICLE 18 – IMPLEMENTING MEASURES.

Text of Article 18:

"Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory and administrative measures and other steps necessary for implementing its obligations under this Convention"

Poland, being a Member State of the IAEA since the ratification of its Statute in 1957, has become the Party of several international conventions and agreements important for safe use of atomic energy and safeguards of nuclear material. Once they had been signed and ratified, they became a crucial segment of legal framework for nuclear activities in Poland, including management of spent nuclear fuel and radioactive waste resulting from such activities. These international requirements have been incorporated into national legislation and appropriate administrative measures and procedures have been established to implement them. The updated list of the international nuclear safety arrangements (treaties, conventions and agreements) both bilateral and multilateral, to which Poland is a Party, has been annexed (see **Annex 8**).

The national legislative and statutory framework that regulates the safety of facilities and activities has been established in Poland; it is described under article 19. Also the National Atomic Energy Agency, maintained under the Ministry of Environment as Regulatory Body for nuclear facilities and activities, are effectively and organizationally independent from bodies charged with the promotion of the nuclear technologies or responsible for facilities or activities in the spent fuel and waste management area (those bodies are maintained under the Ministry of Economy and Labour)

Article 19. LEGISLATIVE AND REGULATORY FRAMEWORK

Text of Article 19:

" 1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management.

2 . This legislative and regulatory framework shall provide for:

(i) the establishment of applicable <u>national safety requirements</u> and <u>regulations for radiation safety</u>

(ii) a system of <u>licensing</u> of spent fuel and radioactive waste management activities

(iii) a system of <u>prohibition of the operation</u> of a spent fuel or radioactive waste management facility <u>without a licence</u>;

(iv) a system of appropriate <u>institutional control</u>, <u>regulatory inspection</u> and <u>documentation and reporting</u>;

(v) the <u>enforcement</u> of applicable regulations and of the terms of the licences;

(vi) a clear <u>allocation of responsibilities</u> of the bodies involved in the different steps of spent fuel and of radioactive waste management.

3. When considering whether to regulate radioactive materials as radioactive waste, Contracting Parties shall take due account of the objectives of this Convention."

Basic law related to nuclear safety and radiation protection was established in 1986 as an Act of Parliament on peaceful use of atomic energy (Act of Atomic Law). On the basis of this Act, several governmental decrees and regulations have been issued by the Council of Ministers as well as by the President of the National Atomic Energy Agency (NAEA President, Agency's President). The Act and the regulations created an adequate legal framework at that time and provided for establishing a regulatory infrastructure, oriented to solve the nuclear and radiation safety problems, related in particular to safety of spent fuel and radioactive waste management. The legal framework, based on the 1986 Act, was generally consistent with international requirements, nevertheless there was increasing need for its revision to introduce some necessary amendments and supplements. In the late nineties a long term process was initiated by the NAEA President to revise Polish laws and regulations according to up-to-date, internationally accepted, basic nuclear and radiation safety requirements. Special attention was given to achieve compliance with the European Union directives and regulations in this area in the process of harmonization of laws and regulations with aquis communautaire, prerequisite to Poland's accession to European Union. It resulted in the replacement of the 1986 Act by the new one (Atomic Law), passed by Parliament on 29 November 2000.

The new *Atomic Law Act* of 29th November 2000, published in the Official Journal of Laws ("Dziennik Ustaw"), no.3, item 18, on 18 January 2001, and entered into force on 1st January 2002 . Pursuant to the new Act provisions several new regulations has been issued in the years 2001 and 2002 by the Council of Ministers or a Minister competent in particular issues. The Act and the secondary regulations govern in particular the safety of spent fuel and radioactive waste management. Up to the end of the year 2002 new 18 executive regulations to the *Act of Atomic Law* was prepared in NAEA and issued in the form of regulations of the Council of Ministers. Further 6 ones has been issued by the Prime Minister (2), Minister for Environment (2), Minister for Health (1), Minister for Internal Affairs and Administration (1).

To ensure full compatibility of the *Atomic Law* with the European Union laws, in 2003 the President of NAEA initiated the work aimed at amending this Act of Parliament and subsequently, where needed, the executive regulations. The purpose of these activities was, on one hand, to supplement or correct the existing regulations, and on the other – to eliminate the regulations transposing the EU provisions contained in EU regulations, in view of the fact that subsequent to the EU membership acquisition by Poland, the EU regulations will be binding directly within the domestic legal framework. The draft of the bill, prepared by NAEA staff (excluding the regulations involving medical exposure, developed by a special

Ministry of Health team), after broad public and interdepartmental consultations, were approved in December 2003 by the Council of Ministers and in March 2004 passed by the Parliament[3] and entered into force on 1 May 2004. A brief summary of the new Atomic Law Act, together with comments on main changes introduced to it by the last revision, is attached in **Annex 9.** Further amendments proposals to the Act have been developed by NAEA in the year 2005, to assure proper implementation of the EU directive on high activity sealed sources (HASS), and new safeguards provisions stemming from trilateral agreement with IAEA and EURATOM.
The national safety requirements provided by the Act and secondary regulations related to safety of spent nuclear fuel and radioactive waste management are discussed below.

National safety requirements

Atomic Law Act of 29th November 2000 (as amended on 12th March 2004)

The Act defines **activities** related to peaceful use of atomic energy, involving real and potential exposures to ionizing radiation emitted by artificial **radioactive sources, nuclear materials, radiation generators, radioactive waste and spent nuclear fuel**. It defines also the **obligations of the managers** conducting these activities and **the authorities** competent in the area of nuclear safety and radiological protection. The Act requires that all these **activities and practices** shall be **permitted only if** the **adequate measures** defined in appropriate regulations **are undertaken to ensure safety** and protection of human life and health, as well as protection of the property and environment. The act incorporates also the principles of **liability for nuclear damages**, lays down **financial penalties for the violations** of nuclear safety and radiological protection regulations, and the **rules for imposing such penalties.**

The Act defines the term *nuclear safety* as the conditions achieved through overall organizational and technical measures undertaken to prevent occurrence of an uncontrolled, self-sustaining nuclear fission chain-reaction from **practices involving nuclear materials,** and to mitigate their consequences (Art.3 p.2); it defines also the term *radiological protection* – as the **prevention of human exposure and environmental contamination**, and if such prevention is not possible – **limitation of their consequences** to the as low as reasonably achievable level, taking into account economic, social and health factors;

The Act enumerates also the particular **activities that <u>require a licence</u> from** (or should be at least notified to) **the regulatory body**. Those activities include in particular the **manufacturing**, **conversion**, **storage**, **disposal**, **transport** or **use** of nuclear materials, radioactive sources, **radioactive waste and spent nuclear fuel.** They encompass also the **construction**, **operation**, **closure** and **decommissioning of disposal facilities** for **radioactive waste** and disposal facilities for **spent nuclear fuel** and **construction and operation of storage facilities for spent nuclear fuel**.

The **protection of health and training of workers**, employed in nuclear installations or **dealing with** the activities involving nuclear materials, **radioactive waste** and other sources of ionising radiation, **is** also **subject to regulatory control.**

The law requires that any activity involving exposure to ionising radiation shall be conducted by adequately trained and duly authorised personnel, and in such a way, that the number of persons exposed is as low as possible and that doses of radiation, received by such persons, are maintained at practically lowest level and do not exceed the dose limits.

The Act defines also the scope and responsibilities of the President of the National Atomic Energy Agency (NAEA) to whom is given authority of the regulatory body as defined in the art. 20 of the Convention .

[3] Act of Parliament of 12 March 2004 on the amendment to the Acts of Atomic Law and Fiscal Duty Law (O.J.2004 no 70, item 632)

Governmental regulations for nuclear and radiation safety

The general nuclear safety rules and requirements, defined in the *Act of Atomic Law* have been further developed into the more specific provisions and procedures in the form of executive regulations, established on the basis of specific delegations provided by the Act. The original Act of 29 November 2000 encompassed in total of 46 such delegations – 4 for the Prime Minister, 33 for the Council of Ministers, 5 for the Minister of Health and one for each of the Ministers of Environment , of Finance , of National Defence and of Internal Affairs and Administration. Based on above delegations (except of 3 which were facultative ones) 27 executive regulations has been issued up to the end of the year 2002 by the above Bodies, most of them prepared in the NAEA and issued by the Council of Ministers. The regulations issued in the years 2001-2002 covered majority of delegations of the Act, however some others (prepared by the Ministers of Health, of Finance, and of National Defence) were for different reasons delayed and finally issued in the years 2003 and 2004. Some of these regulations substituted the former ordinances of the NAEA President, which had to be newly issued at least on the ministerial level - required by the *Constitution Act* of 1999.

The complete list of these regulations is attached (see **Annex 10**). Those connected with the revision of the Act in March 2004 and issued before the Poland's accession to the EU on 1st of May, 2004, are listed below (relevant articles of *Act of Atomic Law*, referred to as legal delegation for each of the regulations, are given in brackets):

1) *Council of Ministers regulation* ***on amendments to regulation on exemption of certain practices from the obligation to apply for license, or from reporting obligations*** (Art.6.1), issued 27.04.2004 OJ (Dz. U. 2004) no. 98 item 980, in force since 01.05.2004 - **amends existing regulation** OJ (Dz. U. 2002) no.137 item 1153, issued on 06.08.2002)
2) *Council of Ministers regulation* ***on amendmends to regulation on documents required for licence application submitted for practices that involve or could involve radiation exposure or for the notification of such practices*** (Art.6.2), issued 27.04.2004 OJ (Dz. U. 2004) no. 98 item 981, in force since 01.05.2004 - **amends existing regulation** issued on 03.12.2002, OJ (Dz. U. 2002), no 220, item 1851 ;
3) *Council of Ministers regulation* ***on particular obligations related to safeguard of nuclear materials*** (Art.42.1), issued 27.04.2004 OJ (Dz. U. 2004) no. 98 item 982, in force since 01.05.2004 - **replaced former regulation** on nuclear materials subject to accounting, no.87/ 955 - 31.07.2001.
4) *Council of Ministers regulation* ***on physical protection of nuclear materials*** (Art.42.2), issued 27.04.2004 OJ (Dz. U. 2004) no. 98 item 983, in force since 01.05.2004 - **replaced former regulation** no.90/997 - 31.07.2001. ,
5) *Council of Ministers regulation* ***on conditions governing import export and transit through the territory (of Poland) of nuclear materials, radioactive sources and equipment containing such sources*** (Art.62.4 p.1), issued 27.04.2004 OJ (Dz. U. 2004) no. 98 item 984, in force since 01.05.2004 - **replaced former regulation** no.207/1754 - 05.11.2002,
6) *Council of Ministers' regulation* ***on the issuing of the permits for the import to, export from, and transit through the territory of Poland of radioactive waste*** **(**Art.62.4 p.2) , issued 27.04.2004 OJ (Dz. U. 2004) no 98 item 985, in force since 01.05.2004 - **replaced a part of former regulation** no.215/1817 - 05.11.2002,
7) *Council of Ministers' regulation* ***on the issuing of the permits for the import to, export from, and transit through the territory of Poland of spent nuclear fuel*** ,**(**Art.62.4 p.3) , issued 27.04.2004 OJ (Dz. U. 2004) no 98 item 986, in force since 01.05.2004 - **replaced a part of former regulation**.no.215/1817 - 05.11.2002

8) *Council of Ministers regulation* ***on the values of intervention levels for particular types of intervention activities and levels for their cancellation*** **(**Art.87.3) , issued 27.04.2004 OJ (Dz. U. 2004) no 98 item 987, in force since 01.05.2004 - **replaced former regulation** no. 145/1218 - 06.08.2002 and its amendment no.151/1463-2003.
9) *Council of Ministers regulation* ***on the Bodies relevant to control of foodstuff and feeding-stuff after a radiation emergency on conformance with the prescribed contamination limits*** (Art.97.4), issued 27.04.2004 OJ (Dz. U. 2004) no 98 item 988, in force since 01.05.2004
10) *Council of Ministers regulation* ***on preliminary information to the general public on health protection measures to be implemented in a case of radiation emergency*** **(**Art.92.4), issued 27.04.2004 - OJ (Dz. U. 2004) no 102 item 1065, in force since 01.05.2004
11) *Council of Ministers regulation* ***on radiation protection of external workers exposed in controlled areas*** **(**Art.29.3) , issued 27.04.2004 OJ (Dz. U. 2004), no 102 item 1064, in force since 01.05.2004 - **replaced former regulation** no.201/1693 - 05.11.2002

Four more regulations connected with the revision of the Act in March 2004 were issued after the accession date - in the years 2004 and 2005:

12) *Council of Ministers regulation on the rules of* ***subsidising the tasks enhancing*** *of nuclear and radiation* ***safety*** *in performing particular activities involving risk from* radiation (Art.33.5) issued 28.09.2004 OJ (Dz. U. 2004) no 224 item 2272, in force since 01.01.2005 - **replaced former regulation** no.145/1626 - 03.12.2001;
13) *Council of Ministers regulation on ionizing radiation* ***dose limits*** (Art.25.1), issued 18.01.2005 OJ (Dz. U. 2004) no 20 item 168, in force since 01.02.2005 - **replaced former regulation** no. 111/969 - 25.05.2002 and its amendment no.38/333-2003;
14) *Council of Ministers regulation on the national emergency preparedness plan and the patterns of facility and regional* ***emergency preparedness plans*** (Art. 87 p.1 i 2) issued 27.04.2004 OJ (Dz. U. 2004) no 20 item 169, in force since 01.02.2005- **replaced former regulation** no. 239/2033 - 23.12.2002 and its amendment no.38/333-2003;
15) *Council of Ministers regulation on the* ***posts being of primary importance for the nuclear safety*** *and radiation protection, and on the regime and procedures to be followed in the granting of authorisation indispensable for holding such post* (Art.12.2) issued 18.01.2005 OJ (Dz. U. 2005) no 21 item 173, in force since 01.02.2005 - **replaced former regulation** no. 145/1217 - 06.08.2002 and its amendment no.38/333-2003

System of licensing

The *Atomic Law Act* requires (art.4.1 p.3) a separate licence, issued by the President of NAEA, for construction, operation, closure and decommissioning of radioactive waste repositories and spent nuclear fuel repositories, and for construction and operation of storage facilities for spent nuclear fuel. The requirements, concerning documentation to be submitted by an applicant and the procedure to be followed to obtain an appropriate licence, have been established by the *Council of Ministers Regulation on the documents required for license application submitted for the practices that involve or could involve radiation exposure or for the notification of such practices,* which replaced from the 1st January 2003 the former regulation issued in November 1995 and was further amended on 27th April 2004 (OJ no 98 item 981). The general procedure of licensing nuclear installation (including research reactors, radioactive waste and spent fuel management facilities), in the phases of construction, commissioning, operation, decommissioning or closure is illustrated on **Fig.5**.

Applications for a licence or for a official opinion related to an installation must be submitted to NAEA President. It applies also, with some modifications, to the stage of siting, which does not require NAEA President's licence, but only official opinion of this Body.

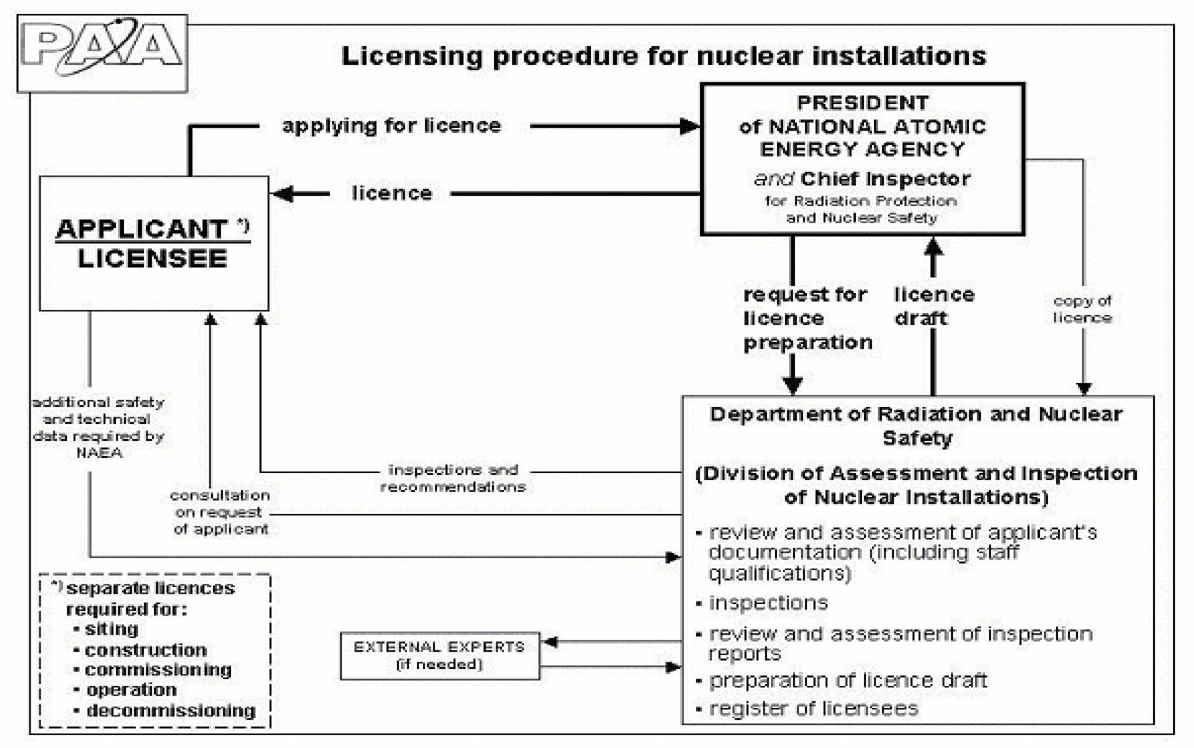

Fig. 5. Licensing procedure

Draft licences and opinions are prepared by the NAEA Department for Radiation and Nuclear Safety in its Division of Assessment and Inspection of Nuclear Installations, on the basis of review and assessment of safety documentation supplied by the applicant and also on the basis of inspections performed by NAEA regulatory inspectors in applicant's premises if necessary. The reports from each of inspections, performed by NAEA inspectors in nuclear installations upon the Agency President's order, are submitted to the Chief Inspector and to the Agency's President.

While performing the review and assessment tasks, NAEA may use external consultant organizations and experts, but only on the condition that those organizations and experts are free from conflict of interest, i.e. they are not employed by or otherwise dependent on applicant/licensee. A draft license or opinion, if accepted by Chief Inspector, is submitted to the NAEA President for endorsement and the official granting to the applicant.

In the siting stage of radioactive waste and spent fuel repositories or spent fuel storage, the authority, competent to issue the decision on construction and development conditions on the site of a future nuclear facility, issues this decision after obtaining the Agency's President positive opinion on the matters concerning nuclear safety and radiological protection (art.36 or art.54 as appropriate)

The licensing process applies also to the staff of a facility. According to Art.12 of the *Atomic Law Act* in any facility performing activities involving radiation exposure, **the position important for ensuring nuclear safety and radiological protection have to be occupied exclusively by an individual possessing appropriate authorization issued by the Agency's President**. Licenses for such positions are granted on the basis of the qualification process, established by the Council Ministers' Regulation, issued pursuant to Art. 12.2 of the Act, and of the exams performed by the Commission for Qualification of Staff for the Posts Important for Nuclear and Radiation Safety, appointed by the NAEA President. Moreover, according to Art.11 of the Act, **any employee of a nuclear facility have to be duly trained, according to the program prepared by the facility manager and endorsed by the NAEA President**, to possess and maintain the knowledge of nuclear safety and radiological protection regulations appropriate for his position, as well as appropriate skills and qualifications.

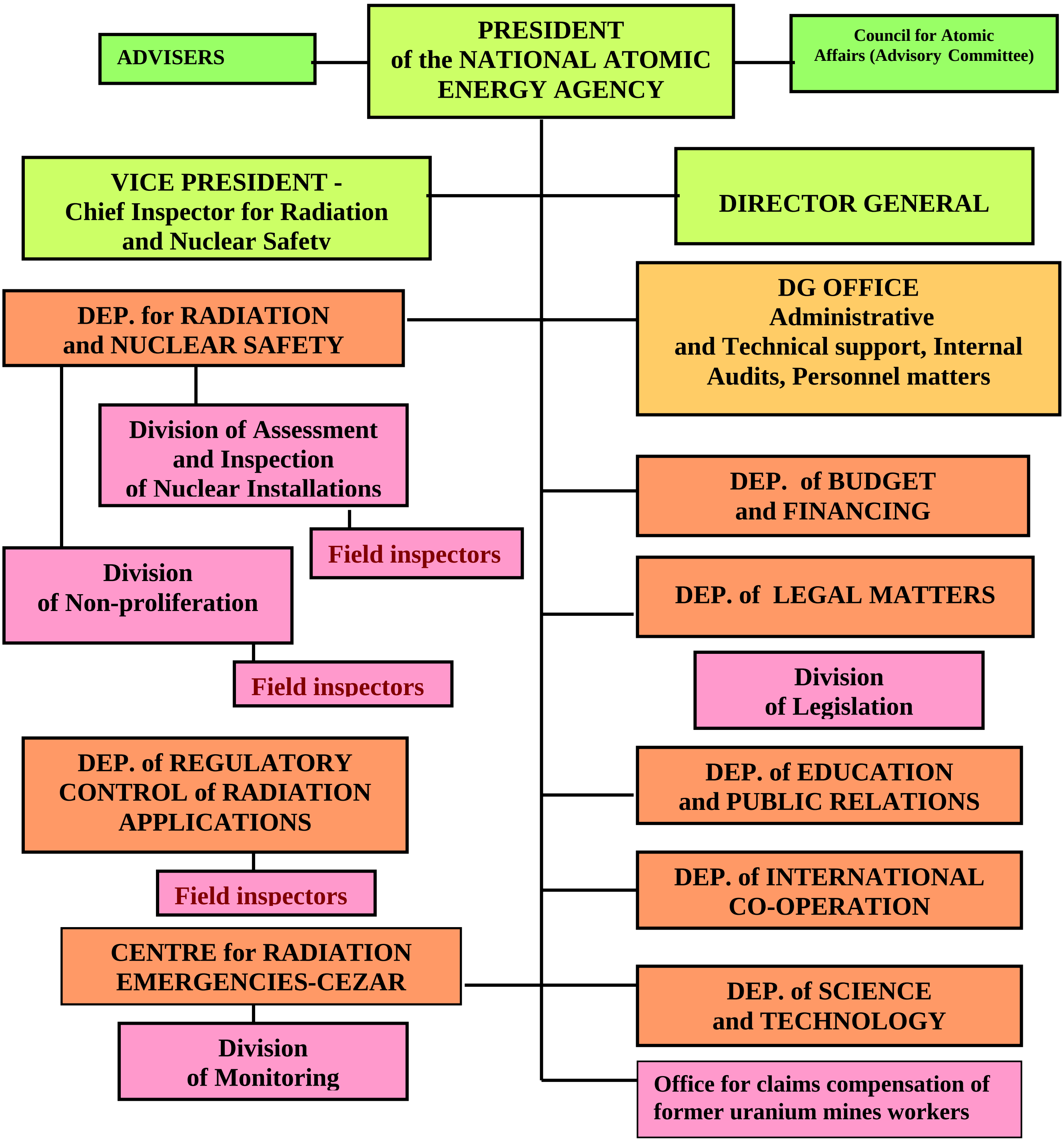

Fig.6. Structure of the National Atomic Energy Agency of Poland

Department for Radiation and Nuclear Safety, responsible for the assessment and inspection of the nuclear reactors as well as of the spent fuel and radioactive waste management facilities, operates also the Agency's President Central Register of Doses of all the occupationally exposed A - category workers in Poland.

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Prohibition of the operation without a licence

According to the art.2 of the *Atomic Law Act*, activities involving real and potential exposures to ionising radiation emitted by radioactive waste and spent nuclear fuel shall be permitted after undertaking the measures defined in appropriate regulations, aimed at ensuring the safety and protection of human life and health, as well as protection of property and the environment.

According to the art.4.1.p.3) each subsequent stage, i.e. construction, operation, closure and decommissioning, requires separate licences, granted by the NAEA President after ascertaining that the conditions and requirements relevant for radiation and nuclear safety at the given stage were met and fulfilled. It means, in particular, that **the operation of a facility without a licence is prohibited.** The applicant/licensee must submit at each of the stages, together with his application for the licence to the NAEA President, a proper safety documentation of the facility. Results of the review and assessment of this documentation provide the regulatory body with the basis for preparation of suitable licence and for the specification of the relevant requirements and conditions in the text of license document.

Also import into, export from and transit through the territory of Poland of radioactive waste and spent nuclear fuel shall require (art.62.1) the consent of the Agency's President.

The head of the organisational entity, **who without the required licence**, or in violation of the conditions attached to such a licence, **engages in the construction, operation, closure and decommissioning** of radioactive waste and spent nuclear fuel repositories, or in the construction and operation of storage facilities for spent nuclear fuel, **or in the import, export or transit** of radioactive waste and spent nuclear fuel, **is subject to fine** penalty (art.123), imposed by the Chief Nuclear Regulatory Inspector.

Institutional control, regulatory inspection, documentation and reporting

According to the *Act of Atomic Law*, Regulatory Body responsibilities include in particular conducting inspections in nuclear facilities and in other facilities possessing nuclear materials, ionizing radiation sources, radioactive waste and spent nuclear fuel (Art.64.4). To perform inspection tasks, the NAEA President uses, as his executive body, the appropriate NAEA departments. In particular:

- Department for Radiation and Nuclear Safety with its:
  - Division of Regulatory Assessment and Inspection of Nuclear Facilities,
  - Division of Non-proliferation and Safeguards
- Department of Regulatory Control of Radiation Applications

employ regulatory inspectors (see **Fig.6**), who are under direct control of Chief Inspector.

In the context of conducted inspection the regulatory Inspectors are entitled to (Art.66):

1) access at any time the means of transport and the sites of organizational units, where nuclear materials, ionizing radiation sources, radioactive waste or spent nuclear fuel are produced, used, stored, disposed or transported (in particular – nuclear installations),
2) access to the documents relevant for nuclear safety and radiological protection in inspected organizational unit,
3) conduct, if necessary, independent technical and dosimetric measurements,
4) request written or oral information, when it is necessary for clarifying a concern.

The manager of facility being inspected is obliged (Art. 67) to supply all necessary resources, to meet the conditions necessary for inspection, and make available all documents. The employees of the unit being inspected have to give the inspectors oral or written explanations on the questions related to the subject of inspection. Should an inspection reveal a direct threat to nuclear safety or radiation protection, the President of NAEA, the Chief Inspector or regulatory Inspectors are obliged by Art. 68 of the Act to give immediately applicable orders to impose emergency measures designed to eliminate the danger. The inspection procedure for both – the nuclear facilities and the radiation application activities – is presented on **Fig.7** .

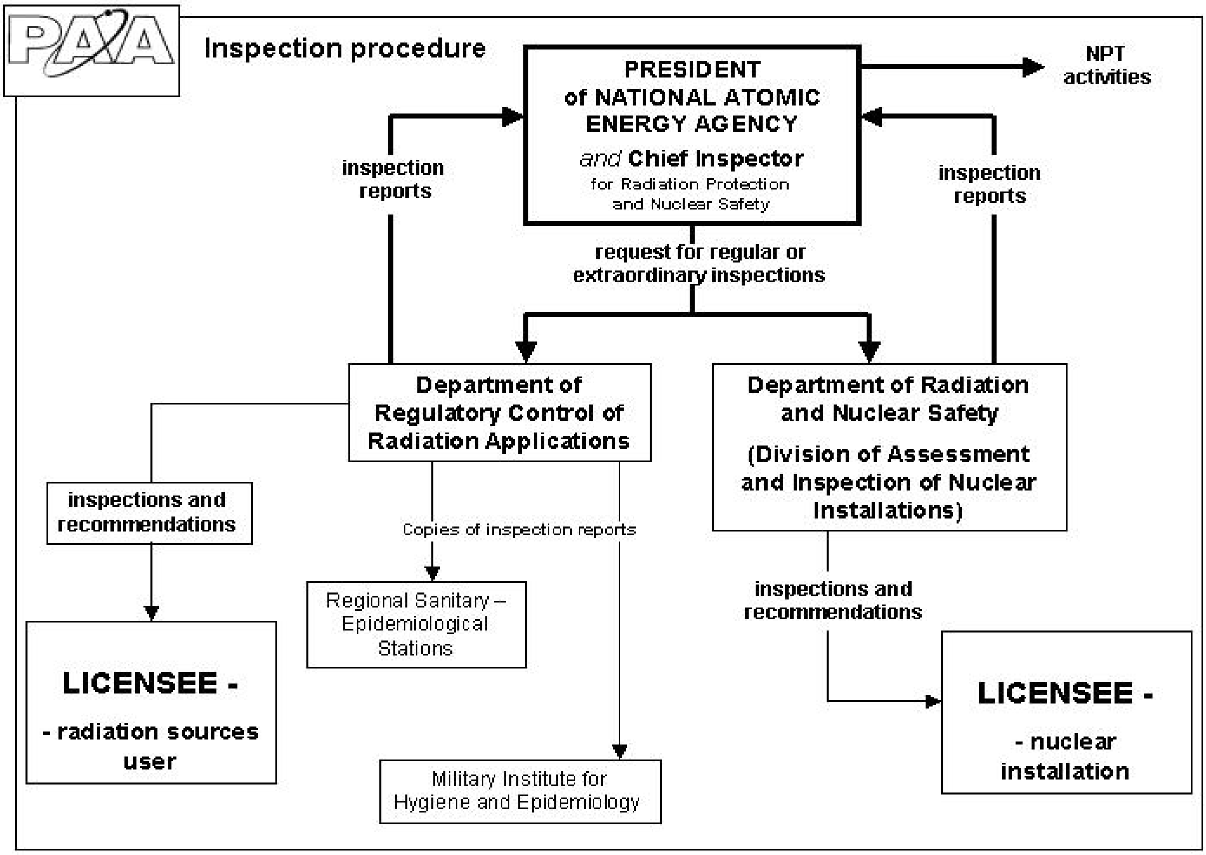

Fig.7. Inspection procedure

In the performing regulatory inspection also the international guidelines and experience from former inspections of nuclear facilities are taken into account. The primary purpose of regulatory inspection is the independent determination of how the licensee complies with the general nuclear safety and radiation protection requirements, with the licence conditions, additional regulatory requirements and good engineering practices; the inspection also is a check of the implementation of the QA programme.
To ensure the effectiveness of routine regulatory inspections, each of them is carefully prepared. The programme and scope of such inspections is formulated prior to visiting the site, relevant procedures are evoked or, if necessary, prepared by the inspectors. The personnel designed to carry out each inspection is selected and notified beforehand to provide adequate time to become acquainted with applicable instructions and appropriate background material. In some cases non-routine (special) inspections are performed.

Enforcement provisions

The *Act of Atomic Law* gives regulatory body adequate powers to enforce compliance with safety requirements imposed by laws, regulations and licence conditions. According to its Art. 5.5 and Art 5.6 the NAEA President may **revoke a licence or modify it** as needed. In particular (Art.5.11) Agency's President shall **revoke a license if** nuclear safety and radiation protection **requirements imposed by applicable regulations and of the terms of licence have not been fulfilled**. Depending of regulatory assessment of situation the following enforcement actions can be undertaken:
(1) oral or written immediately applicable order (Art.68)
(2) issuance of a written warning or directive to the licensee (Art.67.4, Art. 69),
(3) ordering the licensee to curtail activities (Art.39),
(4) suspension or revoking the licence (Art.5.11),

(5) financial penalty collected by mean of administrative execution proceedings (Art.123).,
(6)punishment by fine or detention (Art. 127).
(7) recommendation of prosecution through the courts of law.
The regulatory inspectors have been equipped by Art.68 of the Act of Atomic Law with the authority to take on-the-spot decisions.

Allocation of responsibilities

The responsibility for spent nuclear fuel management and radioactive waste management rests with the **holder of the licence** for activities leading to arising of either spent fuel or radioactive waste, until the handover of this spent fuel or this waste with its documentation containing technical data and classification to the **Radioactive Waste Management Plant** – the only legal entity in Poland, established **under the Ministry of Economy** to perform the collection, treatment, conditioning, interim storage and - above all – the activities **ensuring permanent feasibility of radioactive waste and spent nuclear fuel disposal.**
The responsibility for **regulatory control** of both – the particular users, and the RWMP - rests with the **President of the National Atomic Energy Agency**, the only legal authority in Poland to issue licences and binding opinions, and to perform inspections of activities leading to arising of spent nuclear fuel and radioactive waste (see also the text below, under Article 20)

ARTICLE 20. REGULATORY BODY

Text of Article 20:

1. ***Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 19, and provided with adequate authority, competence and financial and human resources to fulfill its assigned responsibilities.***
2. ***Each Contracting Party, in accordance with its legislative and regulatory framework, shall take the appropriate steps to ensure the effective independence of the regulatory functions from other functions where organizations are involved in both spent fuel or radioactive waste management and in their regulation.***

Scope of responsibilities and organization

*The Atomic Law requires that **activities involving real and potential ionizing radiation exposures from** man-made radioactive sources, nuclear materials, equipment generating ionizing radiation, **radioactive waste** and **spent nuclear fuel**, **are supervised** and **controlled** by the State and can be permitted on the condition of employing regulatory means for the safety and health and life protection of humans, and also for the protection of property and environment (Art.2). This includes the **obligation of obtaining an appropriate licence**, excluding the cases when such activities may be performed on the basis of notification or do not have to be licensed or notified according to the criteria established in the regulation of the Council of Ministers of 6 August 2002 (amended in 2004), based on the Article 6.1 of the Atomic Law.*
Under the Atomic Law, the following activities / practices involving exposures require a licence or notification (with reservation as above):

1) *manufacturing**, conversion, reprocessing, storage, disposal, transport** or use of, and trade in, nuclear materials, radioactive sources, **radioactive waste and spent nuclear fuel**;*
2) *construction, commissioning, test and permanent operation and decommissioning of nuclear facilities;*
3) ***construction, operation, closure and decommissioning of disposal facilities for radioactive waste and disposal facilities for spent nuclear fuel, and construction and operation of storage facilities for spent nuclear fuel**;*
4) *manufacture, installation, use and maintenance of equipment containing radioactive sources and trade in such equipment;*
5) *manufacture, purchase, commissioning and use of the ionizing radiation generating devices;*
6) *commissioning of laboratories and workrooms using ionizing radiation sources, including X-ray rooms;*

7) *intended addition of radioactive materials in the processes of manufacturing consumer and medical products, and trade in such products;*
8) *intended administration of radioactive materials to humans and animals, for medical or veterinary diagnostics, therapy or research purposes.*

According to art.5, art.36-39 and art.63 of the *Atomic Law Act*, legal authority to **issue licences, binding opinions** and to **perform regulatory control** of the activities involving **radioactive waste** and **spent nuclear fuel** in Poland is given to the **President of the National Atomic Energy Agency**.

The President of the National Atomic Energy Agency **issues the licences and accepts the notifications** related also to other activities / practices that are listed above, with only the following exceptions: the **licences** for commissioning and use of X-ray equipment for medical purposes[4] and for commissioning of the laboratories using such equipment are issued by **the state regional sanitary inspector** or – for organizational units subordinated or supervised by the National Defense Ministry – **the commander of the military preventive medicine center**, or – for organizational units subordinated or supervised by the minister for internal affairs – **the state sanitary inspector in the Ministry of Internal Affairs and Administration.**
As a consequence of the above exceptions also the **supervision and control** in the area of nuclear safety and radiological protection over the activities / practices resulting in factual or potential ionizing radiation exposures of people and environment, are executed by (Art. 6.2):

1) "regulatory bodies" (as defined below) – in the cases **when the license is issued or notification accepted by the President of the Agency**;
2) regional sanitary inspector, commander of the military preventive medicine center or state sanitary inspector in the Ministry of Internal Affairs and Administration in the sphere of activities / practices licensed by these bodies.

According to definitions in the Art.64.1 of the *Act of Atomic Law*, the "regulatory bodies" consist of:

1) the President of NAEA, as the supreme nuclear regulatory body,
2) Chief Nuclear Regulatory Inspector, as the higher-level body in relation to the nuclear regulatory inspectors,
3) regulatory inspectors.

Atomic Law defines the task of the above regulatory bodies in its Chapter 9. They include in particular (Art.64.4):

1) **issuing licences and other decisions** in issues related to the nuclear safety and radiological protection, according to the principles and methods established by the law;
2) **conducting inspections** in nuclear facilities and organizational units which possess nuclear materials, ionizing radiation sources, radioactive waste and spent nuclear fuel,
3) **issuing on-the-spot orders** if during the inspection it is found that nuclear safety and radiological protection are endangered,
4) **approving training programs** developed by the managers of organizational units operated on the basis of a licence (except the training programs developed by the managers of organizational units using X-ray equipment for medical purposes).

The President of NAEA constitutes a **central organ** of the governmental administration, **competent in** the issues of **nuclear safety** and **radiological protection** within the scope defined in the *Act of Atomic Law* **(**Art.109.1). Mandate, authority and particular responsibilities of this body are defined in the Chapter 13 of the *Atomic Law Act*.

The Agency's President is nominated and recalled by the Prime Minister (Art.109.2), and reports directly to him (Art.109.13) However, since the 1st January 2002 , due to amendments made in the Act on Sectors of Governmental Administration (by the new Act passed by Parliament on 21 December 2001), the Agency's President has been

[4] In the following scope: medical diagnostics, invasive radiology, surface radiotherapy and radiotherapy for non-cancerous diseases.

administratively supervised by the Minister of Environment, who was obliged to invest the NAEA with a new statute establishing its internal organization. The above change in the law resulted in a rule that the Agency President shall be nominated by the Prime Minister upon request of the Minister of Environment. Prime Minister, in the form of regulation, may establish a detailed scope of activities for the Agency's President (art.111).

The President of NAEA executes his tasks through the National Atomic Energy Agency (art.112 of the Atomic Energy Act). To perform **regulatory** tasks, the NAEA President uses, as his executive body, the appropriate NAEA departments (see **Fig.6**), mostly the Department for Radiation and Nuclear Safety (DRNS) and the Department of Regulatory Control of Radiation Sources (DRCRS) in co-operation with Legal Department. They support the Agency's President in the discharge of his regulatory responsibilities and perform their duties related to particular regulatory tasks listed above as well as to the following ones:

(1) establishing regulations (art.110 p.11) and guidelines (art.110 p.3) for nuclear safety and radiation protection;

(2) giving binding opinion at the stage of siting and licensing the construction, commissioning, operation and decommissioning of nuclear installation after appropriate review and assessment of all safety concerns (art.5, art.36-38);

(3) licensing activities related to the application of radiation sources (art.5, art.64.4 p.1)

(4) conducting review and assessment of the licensees' documentation, demonstrating the safety of nuclear installations or other radiation sources application (art.66.1 p.2),

(5) verifying whether the activities/practices performed by licensees comply with the nuclear safety and radiation protection requirements as set forth in relevant regulations and terms of licences (66.1 p.3).

The terms of operating licences usually include a requirement to perform a systematic safety assessment of a facility and to maintain submitting by operator regularly (quarterly of half-yearly) the relevant reports for review by NRA.

The issues involving the training program acceptance are covered by Department of Training and Public Information (DTPI), which is also in charge of communication with the public – by web page or periodic publications – to inform on regulatory requirements, decisions and opinions, but also – by communications of the Agency's President - to inform on radiation situation of the country and (also by press conference and interviews) - to react in a case of rumours or to advice in emergency situations.

Regulatory tasks involving facilities for the management of radioactive waste and spent nuclear fuel, including the nuclear material accountancy and safeguards as well as those involving other users of ionizing radiation sources are performed mainly by two Agency's departments: DRNS and DRCRS. Liaison is maintained also with regulatory body authorities of other countries and with international organisations to promote cooperation and the exchange of regulatory information; it is organised by Department of international Co-operation and European Integration with participation of representatives of departments performing regulatory tasks.

The licences and other decisions related to safety of waste and spent fuel management facilities are issued by the NAEA President, on the basis of documents prepared by a facility operator and opinion on these documents by the DRNS, including its Division of Assessment and Inspection of Nuclear Installations. Inspectors from this Division perform regulatory inspections in nuclear facilities and facilities for the management of radioactive waste and spent nuclear fuel in Poland, and also perform assessments of the situation concerning nuclear and radiation safety in nuclear facilities in neighbouring countries.

Licences for activities / practices involving ionizing radiation sources are issued by the NAEA President (or individuals by him authorized), basing on the draft documents prepared by the DRCRS. The inspectors from this Department perform all other relevant inspections.

Separation of regulatory and promotional function

Neither National Atomic Energy Agency nor its President, being the NRA in Poland, is responsible for promoting of any activities being under their regulatory control. With respect to research reactors or spent fuel and radwaste facilities, the clear separation between regulatory and managerial responsibility of the NAEA President was achieved according to provisions of the *Atomic Law Act* of 29 November 2000 by appropriate organizational changes successfully performed before the new Atomic Law entered in force. Since the beginning of the year 2002 the Agency's President has no duties which could be in contradiction with its regulatory functions in nuclear safety matters. All the operators of nuclear facilities (research reactors, spent fuel and waste management, disposal and repository sites), as well as all organisational units performing activities licensed by or notified to the Agency's President are within the organisational structures other then NAEA: the Institute of Atomic Energy (operator of MARIA research reactor) as well as Radioactive Waste Management Plant (operator of the spent fuel facilities, the decommissioned EWA reactor and the radwaste management and disposal facilities in Swierk and Rozan) are under the Ministry of Economy while the NAEA is in different sector of State administration - supervised by the Ministry of Environment. The clear separation of regulatory function from management and promotion functions has been then fully attained.

Deciding whether to regulate radioactive materials as radioactive waste

The *Atomic Law Act* defines radioactive material as the material containing one or more radioactive isotopes, with activity or radioactive concentration that can not be disregarded from radiological protection viewpoint. Radioactive waste means solid, liquid or gaseous waste containing radioactive materials or contaminated by such materials, **assigned to waste category**, according to its activity level or surface dose rate, and, if appropriate, **to waste subcategory** - according to the half-live of radioactive isotopes contained in the waste, or - according to emitted heat power (art.47.1). Also spent sealed radioactive sources, **when such a decision is taken, become** a separate category of **radioactive waste** (art.47.2). In each case it is arbitrary **decision of the manager** of the organizational unit on which site the waste arises to classify and register them as waste of definite category (and subcategory if appropriate).

Radioactive waste classification may be performed also by the Agency's President but only in the cases of:

- discrepancies in waste classification performed by the manager of the organizational unit on which site the waste is arising and the classification performed by the manager of the organizational unit receiving the waste, or
- ascertainment of irregularities in waste classification by the manager of the organizational unit on which site the waste is present.

Also spent nuclear fuel is treated as radioactive waste of high-level category - if intended for disposal (art.52.3).

SECTION F. OTHER GENERAL SAFETY PROVISIONS

Article 21. RESPONSIBILITY OF THE LICENCE HOLDER

Text of Article 21:

1. ***Each Contracting Party shall ensure that prime responsibility for the safety of spent fuel or radioactive waste management rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.***

If there is no such licence holder or other responsible party, the responsibility rests with the Contracting Party which has jurisdiction over the spent fuel or over the radioactive waste.

According to art.7.1 of the *Atomic Law Act* **the responsibility for compliance with nuclear safety and radiological protection requirements rests with the head of the organisational entity pursuing the activities involving exposure**. These activities, as defined in the art. 4.1 of the Act, include in particular the **construction and operation** of **storage facilities** for spent nuclear fuel as well as the **construction, operation, closure and decommissioning** of radioactive waste and spent nuclear fuel **repositories**, and require licence granted by NAEA President. Also the **import, export or transit** of radioactive waste and spent nuclear fuel requires consent from this Body.

Therefore the legal provision exists that prime responsibility for the safety of spent fuel or radioactive waste management rests with the licence holder. To ensure that each such a licence holder meets its responsibility, the obligation of submitting of relevant quarterly reports is usually imposed on him by the license conditions and regulatory inspection are performed for verification.

Article 22. HUMAN AND FINANCIAL RESOURCES

Text of Article 22:

Each Contracting Party shall take the appropriate steps to ensure that:

i. ***qualified staff are available as needed for safety-related activities during the operating lifetime of a spent fuel and a radioactive waste management facility;***
ii. ***adequate financial resources are available to support the safety of facilities for spent fuel and radioactive waste management during their operating lifetime and for decommissioning;***

financial provision is made which will enable the appropriate institutional controls and monitoring arrangements to be continued for the period deemed necessary following the closure of a disposal facility.

State-owned public utility named Radioactive Waste Management Plant located in Otwock-Świerk has been established for conducting the activities involving radioactive waste management and spent nuclear fuel management, and - above all – for the activities **ensuring permanent feasibility of radioactive waste and spent nuclear fuel disposal**.

Human resources

There are 49 people working in the RWMP, 16 of them are university graduates. According to requirements of *Atomic Law Act* (art.11) all workers were trained on nuclear safety and radiological protection issues. Training programmes were developed by the director of RWMP on the basis of a licence conditions and approved by the licensing authority.
According to art.12 of *Atomic Law Act*, in the RWMP there are following positions, important for ensuring nuclear safety and radiological protection which may be occupied by the individuals possessing an appropriate authorizations issued by the National Atomic Agency's President:

- specialist for accounting for nuclear materials

- operator of spent nuclear fuel storage facility
- head of radioactive waste repository
- head of radioactive waste management plant.

Head of radioactive waste repository as well as head of radioactive waste management plant possess an appropriate authorization. This applies also to the specialist for accounting for nuclear materials and operators of spent nuclear fuel storage facility.

Financial resources

Financial resources available to support safety of the facilities for spent fuel and radioactive waste management are as follows:

- state budget through the budget of Ministry of Economy, Labour and Social Policy
- state budget through the budget of National Atomic Energy Agency
- service activity of RWMP.

Financial resources available are sufficient for routine activity of RWMP. However, no financial provision is made currently which will enable to support safety for decommissioning, closure of the repository, and the appropriate institutional controls and monitoring arrangements to be continued for the period deemed necessary following the closure of the disposal facility.

The financial support for these purposes should be available from state budget when decommissioning of the facilities or closure of the repository is going to be implemented.

Article 23. QUALITY ASSURANCE

Text of Article 23:

Each Contracting Party shall take the necessary steps to ensure that appropriate quality assurance programmes concerning the safety of spent fuel and radioactive waste management are established and implemented

The NRA pays special attention to the fulfilment of the QA-related requirements. According to art. 7.2 of the *Atomic Law Act*, the applicant/licensee is required to establish and effectively implement of the QA programme (named in the Act "a programme for nuclear and radiation safety"). The programme should be submitted for review and assessment by the regulatory body. This programme should describe the ways of assuring that all quality-related activities will be performed in the properly controlled conditions, i.e. by properly qualified personnel using appropriate tools, equipment, methods and technological processes and under suitable environmental conditions, so that the required quality is attained and may be verified by inspection or test. Review and assessment of relevant QA programmes is carried out by the regulatory body at all stages of the licensing process, i.e. prior to and during the construction, operation, closure and decommissioning of radioactive waste repositories and spent nuclear fuel repositories, and construction and operation of storage facilities for spent nuclear fuel. If necessary, suitable conditions and requirements will be included in the licence.

The regulatory body, through the requirements concerning the preparation and implementation of the QA programme, obliges the applicant/licensee, as well as his vendors, to plan, perform, verify and document all their activities in an organized and systematic way. An effective QA programme, established and implemented by the licensee, allows the regulatory body to obtain satisfactory confidence in the quality of facility's equipment and in the quality of all performed activities. The regulatory body satisfies itself that the licensee has established and implemented and effective QA programme by audits, document reviews and inspections of work. In practice the Quality Assurance programmes were implemented for:

- operation of the National Radioactive Waste Repository – Różan
- operation of spent nuclear fuel storage facilities no 19 and 19A
- overall activity of the Radioactive Waste Management Plant.

Article 24. OPERATIONAL RADIATION PROTECTION

Text of Article 24:

1. ***Each Contracting Party shall take the appropriate steps to ensure that during the operating lifetime of a spent fuel or radioactive waste management facility:***
   1. ***the radiation exposure of the workers and the public caused by the facility shall be kept as low as reasonably achievable, economic and social factors being taken into account;***
   2. ***no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection; and***
   3. ***measures are taken to prevent unplanned and uncontrolled releases of radioactive materials into the environment.***

0. ***Each Contracting Party shall take appropriate steps to ensure that discharges shall be limited:***
   - ***i. to keep exposure to radiation as low as reasonably achievable, economic and social factors being taken into account; and***
   - ***ii. so that no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection.***

3. ***Each Contracting Party shall take appropriate steps to ensure that during the operating lifetime of a regulated nuclear facility, in the event that an unplanned or uncontrolled release of radioactive materials into the environment occurs, appropriate corrective measures are implemented to control the release and mitigate its effects.***

In RWMP, there are 39 workers classified into category A and 10 classified into category B. Occupational exposure assessment is based on control measurements of individual doses or on dosimetric measurements in the workplace. The radiation protection rules imposed by law, in particular those observed in assigning workers to A or B categories, as well as dose limits are described in **Annex 11**.

Exposure assessment for category A workers is based on systematic individual dose measurements and, if such workers my be exposed to radiation from internal contamination having an impact on the level of effective dose for this category of worker, such workers are also subject to internal contamination measurements.

Exposure assessment for category B workers is based on dosimetric measurements in the workplace, performed in the manner which allows verification thet they should belong in this category.

Regular monitoring of radiation was performed with use of film and TLD dose meters. In the last 3 years the most of individual dose equivalents registered were below detection value (0,4 mSv). Only in few cases this value was exceeded, to maximum 0,8 mSv. 41 workers were subject to the internal contamination measurements .

The environmental monitoring within and outside the Świerk Centre and the National Radioactive Waste Repository – Różan boundaries includes the measurements of direct or stray radiation due to the operation of nuclear facilities (reactors, accelerators, spent fuel and waste management facilities) and the measurement of radioactivity in samples of air, river and underground water, soil, precipitation, mud and vegetation. Since a few years the results of measurements show that there is no registered influence on environment and the population in the vicinity of Świerk Centre and NRWR due to the operation of its facilities.

Article 25. EMERGENCY PREPAREDNESS

Text of Article 25:

1. ***Each Contracting Party shall ensure that before and during operation of a spent fuel or radioactive waste management facility there are appropriate on-site and, if necessary, off-site emergency plans. Such emergency plans should be tested at an appropriate frequency.***
2. ***Each Contracting Party shall take the appropriate steps for the preparation and testing of emergency plans for its territory insofar as it is likely to be affected in the event of a radiological emergency at a spent fuel or radioactive waste management facility in the vicinity of its territory.***

The Council of Minister's regulation *on the national radiation emergency preparedness plan and on the generic content of regional and facility plans* (issued on 23 December 2002, *OJ (Dz.U.2002) no 239, item 2033*, amended in 2004, OJ no 20 item 169, defines the responsibilities, scope, requirements and general rules of cooperation in a case of radiation emergency. According to this regulation, the plans on different levels and appropriate emergency preparedness arrangements have to be prepared and maintained by the organizations and bodies responsible for directing actions aimed at eliminating the threat and its consequences, and in particular - for implementation of intervention measures in case of radiation emergency with consequences beyond the site where it has occurred. The same bodies are responsible for systematic testing of these plans and arrangements within the prescribed time-intervals as established by the *Atomic Law* (Art.96).

There are emergency plans for spent fuel and radioactive waste management facilities localized at Świerk site and for the National Radioactive Waste Repository in Różan. The external transportation of radioactive waste is essential for these plans. The plans include internal (radiation protection and decontamination service) and external communication and cooperation (President of the National Atomic Energy Agency, Province Governor office and services, police, fire-department).

The *Atomic Law Act* requires that during on-site radiation emergency, the actions aimed at the elimination of the threat and its consequences shall be directed by the facility manager. During radiation emergency on regional scale actions including intervention measures shall be directed by the governor of a province (Voivoda). On national level this is responsibility of the minister of internal affairs matters, with the NAEA President assistance. This minister is obliged by Law (Art.96.2) to perform exercise to test the national level radiation emergency preparedness plan at least once in 3 years. According to present requirements (Art.96.1) the frequency of testing of the relevant plans at regional (provincial) and facility level must be established within each particular plan by the province governor or the facility manager respectively. In practice such exercises are performed every one-two years.

As there is no NPPs in Poland and existing other nuclear facilities are sited far from the national borders, there is rather unlikely that Poland could create immediate radiation threat to a neighbouring country. Also the NPPs in neighbouring countries are not located in the close vicinity to Poland's borders. However appropriate arrangements has been made within the NAEA organisation to be able to respond adequately to even very unlikely radiation emergency situation. According to the *Atomic Law* the NAEA President is responsible for performing the tasks concerning the assessments of national radiation situation in normal conditions and in radiation emergency situations, and the transmission of relevant information to appropriate authorities and to the general public.

Article 26. DECOMMISSIONING

Text of Article 26:

Each Contracting Party shall take the appropriate steps to ensure the safety of decommissioning of a nuclear facility. Such steps shall ensure that:

- ***i. qualified staff and adequate financial resources are available;***
- ***ii. the provisions of Article 24 with respect to operational radiation protection, discharges and unplanned and uncontrolled releases are applied;***
- ***iii. the provisions of Article 25 with respect to emergency preparedness are applied; and***
- ***iv. records of information important to decommissioning are kept.***

According to *Atomic Law Act* the decommissioning of a nuclear facility requires license from the President of the National Atomic Energy Agency. It is granted on the condition that applicant shall prove fulfillment of all the requirements set forth in the *Atomic Law Act* and secondary legislation related to the decommissioning (generic) as well as will be able to fulfill the conditions, related to particular facility to be decommissioned (facility specific), included in the license.

It is foreseen that decommissioning of spent nuclear fuel and waste management facilities will be performed by the operator of these facilities.

Financial resources for safe decommissioning will be ensured by the state budget when decommissioning plan is going to be implemented.

In the decommissioning activity, the provisions of the Convention with respect to operational radiation protection, discharges and unplanned and uncontrolled releases as well as with respect to emergency preparedness will be applied.

Records of information important to decommissioning are kept in facility (drawings, technology, physical state of spent fuel elements, waste stored inventory etc.).
The above statements are based also on the Poland's experience gained during the decommissioning of EWA research reactor (for more detailed information see **Annex 5**).

SECTION G. SAFETY OF SPENT FUEL MANAGEMENT

This section covers the obligations under the articles 4-10 of the Convention.

Article 4. GENERAL SAFETY REQUIREMENTS

Text of Article 4:

Each Contracting Party shall take the appropriate steps to ensure that at all stages of spent fuel management, individuals, society and the environment are adequately protected against radiological hazards.

In so doing, each Contracting Party shall take the appropriate steps to:

- ***i. ensure that criticality and removal of residual heat generated during spent fuel management are adequately addressed;***
- ***ii. ensure that the generation of radioactive waste associated with spent fuel management is kept to the minimum practicable, consistent with the type of fuel cycle policy adopted;***
- ***iii. take into account interdependencies among the different steps in spent fuel management;***
- ***iv. provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;***

v. take into account the biological, chemical and other hazards that may be associated with spent fuel management;

vi. strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;

vii. aim to avoid imposing undue burdens on future generations.

According to *Atomic Law Act* the fuel management activities as well as the relevant facilities have to be licensed by the President of the National Atomic Energy Agency. The license is granted on the condition that applicant shall prove fulfillment of all the relevant requirements set forth in the Atomic Law Act and secondary legislation related to the spent fuel and radioactive waste management and also will be able to fulfill the requirements related to particular facility or activity, included in the license conditions.
In particular the general radiation protection standards and the spent fuel and radioactive waste safety requirements provided in the Chapters 3,4 and 7 of the *Atomic Law Act* (see **Annex 9**), have to be fulfilled. Also the requirements of the *Council of Ministers regulation on radioactive waste and spent nuclear fuel*, have to be satisfied. This regulation defines in particular the terms of storage and disposal of radioactive waste or spent nuclear fuel and the detailed technical requirements imposed on sites, facilities, compartments and packaging intended for the storage of radioactive waste categories as well as the detailed requirements ion various types of repositories and their siting, operation, construction and closure.

Not all of seven issues of Article 4 of the Joint Convention are directly recognised by the Polish *Atomic Law Act* and secondary legislation within the licensing process for RAW and SF facilities. However the Convention itself, after its ratification by the President of Poland and being published in Polish version in the Polish Journal of Law, had became a part of national legal framework and as such is respected equally to the acts of Parliament. The criticality and heat removal issues (4i) are directly addressed in the art.30 of the governmental *regulation on radioactive waste and spent nuclear fuel* , issued on 3 Dec 2002. The minimalization of waste generation (4ii) and interdependencies (4iii) are not recognised directly by the *Atomic Law Act* and secondary legislation. Nevertheless those approaches have been always important elements of the waste management policy and practice, observed both by the licensees and the regulators. The radiological protection (4iv) at the national level is broadly addressed in the Chapter 3 of *Atomic Law Act* and relevant several secondary regulations in which internationally endorsed criteria and standards had been incorporated (ICRP 60/72 –BSS, relevant EU directives). As regards the hazards other then radiological (4v), in the situation when operations with spent fuel in Poland limited only to wet storage and preparation to dry storage by encapsulation of fuel elements without des-integrating them, the serious chemical and other important hazards do not exist. Nevertheless the general rules of health protection in work are always applied and relevant regulation's requirements have to be observed and satisfied. Aim to avoid impacts (4vi) and undue burdens(4vii) on future generations is reflected in the Chapter VI of *Regulation on radioactive waste and spent nuclear fuel*.

Article 5. EXISTING FACILITIES

Text of Article 5:

Each Contracting Party shall take the appropriate steps to review the safety of any spent fuel management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility.

Spent fuel storage facilities no19 and 19A and MARIA reactor interim storage pool.

The investigations on the technical state of spent fuel elements, temporarily stored in the water ponds of storage facilities no 19 and 19A as well as of the MARIA reactor, performed within the Strategic Governmental Programme, showed the corrosion of cladding material and releases of fission products. It is planned to encapsulate all stored fuel elements and placed them in a new dry storage facility. In February 2003 the encapsulation process of MR-

6 MARIA RR spent fuel was commenced by its operator - the Institute of Atomic Energy in Swierk. Amount of ca.130 SFA was encapsulated in the years 2003-2005.

Article 6. SITING OF PROPOSED FACILITIES

Text of Article 6:

1. ***Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed spent fuel management facility:***
    1. ***to evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime;***
    2. ***to evaluate the likely safety impact of such a facility on individuals, society and the environment;***
    3. ***to make information on the safety of such a facility available to members of the public;***
    4. ***to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.***

In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 4.

Both encapsulation and dry storage facility are planning to be located in the building of former EWA reactor at Świerk Centre.
The technology of spent fuel encapsulation is being prepared in the frame of PHARE Project which stared in the year 2004.
Encapsulated fuel elements will be placed again in the water ponds until the dry storage facility is available. Relevant information will be provided to the public as well as the consultations performed with Parties concerned, if required.

Article 7. DESIGN AND CONSTRUCTION OF FACILITIES

Text of Article 7:

Each Contracting Party shall take the appropriate steps to ensure that:

- ***i. the design and construction of a spent fuel management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;***
- ***ii. at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a spent fuel management facility are taken into account;***

the technologies incorporated in the design and construction of a spent fuel management facility are supported by experience, testing or analysis.

The requirements regarding the design and construction of spent fuel management facility will include providing for suitable measures to limit possible radiological impacts on individuals, society and the environment.
At the design stage the technical provisions for the decommissioning of spent fuel management facility will be taken into account.
The technologies incorporated in the design and construction will be developed with the assistance of experienced specialists and supported by testing and analysis.

Article 8. ASSESSMENT OF SAFETY OF FACILITIES

Text of Article 8:

Each Contracting Party shall take the appropriate steps to ensure that:

- ***i.*** ***before construction of a spent fuel management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;***
- ***ii.*** ***before the operation of a spent fuel management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).***

The requirements to perform appropriate safety assessments of the spent fuel facility to be constructed or operated and to submit the relevant safety documentation to the President of the National Atomic Energy Agency, is prerequisite to obtain the relevant licenses for this stages.

Article 9. OPERATION OF FACILITIES

Text of Article 9:

Each Contracting Party shall take the appropriate steps to ensure that:

- ***i.*** ***the licence to operate a spent fuel management facility is based upon appropriate assessments as specified in Article 8 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;***
- ***ii.*** ***operational limits and conditions derived from tests, operational experience and the assessments, as specified in Article 8, are defined and revised as necessary;***
- ***iii.*** ***operation, maintenance, monitoring, inspection and testing of a spent fuel management facility are conducted in accordance with established procedures;***
- ***iv.*** ***engineering and technical support in all safety-related fields are available throughout the operating lifetime of a spent fuel management facility;***
- ***v.*** ***incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;***
- ***vi.*** ***programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;***

decommissioning plans for a spent fuel management facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body.

The facilities 19, 19 A and MARIA reactor have appropriate valid licences for operation, issued by the President of the National Atomic Energy Agency after assessment of safety of those facilities performed by regulatory inspectors on the basis of submitted safety documentation as well as inspections findings in the facilities. The licences include operational limits and conditions. In-service inspection programmes are performed by the facilities' Operators and relevant reports are regularly submitted for review to the NAEA Department for Radiation and Nuclear Safety. Engineering and technical support is provided if necessary. Operating experience is documented and reported to the NAEA. Incidents are notified through established emergency channels.

Article 10. DISPOSAL OF SPENT FUEL

Text of Article 10:

If, pursuant to its own legislative and regulatory framework, a Contracting Party has designated spent fuel for disposal, the disposal of such spent fuel shall be in accordance with the obligations of Chapter 3 relating to the disposal of radioactive waste.

The spent fuel disposal in Poland remains at research and planning stage only. Up to now no any spent fuel has been designated for disposal, all existing spent fuel from research reactors is in interim storage phase only. Some preliminary studies on possible siting for deep geological repository has been performed within Strategic Governmental Programme. The review of geological structure of the country has been done, from the point of view of possible potential sites. It was found that granite bedrocks in Poland are not suitable for repository placing due to the great number of cracks. The deposit of homogenous clay rocks and 3 salt dams fulfilling siting criteria were chosen for further examination.

SECTION H. SAFETY OF RADIOACTIVE WASTE MANAGEMENT

This section covers the obligations under the articles 11-17:

Article 11. GENERAL SAFETY REQUIREMENTS

Text of Article 11:

Each Contracting Party shall take the appropriate steps to ensure that at all stages of radioactive waste management individuals, society and the environment are adequately protected against radiological and other hazards.

In so doing, each Contracting Party shall take the appropriate steps to:

- ***i.*** ***ensure that criticality and removal of residual heat generated during radioactive waste management are adequately addressed;***
- ***ii.*** ***ensure that the generation of radioactive waste is kept to the minimum practicable;***
- ***iii.*** ***take into account interdependencies among the different steps in radioactive waste management;***
- ***iv.*** ***provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;***
- ***v.*** ***take into account the biological, chemical and other hazards that may be associated with radioactive waste management;***
- ***vi.*** ***strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;***
- ***vii.*** ***aim to avoid imposing undue burdens on future generations.***

According to *Atomic Law Act* the radioactive waste management activities as well as the relevant facilities have to be licensed by the Agency's President.
The license is granted on the condition that applicant shall prove fulfillment of all the relevant requirements set forth in the *Atomic Law Act* and secondary legislation related to the radioactive waste management as well as will be able to fulfill the requirements related to particular facility or activity, included in the license conditions.

In particular the general radiation protection standards and the radioactive waste safety requirements provided in the Chapters 3,4 and 7 of the *Atomic Law Act* (see **Annex 9**), have to be fulfilled. Also the more detailed provisions of the *Council of Ministers regulation on* *radioactive waste and spent nuclear fuel*, have to be satisfied. This regulation defines in particular the terms of storage and disposal of radioactive waste or spent nuclear fuel and the detailed technical requirements imposed on sites, facilities, compartments and packaging intended for the storage of radioactive waste categories as well as the detailed requirements imposed on various types of repositories and their siting, operation, construction and closure.

(see also further comments made to Article 4 on pages 35-36 of this Report)

Article 12. EXISTING FACILITIES AND PAST PRACTICES

Text of Article 12 :

Each Contracting Party shall in due course take the appropriate steps to review:

- ***i. the safety of any radioactive waste management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility;***
- ***ii. the results of past practices in order to determine whether any intervention is needed for reasons of radiation protection bearing in mind that the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including the social costs, of the intervention.***

The National Radioactive Waste Repository in Różan is the only repository in Poland. Some years ago, the releases of tritium have been observed. Therefore, an appropriate actions has been undertaken to monitor the situation development and planned to improve storage conditions with aim to diminishing of further tritium release.

In the frame of the PHARE Project performed in the years 2003 and 2004 the safety reports related to respectively the operation, closure and post-closure phase of the Różan facility were prepared. The operating phase report integrated all recent data concerning the safety of the site. The closure and post-closure reports have been prepared in line with international safety recommendations for radioactive waste management.

Article 13. SITING OF PROPOSED FACILITIES

Text of Article 13:

1. ***Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed radioactive waste management facility:***
    1. ***to evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime as well as that of a disposal facility after closure;***
    2. ***to evaluate the likely safety impact of such a facility on individuals, society and the environment, taking into account possible evolution of the site conditions of disposal facilities after closure;***
    3. ***to make information on the safety of such a facility available to members of the public;***
    4. ***to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.***

0. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 11.

All above requirements were strictly observed during preparation of the safety report for the final closure of the Rozan repository (see **Annex 3**) and will be followed when new waste management facilities will be sited.

Article 14. DESIGN AND CONSTRUCTION OF FACILITIES

Text of Article 14:

Each Contracting Party shall take the appropriate steps to ensure that:

- ***i. the design and construction of a radioactive waste management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;***
- ***ii. at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a radioactive waste management facility other than a disposal facility are taken into account;***
- ***iii. at the design stage, technical provisions for the closure of a disposal facility are prepared;***

the technologies incorporated in the design and construction of a radioactive waste management facility are supported by experience, testing or analysis.

The technical criteria and requirements regarding the design and construction of radioactive waste management facility will include provisions for suitable measures to limit possible radiological impacts on individuals, society and the environment.
At the design stage the technical provisions for the decommissioning of radioactive waste management facility will be taken into account.
The technologies incorporated in the design and construction will be developed with the assistance of experienced specialists and supported by testing and analysis.

Article 15. ASSESSMENT OF SAFETY OF FACILITIES

Text of Article 15:

Each Contracting Party shall take the appropriate steps to ensure that:

- ***i. before construction of a radioactive waste management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;***
- ***ii. in addition, before construction of a disposal facility, a systematic safety assessment and an environmental assessment for the period following closure shall be carried out and the results evaluated against the criteria established by the regulatory body;***

before the operation of a radioactive waste management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).

The requirements to perform appropriate safety assessments of a radioactive waste management facility to be constructed or operated and to submit the relevant safety documentation to the President of the National Atomic Energy Agency, is prerequisite to obtain the relevant licenses for this stages.

Article 16. OPERATION OF FACILITIES

Text of Article 16:

Each Contracting Party shall take the appropriate steps to ensure that:

- ***i. the licence to operate a radioactive waste management facility is based upon appropriate assessments as specified in Article 15 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;***

ii. ***operational limits and conditions, derived from tests, operational experience and the assessments as specified in Article 15 are defined and revised as necessary;***
iii. ***operation, maintenance, monitoring, inspection and testing of a radioactive waste management facility are conducted in accordance with established procedures. For a disposal facility the results thus obtained shall be used to verify and to review the validity of assumptions made and to update the assessments as specified in Article 15 for the period after closure;***
iv. ***engineering and technical support in all safety-related fields are available throughout the operating lifetime of a radioactive waste management facility;***
v. ***procedures for characterization and segregation of radioactive waste are applied;***
vi. ***incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;***
vii. ***programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;***
viii. ***decommissioning plans for a radioactive waste management facility other than a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body;***
ix. ***plans for the closure of a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility and are reviewed by the regulatory body.***

The Radioactive Waste Management Plant as well as the National Repository for Radioactive Waste in Rozan have appropriate valid operating licences, issued by the President of the National Atomic Energy Agency after assessment of safety of those facilities performed by regulatory inspectors on the basis of submitted safety documentation as well as inspections findings in the facilities. The licences include operational limits and conditions. Operation, maintenance, monitoring, inspection and testing programmes are performed by the facilities' Operators and relevant reports are regularly submitted to the NAEA Department for Radiation and Nuclear Safety for review. Engineering and technical support is provided if necessary. Operating experience is documented and reported to the NAEA. Incidents are notified through established emergency channels.

Article 17. INSTITUTIONAL MEASURES AFTER CLOSURE

Text of Article 17:

Each Contracting Party shall take the appropriate steps to ensure that after closure of a disposal facility:

i. ***records of the location, design and inventory of that facility required by the regulatory body are preserved;***
ii. ***active or passive institutional controls such as monitoring or access restrictions are carried out, if required; and***

if, during any period of active institutional control, an unplanned release of radioactive materials into the environment is detected, intervention measures are implemented, if necessary.

It is planning that the Różan repository will operate until 2015 – 2020. On the basis of updated safety report for final closure of the repository, time scale for institutional control, as well as, post-closure activity has been established. Post-closure safety report defines the scope of this activity. The obligation of Article 17 of the Convention have been also addressed in this report.

SECTION I. TRANSBOUNDARY MOVEMENT

This section covers the obligations under the article 27 of the Convention

Article 27. TRANSBOUNDARY MOVEMENT

Text of Article 27:

1. ***Each Contracting Party involved in transboundary movement shall take the appropriate steps to ensure that such movement is undertaken in a manner consistent with the provisions of this Convention and relevant binding international instruments.***

   In so doing:

    1. ***a Contracting Party which is a State of origin shall take the appropriate steps to ensure that transboundary movement is authorized and takes place only with the prior notification and consent of the State of destination;***
    2. ***transboundary movement through States of transit shall be subject to those international obligations which are relevant to the particular modes of transport utilized;***
    3. ***a Contracting Party which is a State of destination shall consent to a transboundary movement only if it has the administrative and technical capacity, as well as the regulatory structure, needed to manage the spent fuel or the radioactive waste in a manner consistent with this Convention;***
    4. ***a Contracting Party which is a State of origin shall authorize a transboundary movement only if it can satisfy itself in accordance with the consent of the State of destination that the requirements of subparagraph (iii) are met prior to transboundary movement;***
    5. ***a Contracting Party which is a State of origin shall take the appropriate steps to permit re-entry into its territory, if a transboundary movement is not or cannot be completed in conformity with this Article, unless an alternative safe arrangement can be made.***

0.A Contracting Party shall not licence the shipment of its spent fuel or radioactive waste to a destination south of latitude 60 degrees South for storage or disposal.

0.Nothing in this Convention prejudices or affects:

- ***i. the exercise, by ships and aircraft of all States, of maritime, river and air navigation rights and freedoms, as provided for in international law;***
- ***ii. rights of a Contracting Party to which radioactive waste is exported for processing to return, or provide for the return of, the radioactive waste and other products after treatment to the State of origin;***
- ***iii. the right of a Contracting Party to export its spent fuel for reprocessing;***

rights of a Contracting Party to which spent fuel is exported for reprocessing to return, or provide for the return of, radioactive waste and other products resulting from reprocessing operations to the State of origin

The transboundary movements are regulated by the Council of Ministers' regulations on the issuing of the permits for the import to, export from, and transit through the territory of Poland of radioactive waste and spent nuclear fuel, both issued on 27.04.2004, OJ (Dz. U. 2004), no 98 items 985 and 986, replacing former regulation 215/1817 - 05.11.2002; The regulations have implemented relevant European Commission directives and include the same rules, procedures and related documents and forms.

SECTION J. DISUSED SEALED SOURCES

This section covers the obligations under the article 28 of the Convention

Article 28. DISUSED SEALED SOURCES

Text of Article 28:

1. ***Each Contracting Party shall, in the framework of its national law, take the appropriate steps to ensure that the possession, remanufacturing or disposal of disused sealed sources takes place in a safe manner.***

A Contracting Party shall allow for reentry into its territory of disused sealed sources if, in the framework of its national law, it has accepted that they be returned to a manufacturer qualified to receive and possess the disused sealed sources.

Poland allows the reentry of disused sealed sources into its territory for return to a manufacturer. The disused sealed sources of foreign origin, which had been used in Poland and cannot be return to the foreign manufacturer form the separate category of waste and are safely stored by the RWMP.

SECTION K. PLANNED ACTIVITIES TO IMPROVE SAFETY

International Cooperation

PHARE PROJECTS

1) "Improvement of the storage conditions and closure of the National Radioactive Waste Repository – Różan"
   - implementation of the results of the project
2) "Development of the technology and procurement of equipment for encapsulation of spent nuclear fuel arising from operation of Polish research reactors"
   - project finalization: installation of equipment, performing encapsulation tests, and
   - development of routine encapsulation of fuel from former EWA RR

IAEA TC PROJECTS

3) Highly Enriched Uranium (HEU) Spent Fuel Repatriation Project; Preparation within Global Threat Reduction Initiative (GTRI) to:
   - Conversion MARIA RR from HEU to LEU fuel
   - Evacuation of spent HEU fuel to manufacturer in former Soviet Union

SECTION L. ANNEXES

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Annex no.1

Nuclear sites in Poland

Research reactors

The only Polish **operational reactor „MARIA"** is a high flux **channel-pool type** one, of nominal thermal power **30 MW** (**first criticality date 1974/18/12**), at present operating at about 20 MW thermal power, and used mostly to isotopes production and targets irradiation. It was operating at the time of entering into force of the Convention, after an extensive process of upgrading. In the years 1999-2002, a process of conversion (from 80% to 36% enriched fuel) of the MARIA reactor core was completed. The facility, **operated by the Institute of Atomic Energy in Swierk (IAE)**, is subject to process of its constant upgrading and accommodation to actual tasks.

All spent fuel from this reactor is stored, up to now in a special pool connected to the reactor pool inside the reactor building (**AR, wet** type of storage). Preparations are in progress for a dry storage of this fuel, first step was the encapsulation process, started in the year 2003 when the first 40 fuel assemblies were encapsulated in the stainless steel containers with inert gas. The process of encapsulation has been continued in the years 2004 and 2005 when further 90 fuel assemblies have been encapsulated.

The first research **reactor "EWA"** (pool type) 10 MW_{th} (first criticality date **1958/06/14**), used for isotopes production and physical experiments in horizontal channels, was shut down and unloaded of fuel in 1995. Its **decommissioning** process, authorized under general permission issued to its **operator (IAE)** - in 1997, recently has reached the end of its **2nd stage**, according to IAEA definition. The spent fuel unloading, decontamination and the majority of dismantling works were performed by IEA before the year 2002, when the facility was handed over together with spent fuel facilities to the newly created State owned public utility enterprise Radioactive Waste Management Plant (RWMP). Since the beginning of the 2002 RWMP has been continuing of EWA decommissioning works and operating 2 separate facilities containing all EWA reactor spent fuel (**AFR, wet** type of storage), under the new license issued by the NAEA President.

Former **critical assembly "ANNA"** (first criticality date **1963/01/01**), **zero-power reactor "AGATA"** (pool type, first criticality date **1973/05/05**) and **small power (100 kW_{th}) reactor "MARYLA"** (pool type, first criticality date **1967/02/01**) long ago had been **permanently shut-down**, unloaded of fuel and **dismantled**.

Both facilities as well as the water ponds containing spent fuel from above RRs (more than 5000 SF assemblies) are sited at nuclear research centre in Swierk , where also waste treatment and storage facilities for ILW and LLW are located. Spent sealed radioactive sources (SSRS) of high activity are also temporarily stored at Swierk. Another nuclear site in Poland is Rozan Radioactive Waste Repository, for near-surface disposal of LILW institutional waste, SSRS and for interim storage of alpha waste.

Spent fuel facilities

Spent fuel from MARIA reactor is stored in the MARIA reactor operated by IEA (**AR, wet**), spent fuel from other reactors and critical assemblies is stored in the 2 separated facilities (**AFR,wet**) at Swierk, operated by RWMP. No SF has ever been returned to the Russian supplier. Some fuel has been in interim wet storage since 1958. EU sponsored project is underway to start encapsulation of SF from facilities operated by RWMP and to prepare interim dry storage in the former EWA reactor building.

Radioactive waste facilities

RWMP operates the following installations and facilities at Swierk site and Rozan site:

Swierk:
Treatment and storage of ILW and LLW liquid waste and LILW solid waste: evaporation facility and membrane separation facility, chemical treatment facilities (liquid waste), cementation unit, bituminisation unit, hydraulic press (12 ton), temporary storage facility.

Rozan (the site was originally a military fort, converted to a repository in 1961)
Near-surface repository / storage. LILW Institutional waste, SSRS, Interim storage in case of alpha waste. Low- and intermediate-level beta and gamma waste is being disposed of in a moat area (facility no. 8), and alpha-bearing waste is being placed in temporary storage in facility no.1. The PHARE project on the closure of the repository, at present (2004) underway, specifically considered the decommissioning options regarding facilities nos. 2 and 3 at the site, including waste retrieval, repackaging and re-disposal.
It is currently the only radioactive disposal site available in Poland. It is likely that another site for a national repository for future waste arising will eventually have to be found. Indeed, in 1999 Poland completed a three-years Strategic Governmental Programme covering all aspects of present and possible future radioactive waste management in the country. Not only did this deal with the siting issue regarding a replacement for the Rozan facility but also considered the waste implications on a future national nuclear power programme (i.e. deep geological repository). This detailed examination of areas suitable for near surface repository siting resulted in 19 sites being chosen for *in-situ* geological investigations. Unfortunately, none of the local authorities concerned are currently in favour.

Uranium mining

Most mining activities took place in the south-west of the country. Mining of ore ended in 1968, and processing was terminated in 1973. There are some 100 dumps, mostly abandoned, of waste rock and ore totalling approximately 1.4×10^6 m^3 as well as one tailing pond, which is has been the object of a remediation project partly funded by the European Commission.

Annex no.2

Development of facility for interim storage of encapsulated spent fuel on the site of the decommissioned EWA reactor.

During operation of EWA reactor at Swierk different fuel elements like EK-10 and WWR have been deployed. The spent fuel elements are stored under water in the two storage ponds in building 19 and 19A. Periodic quality inspections ensure the safety of the stored fuel elements. Corrosion on the surface of the fuel elements surface was find due to these inspections.
This fact led to the decision to build a dry storage in the former vault of EWA reactor. In the year 2004 the project was launched to develop technology and to construct a facility in EWA reactor building to start encapsulation of spent fuel from this reactor. This project, co-financed by European Commission within PHARE contract with German company BBN (Babcock Noell Nuclear GmbH), continued through the year 2005. The spent fuel elements will be loaded into airtight capsules. The encapsulation of the fuel elements will be done in hot cell especially constructed for that reason (design and construction financed from the State budget.The PHARE contract's specific objective are:

- to develop the encapsulation technology to be used for the dry store
- to procure the relevant materials, equipment and instrumentation
- to install the equipment and test the encapsulation technology to be used for the dry storage

The contract includes the following tasks:

- analysis of the existing equipment applicability to transport SFA from the storage ponds to the EWA RR
- development of the encapsulation technology to be used for the dry storage
- identification of the needs for the equipment and instrumentation
- determination of the technical specification for the equipment and instrumentation
- setting-up of a procedure for quality control of the encapsulation technology
- safety analysis of the encapsulation technology
- purchase of specified equipment and instrumentation
- definition of a work plan for the practical implementation of the encapsulation technology
- approval of the plan by the National Atomic Energy Agency (NAEA)
- first trials of SFA transport and encapsulation

The preparation of the Preliminary Safety Analysis Report as well as the Environmental Impact Assessment will be performed in the early implementation of the project so that license can be issued in time to carry out the first encapsulation tests. National Atomic Energy Agency will be involved in the licensing process.

After completion of construction of hot cell (ZUOP and BNN) and modification of transportation equipment (ZUOP) preliminary testing of encapsulation technology may commence. These tests will be performed by RWMP personnel and witnessed by NAEA and BNN.The following SFA will be encapsulated: type EK-10, WWR-M2 and WWR-SM.

Because the new dry store will not be constructed before the contract is finished, the encapsulated elements will be returned to the ponds in the facility no.19 and 19A. For this reason the first trials to be performed will consist in the following sequence of actions:

- extraction of selected SFA and pins from storage ponds;
- organisation of transport of SFA and pins to the hot-cell of the EWA RR building; encasing SFA and pins into leak-tight cans;
- transportation of the cans with SFA and pins to the spare pond of the facility no.19A and no. 19;
- checking of the storage conditions using the instrumentation in the pond (visual testing, helium leakage) and control of water (chemistry, conductivity, Cs-137 concentration)

After three successful encapsulation in the hot cell the encapsulation technology is implemented. Following that, technical acceptance takes place and warranty commences.

An important aim of the project is to perform a transfer of know-how from BNN to the concerned organisations in Poland in order to allow them in the future to perform similar work on their own, integrating the feedback of Western European experience. To achieve this transfer of know-how, it is essential that BNN will work together as far as possible in close relation with these organisations. In this context the role of these organisations will not be limited to provide background information and solve local organisational problems, but it will include, under the BNN guidance, active participation in project related tasks, in order to receive an efficient on-the-job training. This working relation will also ensure that the project results can be adapted to the local structure and needs.

Annex no. 3

EU PHARE project – „Improvement of storage conditions and closure of the National Radioactive Waste Repository – Różan”

General objective of the project was to increase the safety of the Różan repository and its further operation until 2020. Main efforts focused on the preparation on up-dated safety report for renewal for the license for the operating phase and the safety report for closure and post-closure phase of the repository. The scope of the project has been covered by the Tasks 1 ÷ 10. A brief description of the technical activity, results and conclusions is given below.

Task 1 – Review of existing safety documentation

Task 2 – Establishing of an inventory of all types of radioactive waste currently stored and/or disposed of in the facility

The objectives identified for these tasks have been achieved, namely:

- Identification of the data requirements
- Identification of gaps, uncertainties in the inventory data
- making an estimation to fill in the gaps in the inventory data
- collating all the relevant information, including the existing safety reports
- identification of gaps in the safety reports.

As a result of work on Task1 and 2, the up-dated inventory of all waste for Różan repository has been prepared. The great effort was concerned the long-lived waste presently stored in the Różan facility and the long-lived waste that might remain after the facility is closed.

Task 3 – Determination of safety objectives

As the safety reports produced within this project needed to be approved by the Polish regulator (NAEA), the following activities were identified within Task 3.

- Determination of the operational safety objectives;
- Determination of the Assessment Context for the post-closure safety report;
- Identification of relevant Features, Events and Processes;
- Definition of post-closure assessment scenarios for normal evolution of the repository and for abnormal events.

These safety objectives were used as a basis for the updating of the safety reports. The work was concentrated on determination of an assessment context. The basic assumption for assessment, assessment purpose, the regulatory requirements, assumptions relating to the site characteristics and storage/disposal facility, the required endpoints, timescale and spatial domain have been considered.

The calculations of doses for the critical group of the population on the basis of scenarios proposed were done. These included groundwater pathway and human intrusion. The different inventory was taken to the calculations.

The proposed scenarios were based on the process “system” which included features, events and processes (FEPs), as well as, on the System Environment (EFEPs) concerning on environmental changes and future human behaviour.

As the results of the post-closure scoping calculations undertaken to support BPO and the findings of Task 4 were used to modify the post closure assessment scenarios.

Task 4 – Analysis of the variations of tritium concentration in ground water

The main objective of this task was updating existing models of radionuclide migration by undertaking the following:

- Presenting the evidence for the conceptual hydrological models of the site;
- Presenting the H-3 monitoring data and interpreting the consequences arising for H-3 transport;
- Presenting the previous numerical modelling studies (VS2D, ANPLA, FEMWATER);
- Determining potential for hazard arising from H-3 and other contaminants.

Existing models were compared with a new two conceptual models.
One of them was recognized to be a more plausible description of the behaviour of groundwater system and was adopted for the scoping calculations for the purpose of the Post-Closure Safety Report.
The risks to the public from releases of radionuclides in groundwater during the operation and closure of the site are considered to be low based on the information currently available, for the following reasons.

- The closure of the site anticipates the retrieval of the waste (including alpha bearing waste) in some facilities what will remove potential source terms.
- Facility 8 (dry ditch) will be capped on closure reducing further the potential for radionuclide leaching in the short-term.
- Monitoring data do not show concentrations of radionuclides outside the site boundary at levels appreciably above background.
- A preliminary modelling analysis based on Conceptual Model suggests that the H-3 expected outside the site boundary would result in a dose below 0.1 mSv/y.
- The groundwater is not anticipated as being used for drinking water supply on these timescales and no occurrences on contaminated springs or groundwater seepages have been documented to date.

Task 5 – Development of technical specifications for the remediation of tritium releases

As a result of implementation of Task 4, it was showed that the risk the public from releases of tritium in groundwater during the operation and closure of the site is insignificant. The current monitoring has shown the presence of elevated tritium concentration within the repository boundary. No levels of beta activity above background have been detected outside the repository boundary. Over the period between now and closure, there will be a further decay of tritium currently disposed (to ~ 40% of its current value) and the site closure plan (which includes retrieval of waste from facility considered as a source of tritium release) will result in the removal of any potential undocumented source within facility. For this reason work carried out within this task was concentrated on the selection of Best Practicable Option (BPO) for closure of the Różan site.
Methodology used to assess the option for closure of the repository was closely based on a Best Practicable Environmental Option (BPEO). It consists of evaluating the available options against a range of attributes to provide a basis for determing the BPO.

Task 6 - Development of technical specification for a long-term monitoring programme

The objectives of this task were as follows:

- Identify regulatory requirements for the long-term monitoring programme based on Polish and international guidelines.
- Assess the current monitoring regime is terms of meeting the radiological protection objectives and accuracy of the monitoring procedure and location of observation points, as well as, critical pathways and exposure.

- Recommendations for monitoring programme for future activities i.e. for site operation until 2020, site closure and post-closure phase.
- As a result of work carried out within this task, the technical specification for monitoring programmes for above mentioned phases of the repository, were developed.

Task 7 - Up-dating of the safety report related to the operation of the disposal facility

The main objective of this task was updating of the operational safety report. Potential faults and hazards associated with normal operation and accident scenarios have been identified and assessed using the existing reports as the basis for this assessment.
The operational safety report has been prepared with use of:

- current operational safety report
- data collected in Task 1
- gaps identified in Task 1
- revised inventory in Task 2
- safety objectives from Task 3
- update the mathematical model of radionuclide migration from Task 4.

The report satisfies the requirements of the Polish Atomic Law of 29th November 2000 and regulatory requirements that emanate from this Law. This report is also addresses the operation of the site in the context of the relevant recommendations of the International Atomic Energy Agency and the International Commission on Radiological Protection (ICRP).

Task 8 - Preparation of the safety report for the final closure of the facility

The report considers the site closure strategy including needs to retrieve the waste, monitoring requirements and engineering features and examine safety of repository during closure.
The report has been prepared with the compliance with Polish and international regulations. According to the Polish regulation only short lived waste should remain at Różan after closure. The National Atomic Energy Agency – Polish Regulator has ruled that limited amount of long-lived waste can remain at the repository provided that an acceptable post-closure safety case can be mode.
The basic features for site closure are as follows:

- Continued operation until 2020. Short-lived waste consisting of gamma sources and other short lived waste would continued to be stored in the repository at separated facilities. Long-lived waste would continued to be stored in separate facility, as well.
- At the site closure, all waste from some facilities would be retrieved. This waste would then be assayed and repacked in a new treatment facility at Różan site. Long lived waste would be sent off to a new underground repository. Short-lived waste would remain on site and be emplaced in Różan repository. Short-lived disused SRS would also remain on site. Storage facilities would be backfilled by concrete and an engineered soil cap installed over the whole site.
- The plan involves a small amount of long-lived waste that is currently in one of the facilities remaining on the Różan site. Assessments have shown that this does not constitute an unacceptable hazard and that off site doses due to this residual long-lived waste remaining at Różan are below the relevant Polish limits (post Closure Safety Report).
- The time required for implementation of engineering plan for closure site extends over 9 years.
- The assessment shows that the management and engineering plan for the closure can be implemented in the way that maintains the exposure of the

workers to radiation ALARA and ensures that no worker exceeds the annual dose limit of 20 mSv/y specified in Polish Atomic Law.

- A quantitative assessment of the engineering features of the planned retrieval process and semi qualitative assessment of doses due to radon, show that none of the operations associated with the Różan site closure will load to a measurable release of air-born radioactivity to the public or off-site environment.

Task 9 - Draft of the safety report for post-closure phase of the repository

The objective of this task was to present post-closure assessment for Różan repository. On the basis of the safety report for final closure of the repository, time scale for the institutional and post-institutional control, as well as, post-closure activity programme has been established. This programme complies the following essential goals of post-closure activity:

- to help in ensuring that information about the existence of the repository and basic knowledge built up throughout the repository lifetime is not lost for future generation,
- to provide reassurance to the public that repository is safe,
- to help in preventing misuse of the contents of the repository.

A methodology in line with that developed by the IAEA's recent Improvement of Safety Assessment Methodologies for Near Surface Disposal Facilities (ISAM) project has been followed in undertaking this post-closure safety assessment for Różan site.
As a part of the ISAM methodology an assessment context has been defined taking into account relevant Polish regulations, as well as, international recommendations and other national best practice. The ISAM FEP list has been used in order to determine those scenarios of potential radiological interest. Both Normal Evolution and Altered Evolution scenarios have been identified.
The post-closure assessment was based on the inventory that would be left in the site at closure following the implementation of the preferred option identified in the BPO study conducted for Task 5 and also used in Task 8.

Task 10 – Finalisation of the safety reports after reviewing by the Polish stakeholders

Task 7, 8 and 9 safety reports were reviewed by the Beneficiary – Ministry of Economy and Labour, the National Atomic Energy Agency and Radiological Commission of Różan. The final versions of the safety reports were approved by the President of the National Atomic Energy Agency. The final report summarising the results and recommendations was also prepared and issued.

Annex no. 4

“Radioactive Waste and Spent Fuel Management in Poland” -
The Governmental Strategic Programme Scope and Developments

The Programme consisted of 9 mutually inter-linked undertakings and 4 research and development projects and resulted in the following developments in 6 areas of interest highlighted below:

- ***Legislative work***

The aim of legislative work was to achieve full coherence of national regulations concerning the management of radioactive waste and spent fuel with the regulations of European Union, taking into account, as far as possible, the International recommendations. Moreover, the legislative work was aiming at creation of the organisation system for waste management in conformity with the European standards.

Draft regulations (on the level of parliamentary bill and that of executive regulations) on the management of radioactive waste and spent nuclear fuel have been prepared – in accordance with the EU requirements and IAEA guidelines as well as with the Joint Convention requirements. Moreover, the work resulted in creation legislative framework provided for changes in an organisation system for waste management in conformity with the European standards.

- ***Conception of closing of Różan repository.***

The purpose of this undertaking was the elaboration of variant conception of closing of Różan repository.

A conception for the closure of the current disposal facility in Różan has been prepared in six variants, where the basic ones involved a multi-layered soil cover, a concrete cap and a partial or total evacuation of collected waste. Appropriate analyses of safety and environmental impact have been performed.The choice of variant and the realisation of the chosen conception will be done after the decision of closing the repository. This decision depends on the technical possibilities of site operation and on the further acceptance of local community. According to present concepts **the operation of Różan repository should be continued as long as possible, provided that all safety conditions be fulfilled.**

- ***Conception of further management of spent fuel from Polish research reactors***

The R&D project conducted with reference to the spent fuel included the following items: characterisation of the existing inventory of fuel as a function of fuel type, age in storage and burn-up, characterisation of the physical conditions of the fuel (underwater video records and eventually ultrasonic characterisation of pitting profiles), identification of leaking fuel elements (sipping tests), development of technology for encapsulation of damaged fuel elements, definition of criteria of extended interim storage, recommendation to the Government on final solution.

The investigation of the state of some chosen spent fuel elements used in EWA and MARIA reactors showed that their long-term storage in water environment led to cladding surface degradation, caused by corrosion. In case of some fuel elements this process leads to leaks of fission products into storage facility water environment. Using the results from spent fuel research, a more detailed conception for dry storage of such fuel has been prepared, involving the building of decommissioned EWA reactor and some of its equipment[5].

- ***Siting activities for the near-surface repository for low and medium activity waste.***

The <u>first step</u> of the work comprised:

- *the elaboration of detailed siting criteria for the near-surface repository of radioactive waste,*
- *the review of several repository sitings proposed earlier and reinterpretation of the data,*

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[5] According to this conception, after removal of the reactor vessel, equipment and thermal column blocks and after cutting out the cast-iron supporting plate special separator with storing channels, made of stainless steel could be installed in the shaft of the reactor concrete shield. In parallel other technologies like dry storage of NUHOMS type or CASCADE were studied.

- the elaboration of geological characteristics (basing on archival materials) for the regions proposed for siting, according to social and economic analysis;

In the second step the more detailed examination of areas with perspective for repository siting has been performed.The boreholes and hydrogeological examinations have been done for 16 sites. Altogether, 50 boreholes were made down to the depth of 15 m.

As a result of the analysis of these areas, 19 sites situated in 12 communes were chosen for geological research *in situ*. The selection of the most promising regions was performed. Unfortunately, the acceptance of local authorities for siting the repository until the end of the project was not gained.

• Siting activities for the repository in deep geological formations.

In the frames of SGP the following works have been done:

- *criteria for the siting of future Polish repository for HLW and SNF have been elaborated;*
- *inventory of deep mines existing in Poland has been done and the possibility of their use, after closing, as radioactive waste repositories has been examined. (such a solution is economically very advantageous. However, after the examination of existing Polish mines it was concluded, that none of them would suit the purpose).*
- *review of geological structure of the country has been done, from the point of view of possible potential sites for future repository. 44 rock structures were chosen for preliminary analysis, comprising:*
  - *magma and metamorphic rocks – 17*
  - *clay formations – 7*
  - *salt deposits – 20*

It was found that granite bedrocks in Poland are not suitable for repository placing due to the great number of cracks.
The deposit of homogenous clay rocks ca. 200 m thick in basin Kotlina Przedsudecka was assigned to further examinations.
Also 3 salt deposits (domes) (Damasławek, Łanięta and southern part of Kłodawa deposit), fulfilling siting criteria were chosen for further examination.

- ***Public information***

The information for the public about radioactive waste management and safe storage was prepared in several forms, among others, the permanent exhibition" Radioactive waste problems and solutions", and the popular booklets, movies and lectures.

Conclusions

Governmental Strategic Programme: "Radioactive waste and spent fuel management in Poland" provided, apart from the solving of several current problems of securing the continuity of safe and effective radioactive waste management, the basis for further decisions concerning the nuclear power programme. **The fundamental question whether is it possible, in Polish conditions, to solve the problem of highly radioactive waste disposal was answered affirmatively.**
The possible methods of future solution of long-lived radioactive waste problem have been studied. The present status of knowledge permits the statement that the transmutation method gives a far-sighted option for the solution of this problem. The main argument in its favor is the possibility of using the enormous energy reserves remaining in spent nuclear fuel. At the same time one should stress that the present level of technological development allows to expect that it will be possible to implement this method on an industrial scale in 2-3 decades. The rational continuation of further research on transmutation in Poland essentially will depend on the increase of research potential and on increased financial resources.

Annex no.5

Decommisioning of the EWA research reactor in Poland
(includes excerpts from NAEA paper presented at Workshop on Policy and Regulatory Aspects of Decommissioning in MOL Belgium 7-8 June 1999)

1. Introduction

Stage 1st and stage 2nd decommissioning of the EWA research reactor has been successfully completed. The spent fuel unloading, decontamination and the majority of dismantling works of EWA reactor were performed in the years 1996-1999.

2. Decommissioning policy

Poland has adopted the 3 stages decommissioning procedures according to IAEA recommendations:

- Stage 1 - safe enclosure with surveillance ("cooling" contaminated and irradiated materials);
- Stage 2 - restricted site release (dismantling the contaminated and irradiated installations);
- Stage 3 - unrestricted site release.

Achieving the 3-rd stage is not obligatory. A facility being dismantled after reaching 2-nd phase (building, biological shields) could be used for several purposes related to spent fuel and waste management or applications of nuclear techniques (repository, irradiation chamber etc.).

Since no commercial nuclear facilities in Poland there is not foreseen (in closest future) to establish enterprises specialised in an execution of decommissioning programmes. Such programmes for research reactors are being implemented and accomplished by the operator (licensee).

Decommissioning programmes for nuclear research reactors are financed by the state budget through the budget of the National Atomic Energy Agency. The respective funds are granted yearly. The decommissioning procedures are accomplished in the frames of year-long contracts supervised by the NAEA Department of Science and Technology.

The strategy of the decommissioning should be adapted to each case individually and should take into account the history of the facility and, if foreseen, its future use. The principle to keep the risks *As Low As Reasonably Achievable* is to be respected during planning, implementing and accomplishing the decommissioning/dismantling procedures.

The implementation of a decommissioning programme needs a respective plan. The following issues are subjects of considerations before preparing the decommissioning plan:

- Legal basis and international recommendations for the decommissioning;
- Location of facility and the history of its exploitation;
- Overall technical condition of the facility after shut down;
- Technical specification of installation being a subject of dismantling;
- The scope of dismantling and a future destination of facility after decommissioning (if foreseen);
- Inventory of activities of contaminated and irradiated materials;
- Technologies and tools applied during the execution of decommissioning programme;
- Foreign experiences in decommissioning;
- Inventory of radioactive waste arisen during the execution of decommissioning programme;
- Waste management and disposal;
- Radiological protection and industrial safety;
- Environmental impact;
- Training programmes for staff engaged in dismantling procedures;

- Emergency plans;
- Quality programme for decommissioning;
- Costs estimation;
- The guidelines for a final report on decommissioning programme.

The decommissioning plan contains the results of all the considerations mentioned above and a timetable of decommissioning programme. The timetable divides the decommissioning/dismantling activities into year-long stages according to the scheme of financing the programme. The year-long stages are divided into steps concerning dismantling specific parts or installations. For each step a technological instruction is prepared in order to ensure a safety of dismantling. The decommissioning plan and dismantling instructions are prepared by the operator.

An overall licence for implementing and executing the decommissioning programme is issued by the President of National Atomic Energy Agency after acceptation of decommissioning plan and after review and assessment of relevant safety documentation, attached to the formal application for decommissioning licence.

The permissions for accomplishment of each individual step have been issued by the NAEA Department of Radiation and Nuclear Safety after acceptation of a respective safety documentation including staff training programmes and technological instructions.

The direct radiological control is executed by the operator's (Institute of Atomic Energy - IEA) Department of Radiation Protection and Radiometry. The activities concerning radiological protection are supervised by the NAEA Department of Radiation and Nuclear Safety, Division of Regulatory Assessment and Inspections.

A decommissioning programme is considered to be completed after approval of the final report on decommissioning by the President of NAEA.

3. Decommissioning of EWA research reactor

In February 1995 it was decided to shut down the EWA research reactor after 37-years operation. It was also a time of beginning the procedure of planning, implementing and executing the first decommissioning programme in Poland. The decommissioning was preceded by the defueling and removal of the control rods performed in the frames of ordinary operation activities.

3.1. Decommissioning plan and implementation of the decommissioning programme

The strategy of *recycle-reuse* has been adopted for decommissioning of EWA reactor. A plan was prepared by the IEA according to the procedure described above. It has been expected to stop the dismantling after completing the 2-nd stage (according to IAEA recommendations). The plan contained proposal to consider two options of future reuse of reactor building and biological shields:

- dry storage of spent nuclear fuel;
- irradiation chamber with ^{60}Co sources;

The plan was accepted by the President of NAEA. Decommissioning licence was issued on 23 May 1997. This day is regarded as a starting point of the implementation of the decommissioning programme of EWA reactor.

The limits of activity (contamination of surface and activity concentration) for unrestricted use of material from decommissioned EWA RR, established in the license, were as follows:

a. Level of removable contamination measured on surface area of 1 dm^2

- for beta emitters $\leq$ 0,4 Bq/cm^2
- for alpha emitters $\leq$ 0,04 Bq/cm^2

b. Activity concentration: 1,0 Bq/g

In the same license annual working limit of effective dose 5 mSv/year (dose constraint) was established for decommissioning workers and 0.1 DAC limit for effluents releases to the atmosphere. All these working limits were decreased by factor of 10 in comparison with the international standards.

The decommissioning programme has been executed step by step. The adopted principles of issuing the permits for all the steps of the programme have been strictly respected. The year-long stages have been subject of subsequent analysis and modifications according to progress of the decommissioning procedure and collection of the experience by the decommissioning team.

Individual doses have been measured by the test films controlled every 3 months. The persons involved in the decommissioning activities have been equipped with the on-line dosimeters for the current radiological control. The individual doses recorded during the period from starting the decommissioning programme have not exceeded the value of 5 mSv/y.

The contamination control of persons, equipment and premises has been performed after each action with radioactive material. The members of decommissioning team undergo the control by the whole body counter after completing certain operation concerning the decontamination and/or dismantling works.

3. 2. Timetable of decommissioning

planned / performed (or rescheduled)

No.	Specification	1997				1998				1999			
		q. 1	q.2	q.3	q.4	q. 1	q.2	q.3	q.4	q. 1	q.2	q.3	q.4
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1.	**Pre-decommissioning works**												
1.1.	Removal of experimental equipment from the reactor hall												
1.2.	Preparation and execution of training programme for dismantling team												
1.3.	Preparing the radiometric measuring method for qualification of wastes												
1.4.	Collection of decontamination materials, means and protective equipment												
1.5.	Collection of equipment and tools for dismantling												
1.6.	Technological system testing before dismantling												
1.7.	Collection of portable radiometric measurement equipment												
2.	**Reactor vessel internals dismantling (isotope irradiation channels, control rods and channels for ionisation chambers)**												
2.1.	Preparing the dismantling procedures and technological instruction												
2.2.	Preparing the tools for remote channel cutting												
2.3.	Preparing containers for radioactive waste												
2.4.	Dismantling works												
2.5.	Waste collection and disposal												

3. 2. Timetable of decommissioning (cont.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
3.	**Dismantling the beryllium blocks**												
3.1.	Preparing the dismantling procedures and technological instruction												
3.2.	Preparing the basket for beryllium blocks transport					The objectives 3.2. - 3.7. shall not be performed. The whole core basket (with beryllium blocks) was removed from reactor vessel, placed in a special container and transported to the repository (storage facility in the Institute of Atomic Energy). Time of storage 50 - 100 years).							
3.3.	Unloading the beryllium blocks to AR storage												
3.4.	Design, manufacturing and assembling the pond no. 1 in the spent fuel repository												
3.5.	Design and manufacturing the storage tank for beryllium blocks storage												
3.6.	Preparing the instruction for the transferee of the beryllium blocks to the storage facility												
3.7.	Beryllium blocks transferee to storage facility												
4	**General decontamination of the primary cooling circuit**												
4.1.	Preparing the technical requirements for the decontamination process	The objectives 4.1. - 4.2. shall not be performed. The two steps decontamination is not necessary.											
4.2.	Decontamination and disposal of wastes												

3. 2. Timetable of decommissioning (cont.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
5.	**Secondary cooling system dismantling**												
5.1.	Preparing the technological instruction					Objectives 5.1. - 5.3. shall be performed after completing the decommissioning programme (no radiological risk)							
5.2.	Dismantling the installations in secondary pumping house												
5.3.	Dismantling the cooling tower												
5.4.	Dismantling the installation in the reactor building												
5.5.	Collection and disposal of waste												
6.	**Dismantling the primary cooling system installation in the pumping room**												
6.1.	Preparing the technological instruction												
6.2.	Preparing the container for large-dimension waste			No solid waste after decontamination									
6.3.	Dismantling works (and decontamination)												
6.4.	Collection and disposal of waste												
6.5.	Preliminary pumping room decontamination												

3. 2. Timetable of decommissioning (cont.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
7.	**Thermal column dismantling**												
7.1.	Preparing the technological instruction												
7.2.	Design and manufacturing the shielding container for the graphite blocks from thermal column												
7.3.	Dismantling work												
7.4.	Waste collection and disposal												
7.5.	Decontamination of dismantling works area												
8.	**Core basket dismantling**												
8.1	Preparing the technological instruction												
8.2.	Design and manufacturing the shielding container for the core basket storage												
8.3.	Preparing the transport equipment for the core basket transferring to shielded container												
8.4.	Dismantling work												
8.5.	Waste collection and disposal												

3. 2. Timetable of decommissioning (cont.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
9.	**Dismantling the reactor vessel (the core basket support, the inner and outer vessels and the horizontal channels**												
9.1.	Preparing the technological instruction												
9.2.	Design and manufacturing the equipment for remote cutting with the plasma torch					Objectives 9.2. - 9.4. and 9.6 - 9.7. shall not be performed. The reactor vessel shall be removed and sealed without dismantling its inner parts and transported to radioactive waste repository in Różan.							
9.3.	Design and manufacturing the equipment for remote cutting of the horizontal channels												
9.4.	Design and manufacturing the shielding containers for the radioactive materials												
9.5.	Design and manufacturing the seal cover												
9.6.	Dismantling work												
9.7.	Waste collection and disposal												
9.8.	Decontamination of the inner surface of the reactor concrete shielding and the cell below the reactor vessel												
10.	**Dismantling the spent fuel storage tank with internals**												
10.1.	Preparing the technological instruction												
10.2.	Decontamination of the storage tank												
10.3.	Dismantling work												
10.4.	Waste collection and disposal												
10.5.	Decontamination of the inner surface of the spent fuel tank shielding												

3. 2. Timetable of decommissioning (cont.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
11.	**Dismantling the technological ventilation system (This objective shall not be performed. The ventilation system shell be modified for the dry storage of spent nuclear fuel)**												
12.	**I & C systems dismantling**												
12.1.	Preparing the technological instruction												
12.2.	Dismantling work												
12.3.	Waste collection and disposal												
13.	**Electrical supply system dismantling (this objective shall not be performed. The electrical supply system will be modified for the dry storage of spent nuclear fuel)**												
14.	**Stationary radiometric system dismantling (this objective shall not be performed. The radiometric system will be modified for the dry storage of spent nuclear fuel)**												
15.	**Post-dismantling work**												
15.1.	Final decontamination of the technological rooms and areas												
15.2.	Dosimetric measurements												
15.3.	Collection of post-decommissioning documents												
15.4.	Elaboration of the post-decommissioning report												

4. The remote controlled tools used during dismantling works

The remote controlled tools have been used for dismantling the installations located inside the reactor vessels and parts of thermal column. The following hand controlled remote-handling tools were used in the reported period of decommissioning:

- Hydraulic powered scissors for cutting the parts irradiated inside reactor core (isotope - control rods - and neutron detectors channels);
- Remote controlled device for cutting by plasma torch (isotope channels of diameters of 80 – 120 mm);
- Remote controlled device for oxacetylene cutting (parts fixing the thermal column);
- Remote controlled device for sawing (selected pats of core basket).

All the tools mentioned above were designed and manufactured by the IEA

5. Decommissioning material management

The most of decommissioning materials after decontamination was a subject of recycling. Radioactive waste was transferred to the Waste Management Department.

5. 1. Material dismantled and scrapped

The following materials arising during dismantling the pumping station of primary cooling circuit reached certificate of nuclear safety surveillance allowed for recycling:

- Acid resistant steel (1H18N9T) ≈ 35 000 kg
- Steel (St3S) ≈ 17 000 kg
- Lead (in steel cowers) ≈ 6 000 kg
- Electric engines ≈ 3 000 kg

5. 2. Radioactive waste

5. 2. 1. Low level liquid waste

- Water from primary cooling circuit ≈ 22.0 m^3
- Decontamination solution (after neutralisation used for decontamination of materials arising during the dismantling of the primary cooling circuit) ≈ 3.5 m^3
- Water user to bath materials after decontamination ≈ 70.0 m^3

5. 2. 2. Low level solid waste

- Installation parts without decontamination 11 drums X 0,20 m^3
- Waste after dismantling the reactor core 5 drums X 0,20 m^3
- Materials used for decontamination 36 X 0.05 m^3
- Small dimensions heat exchangers 4 X 0.25 m^3

5 2. 3. Intermediate level solid waste

- Waste after dismantling the reactor core 3 shielding containers (3 m^3)
- Waste after dismantling the thermal column 3 shielding containers (5 m^3)

6. Conclusions

The works during the period of 1996-1999 indicate some differences between the plan adopted in 1996 and really executed tasks. This is partly a result of decision undertaken in 1997 concerning the reuse of reactor building and biological shields for the dry spent fuel storage and partly due to the experience collected during the decommissioning programme accomplishment. The activities on decommissioning the EWA research reactor has provided certain amount of knowledge, which is very valuable to carry out a planning implementing and execution of decommissioning programme. In closest future it is foreseen to prepare the particular plan of decommissioning the MARIA research reactor.

During reported period of the decommissioning programme the requirements of nuclear safety and radiological protection a well as technological instructions and procedures have been strictly respected. This resulted in very low doses recorded. In opinion of the NAEA the rules and regulations existing in Poland allow ensuring the realistic planning and safe implementing and accomplishing the decommissioning programmes for research reactors. For this reason it is not foreseen to introduce in nearest future regulations dedicated specially for decommissioning.

Annex no. 6

ACTIVITY AND ACTIVITY's CONCENTRATION BEING BASE OF RADIOACTIVE WASTE CLASSIFICATION

Isotope	Activity [Bq]	Activity concentrations [kBq/kg]
1	2	3
H-3	10^9	10^6
Be-7	10^7	10^3
C-14	10^7	10^4
O-15	10^9	10^2
F-18	10^6	10
Na-22	10^6	10
Na-24	10^5	10
Si-31	10^6	10^3
P-32	10^5	10^3
P-33	10^8	10^5
S-35	10^8	10^5
Cl-36	10^6	10^4
Cl-38	10^5	10
Ar-37	10^8	10^6
Ar-41	10^9	10^2
K-40	10^6	10^2
K-42	10^6	10^2
K-43	10^6	10
Ca-45	10^7	10^4
Ca-47	10^6	10
Sc-46	10^6	10
Sc-47	10^6	10^2
Sc-48	10^5	10
V-48	10^5	10
Cr-51	10^7	10
Mn-51	10^5	10
Mn-52	10^5	10
Mn-52m	10^5	10
Mn-53	10^9	10^4
Mn-54	10^6	10
Mn-56	10^5	10
Fe-52	10^6	10
Fe-55	10^6	10^4
Fe-59	10^6	10
Co-55	10^6	10
Co-56	10^5	10
Co-57	10^6	10^2
Co-58	10^6	10
Co-58m	10^7	10^4
Co-60	10^5	10
Co-60m	10^6	10^3
Co-61	10^6	10^2
Co-62m	10^5	10
Ni-59	10^8	10^4
Ni-63	10^8	10^5
Ni-65	10^6	10
Cu-64	10^6	10^2
Zn-65	10^6	10
Zn-69	10^6	10^4
Zn-69m	10^6	10^2
Ga-72	10^5	10
Ge-71	10^8	10^4
As-73	10^7	10^3
As-74	10^6	10
As-76	10^5	10^2
As-77	10^6	10^3
Se-75	10^6	10^2
Br-82	10^6	10
Kr-74	10^9	10^2
Kr-76	10^9	10^2
Kr-77	10^9	10^2
Kr-79	10^5	10^3
Kr-81	10^7	10^4
Kr-83m	10^{12}	10^5
Kr-85	10^4	10^5
Kr-85m	10^{10}	10^3
Kr-87	10^9	10^2
Kr-88	10^9	10^2
Rb-86	10^5	10^2
Sr-85	10^6	10^2
Sr-85m	10^7	10^2
Sr-87m	10^6	10^2
Sr-89	10^6	10^3
Sr-90+	10^4	10^2
Sr-91	10^5	10
Sr-92	10^6	10
Y-90	10^5	10^3
Y-91	10^6	10^3
Y-91m	10^6	10^2
Y-92	10^5	10^2
Y-93	10^5	10^2
Zr-93+	10^7	10^3
Zr-95	10^6	10
Zr-97+	10^5	10
Nb-93m	10^7	10^4
Nb-94	10^6	10
Nb-95	10^6	10
Nb-97	10^6	10
Nb-98	10^5	10
Mo-90	10^6	10
Mo-93	10^8	10^3

Isotope	Activity [Bq]	Activity concentration [kBq/kg]
1	2	3
Mo-99	10^6	10^2
Mo-101	10^6	10
Tc-96	10^6	10
Tc-96m	10^7	10^3
Tc-97	10^8	10^3
Tc-97m	10^7	10^3
Tc-99	10^7	10^4
Tc-99m	10^7	10^2
Ru-97	10^7	10^2
Ru-103	10^6	10^2
Ru-105	10^6	10
Ru-106+	10^5	10^2
Rh-103m	10^8	10^4
Rh-105	10^7	10^2
Pd-103	10^8	10^3
Pd-109	10^6	10^3
Ag-105	10^6	10^2
Ag-108m+	10^6	10
Ag-110m	10^6	10
Ag-111	10^6	10^3
Cd-109	10^6	10^4
Cd-115	10^6	10^2
Cd-115m	10^6	10^3
In-111	10^6	10^2
In-113m	10^6	10^2
In-114m	10^6	10^2
In-115m	10^6	10^2
Sn-113	10^7	10^3
Sn-125	10^5	10^2
Sb-122	10^4	10^2
Sb-124	10^6	10
Sb-125	10^6	10^2
Te-123m	10^7	10^2
Te-125m	10^7	10^2
Te-127	10^6	10^3
Te-127m	10^7	10^3
Te-129	10^6	10^2
Te-129m	10^6	10^3
Te-131	10^5	10^2
Te-131m	10^6	10
Te-132	10^7	10^2
Te-133	10^5	10
Te-133m	10^5	10
Te-134	10^6	10
I-123	10^7	10^2
I-125	10^6	10^3
I-126	10^6	10^2
I-129	10^5	10^2
I-130	10^6	10
I-131	10^6	10^2
I-132	10^5	10
1	2	3
I-133	10^6	10
I-134	10^5	10
I-135	10^6	10
Xe-131m	10^4	10^4
Xe-133	10^4	10^3
Xe-135	10^{10}	10^3
Cs-129	10^5	10^2
Cs-131	10^6	10^3
Cs-132	10^5	10
Cs-134m	10^5	10^3
Cs-134	10^4	10
Cs-135	10^7	10^4
Cs-136	10^5	10
Cs-137+	10^4	10
Cs-138	10^4	10
Ba-131	10^6	10^2
Ba-140+	10^5	10
La-140	10^5	10
Ce-139	10^6	10^2
Ce-141	10^7	10^2
Ce-143	10^6	10^2
Ce-144+	10^5	10^2
Pr-142	10^5	10^2
Pr-143	10^6	10^4
Nd-147	10^6	10^2
Nd-149	10^6	10^2
Pm-147	10^7	10^4
Pm-149	10^6	10^3
Sm-151	10^8	10^4
Sm-153	10^6	10^2
Eu-152	10^6	10
Eu-152m	10^6	10^2
Eu-154	10^6	10
Eu-155	10^7	10^2
Gd-153	10^7	10^2
Gd-159	10^6	10^3
Tb-160	10^6	10
Dy-165	10^6	10^3
Dy-166	10^6	10^3
Ho-166	10^5	10^3
Er-169	10^7	10^4
Er-171	10^6	10^2
Tm-170	10^6	10^3
Tm-171	10^8	10^4
Yb-175	10^7	10^3
Lu-177	10^7	10^3
Hf-181	10^6	10
Ta-182	10^4	10
W-181	10^7	10^3
W-185	10^7	10^4
W-187	10^6	10^2
Re-186	10^6	10^3
Re-188	10^5	10^2
Os-191m	10^7	10^3
Os-193	10^6	10^2
Ir-190	10^6	10
Ir-192	10^4	10

Isotope	Activity [Bq]	Activity concentration [kBq/kg]
1	2	3
Ir-194	10^5	10^2
Pt-191	10^6	10^2
Pt-193m	10^7	10^3
Pt-197	10^6	10^3
Pt-197m	10^6	10^2
Au-198	10^6	10^2
Au-199	10^6	10^2
Hg-197	10^7	10^2
Hg-197m	10^6	10^2
Hg-203	10^5	10^2
Tl-200	10^6	10
Tl-201	10^6	10^2
Tl-202	10^6	10^2
Tl-204	10^4	10^4
Pb-203	10^6	10^2
Pb-210+	10^4	10
Pb-212+	10^5	10
Bi-206	10^5	10
Bi-207	10^6	10
Bi-210	10^6	10^3
Bi-212+	10^5	10
Po-203	10^6	10
Po-205	10^6	10
Po-207	10^6	10
Po-210	10^4	10
At-211	10^7	10^3
Rn-220+	10^7	10^4
Rn-222+	10^8	10
Ra-223+	10^5	10^2
Ra-224+	10^5	10
Ra-225	10^5	10^2
Ra-226+	10^4	10
Ra-227	10^6	10^2
Ra-228+	10^5	10
Ac-228	10^6	10
Th-226+	10^7	10^3
Th-227	10^4	10
Th-228+	10^4	1
Th-229+	10^3	1
Th-230	10^4	1
Th-231	10^7	10^3
Th-232nat	10^3	1
Th-234+	10^5	10^3
Pa-230	10^6	10
Pa-231	10^3	1
Pa-233	10^7	10^2
U-230+	10^5	10
U-231	10^7	10^2
U-232+	10^3	1
U-233	10^4	10
U-234	10^4	10
U-235+	10^4	10

1	2	3
U-236	10^4	10
U-237	10^6	10^2
U-238+	10^4	10
U-238nat	10^3	1
U-239	10^6	10^2
U-240	10^7	10^3
U-240+	10^6	10
Np-237+	10^3	1
Np-239	10^7	10^2
Np-240	10^6	10
Pu-234	10^7	10^2
Pu-235	10^7	10^2
Pu-236	10^4	10
Pu-237	10^7	1
Pu-238	10^4	1
Pu-239	10^4	1
Pu-240	10^3	1
Pu-241	10^5	10^2
Pu-242	10^4	1
Pu-243	10^7	10^3
Pu-244	10^4	1
Am-241	10^4	1
Am-242	10^6	10^3
Am-242m+	10^4	1
Am-243+	10^3	1
Cm-242	10^5	10^2
Cm-243	10^4	1
Cm-244	10^4	10
Cm-245	10^3	1
Cm-246	10^3	1
Cm-247	10^4	1
Cm-248	10^3	1
Bk-249	10^6	10^3
Cf-246	10^6	10^3
Cf-248	10^4	10
Cf-249	10^3	1
Cf-250	10^4	10
Cf-251	10^3	1
Cf-252	10^4	10
Cf-253	10^5	10^2
Cf-254	10^3	1
Es-253	10^5	10^2
Es-254	10^4	10
Es-254m	10^6	10^2
Fm-254	10^7	10^4
Fm-255	10^6	10^3

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Activity of isotopes in the waste stored/disposed at NRWR – Różan in the years 1961 - 2005

Izotop	Initial activity [MBq]	Activity on 30.09.2005 [MBq]	Volume [m^3]	Mass [t]
Ir-192	80 182 358,1	51,1	1 119,615	1 113,871
Co-60	56 598 217,7	5 749 741,3	1 957,044	2 178,254
I-125	27 020 702,0	0,0	1 500,799	1 403,340
Cs-137	23 221 080,5	13 124 132,4	1 648,120	1 665,240
S-35	13 721 553,7	60 659,4	108,430	75,929
H-3	6 181 389,1	3 223 264,2	486,312	340,615
Po-210	5 893 121,3	21,2	23,724	14,761
Pu-239	3 879 018,5	3 877 658,5	302,380	392,460
Am-241	3 303 193,3	3 267 062,6	54,070	54,360
Zn-65	1 844 218,9	1 055,4	101,420	81,262
P-32	1 481 494,9	0,0	123,190	88,751
Sr-90	1 397 382,6	832 155,0	153,378	123,254
Yb-169	1 373 997,8	0,0	5,373	4,122
U-238	1 259 765,0	1 259 764,9	183,687	174,361
Cr-51	1 243 727,5	22,7	121,661	84,410
Pu-238	975 633,3	935 651,6	60,940	54,130
Ra-226	627 860,6	623 201,9	364,770	305,669
Kr-85	581 211,5	267 204,7	6,991	7,810
C-14	517 337,1	516 254,7	405,314	267,559
Tl-204	316 860,8	12 638,8	20,692	21,105
Na-24	275 092,5	0,0	5,590	5,649
Zn-69	262 903,5	0,0	3,600	4,926
I-131	238 393,5	0,0	228,520	151,918
Eu-152	213 424,9	63 388,0	107,855	76,243
Eu-154	207 032,0	30 182,5	15,895	15,616
Pm-147	193 012,8	673,6	9,374	9,248
Tc-99m	174 074,6	0,0	176,470	122,535
Cs-134	162 785,2	6 625,6	57,460	42,128
U-236	153 479,7	153 479,6	0,780	0,641
Y-90	149 997,9	0,0	8,070	11,154
Tm-170	129 239,8	0,0	2,695	0,766
Mo-99	128 604,2	0,0	22,820	18,505
Fe-59	124 273,3	32,1	23,741	18,933
Cm-242	111 000,0	0,0	0,360	0,468
Ce-144	69 449,4	1 923,6	67,431	50,213
Mn-54	58 341,9	7 078,7	7,191	6,469
Ru-106	56 680,8	611,6	30,331	25,640
Sn-113	47 471,4	0,0	15,540	11,083
Ni-63	46 754,6	43 301,3	7,250	10,500

Annex no.7/page 2

Activity of isotopes in the waste stored/disposed at NRWR – Różan in the years 1961 - 2005

Izotop	Initial activity [MBq]	Activity on 30.09.2005 [MBq]	Volume [m^3]	Mass [t]
Ca-45	30 845,6	0,0	69,871	45,725
Th-232	28 665,3	28 665,3	69,511	117,611
Fe-55	22 040,4	1 251,0	5,072	3,784
Ag-110	20 338,3	0,0	10,080	3,450
Th-230	13 627,1	13 622,9	45,600	91,253
Sc-46	13 614,5	0,0	3,050	0,997
Co-58	9 875,7	0,0	2,950	2,240
Sb-124	8 830,6	0,0	53,650	40,560
K-40	7 585,0	7 585,0	10,533	4,701
Co-57	6 233,4	26,6	20,931	15,746
Cu-64	5 813,3	0,0	1,750	0,843
Cl-36	5 645,8	5 645,5	15,540	14,105
Rb-86	5 590,0	0,0	1,800	0,992
Ir-190	5 550,0	0,0	0,070	0,049
Pm-145	5 000,0	3 226,7	5,000	5,200
Hf-181	5 000,0	0,0	0,005	0,040
Cd-109	4 559,7	57,1	0,748	1,370
Cf-252	4 092,0	2 137,1	0,300	0,327
Cm-244	3 700,0	3 016,8	0,050	0,060
U-235	3 250,1	3 250,1	4,797	7,995
La-142	3 237,5	0,0	0,400	0,800
Nb-95	3 050,8	3,0	49,600	45,015
Sb-125	2 834,0	819,1	7,260	6,895
U-234	2 220,0	2 220,0	0,100	0,182
Na-22	2 203,7	133,6	28,553	27,154
Zr-95	1 936,5	9,4	49,000	44,828
Kr-90	1 850,0	0,0	0,250	0,042
Sb-122	1 750,9	0,0	15,200	10,860
Sr-85	1 161,8	0,0	6,000	3,981
Hg-203	1 131,5	0,0	1,981	1,310
Ce-141	1 093,2	0,0	34,400	24,990
Ta-182	980,5	0,0	0,003	0,042
I-124	925,0	0,0	0,010	0,045
Gd-153	921,5	8,8	6,850	4,491
Xe-133	758,5	0,0	0,700	0,124
Cd-115	749,1	0,0	6,311	4,190
I-123	740,3	0,0	0,500	0,235

Annex no.7/page 3

Activity of isotopes in the waste stored/disposed at NRWR – Różan in the years 1961 - 2005

Izotop	Initial activity [MBq]	Activity on 30.09.2005 [MBq]	Volume [m^3]	Mass [t]
Te-127	740,0	0,0	1,700	2,796
Ca-47	740,0	0,0	0,240	0,144
Hg-197	740,0	0,0	0,500	0,075
Mn-56	740,0	0,0	0,200	0,006
Re-186	740,0	0,0	0,200	0,105
Sr-92	740,0	0,0	0,100	0,048
Ba-133	717,2	509,9	21,830	27,250
Lu-177	612,0	0,0	5,400	3,545
U-233	550,0	550,0	1,250	0,056
Np-237	483,5	483,5	1,250	0,579
Re-188	435,0	0,0	0,400	0,222
Ga-67	419,0	0,0	9,000	5,000
Ba-140	330,8	0,0	25,400	16,290
As-77	264,3	0,0	0,200	0,060
Sm-153	116,0	0,0	2,200	1,346
Br-82	111,0	0,0	0,030	0,015
Ru-103	81,4	0,0	13,600	11,034
Rh-106	74,0	0,0	0,060	0,496
Ce-143	40,0	0,0	0,050	0,020
Cd-115m	20,4	0,0	2,510	1,800
Bi-207	18,5	13,9	0,452	0,347
La-140	15,8	0,0	7,000	7,127
W-188	10,0	0,0	2,600	1,900
W-185	9,3	0,0	0,150	0,030
As-74	8,6	0,0	0,210	0,250
Be-7	8,6	0,0	0,210	0,247
Rb-84	7,4	0,0	0,200	0,092
Lu-177m	6,0	0,0	1,600	0,980
In-111	2,1	0,0	0,600	0,366
Total:	**234 721 782,9**	**34 135 972,1**		

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Annex no.8

International conventions related to safe utilization of atomic energy and safeguards of nuclear materials signed, ratified and implemented by Poland

(1) Convention ILO 115 on Workers Protection against Ionising Radiation, *ratified in1965*
As a result the international safety standards for radiation protection and their amended versions were being implemented in Poland, pursuant to subsequent ICRP recommendations; the present legislation is based on the 1994 Basic Safety Standards (BSS) as edited by the IAEA. The recent revision of the BSS has been used for harmonising existing regulations with the directive 96/29 EURATOM.

(2) Treaty on the Non-Proliferation of Nuclear Weapons , *ratified on 12 June 1969* ;
Safeguards Agreement with the IAEA INFCIRC/179 of the full scope safeguards type was signed and ratified in 1972; Poland is also a Member country of the Nuclear Suppliers Group, so that the NSG guidelines published by the IAEA as INFCIRC 254/rev 3/Part 1 and Part 2 are observed: the control of the export and import is exercised by the State system of control of foreign trade in materials and technologies as set by the Law of November 29, 2000 on Foreign Trade in Goods, Technologies and Services Strategically Important for the Security of State and for preserving International Peace and Security. The above mentioned Law is accompanied by a set of regulations issued by the Minister of Economy. The National Atomic Energy Agency (NAEA) provides expertise and opinions in the field of nuclear technologies; licenses are being issued by the Ministry of Economy after considering opinions from relevant ministries and agencies. Poland has ratified (on 5.05.2000) the Additional Protocol to its Safeguards Agreement with the International Atomic Energy Agency and has been implementing procedures of the Protocol; the Protocol replaced, i.a. the earlier voluntary offer to the IAEA concerning extended reporting on nuclear materials and equipment transfers pursuant the IAEA document GOV/2629. Poland has adequate legislation and procedures for accountancy of nuclear materials for the purpose of Safeguards (Regulation of the Council of Ministers on 27.04.2004, pursuant to art. 42.1 of the Atomic Law Act).

(3) Convention on the Physical Protection of Nuclear Material, *ratified on 5 October 1983;*
There are legal provisions to enforce compliance with the convention requirements (Regulation of the Council of Ministers on 27.04.2004, pursuant to art.42.2 of the Atomic Law Act). Poland signed new version of the Convention with amendments agreed in July 2005.

(4) Convention on Early Notification of a Nuclear Accident, *ratified 24 March 1988;*
Poland has signed bilateral agreements on early notification of a nuclear accident and on cooperation in nuclear safety and radiological protection with Denmark (1987), Norway (1989), Austria (1989), Ukraina (1993), Belarus (1994), Russian Federation (1995), Lithuania (1995) Slovak Republic (1996) and Czech Republic (2005); The International Warning Point of the early warning system (IWP) as well as Radiation Emergency Centre ("CEZAR") with International Contact Point has been established within the NAEA organisation. The IWP works on a 24 hours a day basis. It serves as a channel of exchanging information on radiation emergencies with IAEA in Vienna and neighbouring countries according to international conventions and bilateral agreements. Since 22 April 2004 official ECURIE station has been operating in CEZAR . **(5) Convention on Assistance in Case of a Nuclear Accident on Radiological Emergency,** *ratified on 24 March 1988*;
Currently there are no special arrangements on assistance management specifically during a large scale nuclear accident; however Poland has more generic bilateral agreements with neighbouring Countries for the purpose of reception of incoming international rescue teams and for the border entry control in the case of any kind of large scale emergency. Also, the Nation-wide Emergency Preparedness Plan, covering the trans-border and national radiation emergencies, and related regional and local plans are at present in stage of development.

(6) Vienna Convention on Civil Liability for Nuclear Damage, acceded to in 1990, the Joint Protocol relating to the Application of the Vienna Convention and the Paris Convention, and the Protocol to Amend the Vienna Convention, signed in 1999.
There are legal provisions to enforce compliance with the convention requirements –the Chapter 12 of the Act of Atomic Law and Regulation of the Ministrer of Finance issued on 23.04.2004 pursuant to art.103.4 of the Act)

(7) Joint Convention on the Safety of Spent Fuel Management and on the Safety of the Radioactive Waste Management, *ratified on 5 May 2000*;
Compliance with this Convention reported under the 1st and the 2nd review process and the First and the Second Review Meeting of Contracting Parties.

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Annex no. 9

Comment to and summary of the new Act of Atomic Law, as revised in April 2004

The Atomic Law Act, originally enacted by the Parliament of the Republic of Poland on 29 November 2000 and published in the Official Journal of Laws ("Dziennik Ustaw") No 3 on 18 January 2001, due to enter into force on 1st January 2002, was **revised on 12 March 2004** The new revised version entered into force on 1st May 2004. The main changes introduced into it consist in:

1) requirement that the general public have to be provided with prior, regularly updated information on a potential future radiation emergency, which includes:
   a) basic facts on ionizing radiation and its effects on humans and environment;
   b) anticipated emergency situation types and scenarios;
   c) measures to alert the general public in the event of radiation emergency and of conveying the information on its development;
   d) appropriate information on the actions to be taken by the general public to protect themselves against the event's consequences and to acquire necessary assistance;
2) requirement that the general public must be immediately informed of the radiation emergency which has occurred;
3) inclusion into the regulations which transpose into the domestic legal framework the provisions of the 97/43/Euratom directive on the health protection of individuals against the dangers of ionizing radiation in relation to medical exposures (prior to the amendment the Act did not allow for the full transposition of this directive) the requirements of:
   a) mandatory approval of the therapy involving ionizing radiation by the Health Minister or regional sanitary inspector (as appropriate),
   b) mandatory justification of the patient's ionizing radiation exposure,
   c) mandatory optimization of the patient's radiological protection against the radiation,
   d) mandatory control of the radiological equipment physical parameters,
   e) mandatory clinical audits (internal and external);
   f) establishment of the quality management system in medicine,
   g) establishment of the National Centre of Radiological Protection in Health Services,
4) extension of the radiological protection of the individuals exposed in the workplace or in school, by:
   a) extending the definition of an employee on the individuals performing work on the basis other than the employment agreement and on the self-employed,
   b) extending the protective measures provided for exposed employees to cover the apprentices, pupils and students,
5) harmonization of the principles for the external workers protection with the EU requirements, e.g. by introducing a model mandatory document of external worker exposure – so called dosimetric passport,
6) extension of the emergency planning to cover the acts of terror which result in the increased ionizing radiation dose rate or in the radioactive contamination of the environment,
7) harmonization of the regulations for radioactive waste import, export and transit with the EU legislation,
8) introduction of the regulations which enable Poland to fulfill its international obligations in the area of nuclear material safeguards and nuclear technology control,

9) designation of the bodies responsible for the implementation of UE regulations involving the food and feed-stuffs checks subsequent to a radiation event, from the viewpoint of compliance with maximal acceptable radioactive contamination levels.

Amending bill has included also the provisions modifying these provisions contained in the original Atomic Law, which had to be modified in the view of practical experience gained during the implementation of the original Atomic Law.

The Act is divided into 17 Chapters:

Chapter 1 entitled *"General provisions"* defines the subject and presents definitions of terms used in the text of the Law; the subject of the Act has been extended to the definition of particular principles of health protection of individuals against the danger of ionizing radiation in relation to medical exposure. The list of definitions of terms has been extended respectively, also some old definition has been improved (see also comments on pages 5 and 6 of this Report)

Chapter 2 entitled *"Licenses addressing nuclear safety and radiological protection issues"* lists the activities which require licenses or notifications from the point of view of nuclear or radiological safety, and activities which are prohibited. It also sets up adequate procedures regarding the licensing and defines the authorities granting licenses to perform activities.

Chapter 3 entitled *"Nuclear safety, radiological protection and health protection of workers"* places the responsibility for nuclear safety and radiological protection on manager of the organization pursuing the activities involving exposure and defines the scope of this responsibility, in particular in a case of ceasing activity. It formulates the requirement for justification of such activities, as well as a number of other requirements, such as supervision and inspection, the imperative to follow the "optimization principle" with regard to exposures, adequate training of workers, radiological safety of individuals in cases of medical exposures, occupational exposures and radiological protection of workers and external workers, and their rights. This chapter also specifies the conditions for carrying out actions aimed at elimination of radiation emergency consequences, maintaining of the central register of doses received by individuals, categorization of radiation workers (categories A and B) and requirements with regard to dosimetric equipment. Finally, it introduces a system of subsidizing certain activities in the area of nuclear and radiological safety from the State budget;

Chapter 3a entitled *"Medical application of ionizing radiation "* enumerates medical applications of ionizing radiation, and formulates principles of carrying on activities that involve patient's exposure to ionizing radiation, in particular – mandatory justification of exposure and optimization of radiological protection. It places responsibilities for patient's exposures on the authorized medical practitioner, and relevant responsibilities and duties in the area of inspection and clinical audits - on medical institutions. It defines principles and requirements for quality management system in radio-diagnostics, invasive radiology, nuclear medicine and radiotherapy, including the reference radiological procedures for standard medical exposures, the terms of issuance of relevant permits and authorizations and the authorities competent for granting them. Finally, it formulates the scope and terms of creation of the National Radiation Protection Center in Medicine and the central data base for medical radiation facilities.

Chapter 4 entitled *"Nuclear facilities"* places the responsibility for nuclear and radiological safety on manager of the organization which is operating a nuclear facility, and addresses the questions of licensing and establishing of the restricted areas around such facility, as well as formulates the right for the NAEA President to curtail or suspend the operation of nuclear facility when nuclear safety may be endangered;

Chapter 5 entitled "Nuclear materials and technologies" formulates requirements for adequate nuclear materials accountancy and their physical protection as well as for appropriate control of nuclear technologies (as required by appropriate international agreements and conventions). In particular it includes prohibition of use these materials and technologies to construct nuclear weapon or nuclear explosives; any scientific researches in this area are subject to notification to the NAEA President prior their commencement. It defines also other NAEA President's duties and responsibilities in this area as well as the obligations of the managers of units performing activities with nuclear materials and of other users of lend or buildings where such an activities could be possible, in connection with inspections performed by NAEA, IAEA or EURATOM inspectors;

Chapter 6 entitled "Ionizing radiation sources" formulates requirements for the accountancy, and inspection with regard to radioactive sources and to equipment containing such sources or generating ionizing radiation. It includes also requirement of appropriate protection of radioactive sources against damage, theft or possessing by an unauthorized person.

Chapter 7 entitled "Radioactive waste and spent nuclear fuel" classifies radioactive wastes, states the responsibilities of the manager of the organizational unit which is handling wastes, and addresses the questions of wastes disposal and of the necessary protection of humans and of the environment.

Chapter 8 entitled "Transport of nuclear materials, ionizing radiation sources, radioactive wastes and spent nuclear fuel" formulates requirements for safe transporting of such materials and regulates the questions of their import, export and transit through the Polish territory, as well as on reporting of these activities to the NAEA President;

Chapter 9 entitled "Control and inspection from the viewpoint of nuclear safety and radiological protection conditions" allocates the control and inspection responsibilities to appropriate bodies, formulates these responsibilities as well as the rights of the regulatory body organs, introduces enforcement measures, and sets up qualification requirements with regard to inspectors of the regulatory body;

Chapter 10 entitled "National radiation situation assessment" obliges the NAEA President to conduct systematic assessments of the national radiation situation and formulates requirements thereof, including the use for these purposes of a dedicated Radiation Emergency Center established within the NAEA and receiving appropriate data from "stations" and "units" serving for early detection of radioactive contamination (the list of such "stations" and "units" has been established by means of the Governmental regulation) and operates the International Contact Point for early warning and information exchange with IAEA, EU and other Countries in a case of radiation emergency. It also obliges the NAEA President to provide information to the general public, regional governors, Council of Ministers and/or to the chairman of the appropriate crisis management team at the national level.

Chapter 11 entitled "Radiation emergency management" introduces distinction between different types of radiation emergencies and list the actions to be undertaken in case of such emergencies, as well as formulates the responsibilities on all levels. It refers to the national emergency preparedness plan established through a Governmental regulation and sets up rules for the implementation of specific intervention measures (including the issue of costs to be borne in such cases). It also formulates a requirement to conduct periodic exercises to test the national emergency preparedness plan and addresses the questions of protection against the use of food and feeding stuffs which exceed the permitted levels of radioactive substances contents, both produced within the Polish territory or imported;

Chapter 12 entitled "Civil liability for nuclear damage" allocates the responsibility for nuclear damage caused to individuals, property and environment to the operator and limits its liability to 150 million SDR, allows the operator to establish a limited liability fund in case when claims exceed this figure, obliges the operator to be insured, sets procedures for claiming the compensation, sets time limits for suing for the damage, and locates the competence in the issues of nuclear damage.

Chapter 13 entitled "The President of the National Atomic Energy Agency" states that the President of the NAEA is the central organ of the governmental organization and is nominated by the Prime Minister to whom he reports directly, on request by the Minister competent for environmental matters, who supervises NAEA administratively . The President executes his tasks (which are listed) through the National Atomic Energy Agency, statute of which is to be issued by the Minister for environmental matters. In addition, this chapter introduces a NAEA President's consulting and opinion-giving body, "Council for Atomic Affairs" , whose Chairman is to be proposed by the NAEA President and nominated by the Prime Minister.

Chapter 14 entitled "State-owned public utility "Radioactive Waste Management Plant" establishes the above named plant as a legal personality while the supervision over the plant is placed under responsibilities of the minister competent in State economy matters, who will provide the plant with a statute. This chapter specifies, inter alia, that the utility will receive subsidy from the national budget for radioactive waste and spent fuel management.

Chapter 15 entitled "Penal regulations" introduces financial penalty or other means of punishment for cases of violations of rules established by this Law.

Chapter 16 entitled "Transitional, adaptive and final provisions" formulates detailed conditions for the enactment of this Law.

Annex no. 10

Executive Regulations to the Act of Atomic Law :

1. Regulations by the Prime Minister and the Council of Ministers

2001:

- *Council of Ministers regulation* ***on nuclear materials subject to accounting****,(Art. issued on 31.07.2001,* Official Journal of Laws ("Dziennik Ustaw 2001")no.87 item 955, in force since 01.01.2002 (**replaced b*y* the new regulation in 2004)**
- *Council of Ministers regulation* ***on physical protection of nuclear materials****, issued on 31.07.2001,* OJ(Dz.U. 2001) no.90 item 997, in force since 01.01.2002 (**replaced 2004)**
- *Council of Ministers regulation* ***on rules and procedures governing the allocation, accounting and return of subsidies in connection with nuclear safety****, issued on 3.12.2001,* OJ (Dz. U. 2001) no.145 item 1626, in force since 01.01.2002*;*
- *Prime Minister's regulation* ***on the statute of the National Atomic Energy Agency*** *(Art.113.1) issued on 7.12.2001,* OJ (Dz. U. 2001) no.140 item 1576, in force since 14.01.2002*;* (**replaced 2002)**
- *Prime Minister's regulation* ***on the scope and procedures for the activities of the Council of Atomic Affairs*** *, issued on 17.12.2001,* OJ (Dz. U. 2001) no.153, item 1749, in force since 14.01.2002*;*

2002:

- *Council of Ministers regulation* ***on ionising radiation dose limits*** *issued on 28.05.****2002****,* OJ (Dz. U. 2002)no. 111, item 969, (rev. OJ 2003 no. 38 item 333), in force since 03.08.2002*;*
- *Council of Ministers regulation* ***on exemption of certain practices from the obligation to apply for licensing, or from reporting obligations,*** *issued on 06.08.2002* OJ(Dz.U. 2002,)no.137, item 1153, in force since 13.09.2002;
- *Council of Ministers regulation* ***on nuclear regulatory inspectors****, issued on 06.08.2002,* OJ (Dz. U. 2002), no 137, item 1154, in force since 12.09.2002;
- *Council of Ministers regulation* ***on basic requirements concerning controlled and supervised areas,*** *issued on 06.08.2002.* OJ (Dz. U. 2002) no. 138, item 1161, in force since 01.12.2002*;*
- *Council of Ministers regulation* ***on posts being of primary importance for nuclear safety and radiological protection, and on radiation protection officers,*** *issued on 06.08.2002,* OJ (Dz. U. 2002) no 145, item 1217,(rev. OJ 2003 no. 38 item 333), in force since 11.12.2002;
- *Council of Ministers regulation* ***on the values of intervention levels and levels of radioactive substances contents in foodstuffs, feedingstuffs and potable water contaminated as a result of a nuclear accident,*** *issued on 06.08.2002,* OJ (Dz. U. 2002), no 145, item 1218, in force since 01.01.2003 ;
- *Council of Ministers regulation* ***on accountability procedures for the subsidy allocated from the national budget for radioactive waste management and spent nuclear fuel management, and detailed rules for finances management of the State-owned public utility named "Radioactive Waste Management Plant"*** *issued on 24.09.2002,* OJ (Dz. U. 2002), no 163, item 1344, in force since 17.10.2002 ;
- *Council of Ministers regulation* ***on radiation protection of external workers exposed in controlled areas,*** *issued on 05.11.2002,* OJ (Dz. U. 2002), no 201, item 1693, in force since 01.01.2003*;*

- *Council of Ministers regulation* ***on requirements for individual dose registering,*** *issued on 05.11.2002,* OJ (Dz. U. 2002), no 207, item 1753, in force since 01.01.2003*;*
- *Council of Ministers regulation* ***on conditions governing import export and transit through the territory (of Poland) of nuclear materials, radioactive sources andequipment containing such sources,*** *issued on 05.11.2002,* OJ (Dz. U. 2002), no 207, item 1754, in force since 01.01.2003*;*
- *Council of Ministers' regulation* ***on the issuing of the permits for the import to, export from, and transit through the territory of Poland of radioactive waste or spent nuclear fuel*** *issued on 05.11.2002,* OJ (Dz. U. 2002), no 215, item 1817, in force since 01.01.2003*;*
- *Council of Ministers regulation* ***on natural radioactive isotope content in specified materials used in the buildings and in construction industry, as well as on controlling of the content of such isotopes,*** *issued on 03.12.2002,* OJ (Dz. U. 2002), no 220, item 1850, in force since 01.01.2003*;*
- *Council of Ministers regulation* ***on documents required for licence application submitted for practices that involve or could involve radiation exposure or for the notification of such practices*** *issued on 03.12.2002,* OJ (Dz. U. 2002), no 220, item 1851, in force since 01.01.2003*;*
- *Council of Ministers regulation* ***on radioactive waste and spent nuclear fuel,*** *issued on 03.12.2002,* OJ (Dz. U. 2002), no 230, item 1925, in force since 01.01.2003*;*
- *Council of Ministers regulation* ***on detailed conditions for safe handling of radiation sources,*** *issued on 17.12.2002,* OJ (Dz. U. 2002), no 239, item 2029, in force since 01.01.2003*;*
- *Council of Ministers regulation* ***on stations for early detection of radioactive contamination and units performing radioactive contamination measurements,*** *issued on 17.12.2002,* OJ (Dz. U. 2002), no 239, item 2030, in force since 01.01.2003*;*
- *Council of Ministers regulation* ***on requirements for dosimetric equipment, used in normal circumstances and in emergencies,*** *issued on 23.12.2002,* OJ (Dz. U. 2002), no 239, item 2032, in force since 01.01.2003*;*
- *Council of Ministers regulation* ***on radiological emergency preparedness plan on national and local levels,*** *issued on 23.12.2002,* OJ (Dz. U. 2002), no 239, item 2033, (rev. OJ 2003 no. 38 item 333), in force since 01.01.2003*;*

2003

- *Prime Minister's regulation* ***on the procedures for control and inspections of the Internal Security Agency and of the Intelligence Agency conducted by the nuclear regulatory body inspectors*** (art.63), issued on 20.02.2003, OJ (Dz. U. 2003), no 38, item 330, in force since 20.03.2003;

2. Regulation of the Ministry of Health:

2002

- *Regulation of the Ministry of Health on* ***conditions for safe use of ionising radiation in medical applications, and on the procedures of internal control of compliance*** *with these conditions* (Art.7.7) , issued on 24.12.2002, OJ (Dz. U. 2002), no 241, item 2098, in force since 01.01.2003, with exception of § 12 ust.1 pkt 5, that shall be in force after 01.01.2005*;*

2003

- *Regulation of the Ministry of Health on* ***the body designated to qualifying of the radiation protection officers in the medical X-ray facilities with radiation energy up-to 300keV*** (Art.7.7), issued on 11.09.2003, OJ (Dz. U. 2002), no 173 item 1680, in force since 01.01.2003 **(cancelled in 2004)**

- *Regulation of the Ministry of Health on* ***the detailed conditions of the safe use of medical X-ray facilities with radiation energy up-to 300keV*** (Art.46), issued on 11.09.2003, OJ (Dz. U. 2002), no 173 item 1681, in force since 01.01.2003
- *Regulation of the Ministry of Health on* ***the detailed conditions of qualification for the radiation protection officers in the medical X-ray facilities with radiation energy up-to 300keV*** (Art.12.3) issued on 21.10.2003, OJ (Dz. U. 2002), no 188 item 1847, in force since 01.01.2003

3. Regulation of the Ministry of Environment:

2002

- *Minister of Environment Regulation* ***on the statute of the National Atomic Energy Agency establishing its internal organisation,*** (art.113.1) issued on 15.07.2002, Polish Regulations' Bulletin (M.P. 2002), no 33, item 519, in force since 15.07.2002 (**substitutes** former Prime Minister reg.140/1576- 7.12.2001)
- *Minister of Environment Regulation on detailed rules for the creation of* ***restricted area surrounding nuclear facility*** (art.38.2), issued on 30.12.2002, OJ (Dz. U. 2002), no 241, item 2094, in force since 01.01.2003;

4. Regulation of the Ministry of Internal Affairs:

2002

- *Minister of Internal Affairs regulation on the* ***implementation procedures for Atomic Law in Police, State Fire Guard, Border Guard and the organisational units subordinated to the Ministry of Internal Affairs*** (Art. 132), issued on 26.03.2002, Official Journal of the Ministry of Internal Affairs and Administration no.3, item 7, in force since 12.04.2002.

5. Regulation of the Ministry of National Defence

2003

- *Regulation no.51/MON on the* ***implementation procedures for Atomic Law in organizational units subordinated to the Minister of National Defense*** *(art.132), issued on 17.09.2003 Official Journal of the Ministry of National Defense no.15 item 161, in force since 1.10.2003.*

6. Regulation of the Ministry of Finances

2004

- *Minister of Finances Regulation on* ***obligatory third party liability insurance of nuclear intallation operator*** (art.103.4), issued on 23.04.2004, *OJ (Dz. U. 2004) no 94 item 909, in force since 01.05.2004*;

Further 15 regulations were issued by Council of Ministers in the years 2004 -2005 - see information on page 22-23 of this Report (in the Article 19, subtitle: *Governmental regulations for nuclear and radiation safety)*

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Annex no. 11

Radiation protection rules and dose limits in Poland

The radiological protection issue at the national level is broadly addressed in the chapter 3 of *Atomic Law Act* and relevant several secondary regulations in which internationally endorsed criteria and standards had been incorporated (ICRP 60/72 –BSS, relevant EU directives).
Dose limits are established strictly according to the EU Directive 96/29 EURATOM in the governmental *regulation on ionising radiation dose limits,* issued on 28 May 2002, and has been recently updated. The last version, issued 18.01.2005 (OJ no 20 item 168, in force since 01.02.2005) - **replaced former regulation** no. 111/969 - 25.05.2002 and its amendment no.38/333-2003. The effective dose limit for workers is 20 mSv per year (or equivalent dose for the lens of eye – 150 mSv per year, for the skin 500 mSv per year and for the hands, forearms, feet and ankles – 500 mSv per year respectively), it is allowed however to exceed it up to the 50mSv in calendar year provided that in any 5 years period of his occupational exposure the worker shall not exceed effective dose of 100 mSv (average value of 20 mSv yearly). The same limits are for apprentices and students over 18 years old. For this category for age between 16 and 18 years old yearly limit is 6 mSv/y , for younger then 16 years – 1 mSv/y – the same as for general public. If the worker is pregnant woman, the limitation of her doses have to be such as her child to be born does not exceed the dose of 1 mSv. In special circumstances, strictly defined by law, the limits above may be exceeded with exclusion of apprentices, students and pregnant women. For population equivalent dose limits are 15mSv per year for the lens of eye and 50 mSv per year for skin; the limit of 1 mSv per year may be exceeded provided that in 5 years period the effective dose shall not exceed 5 mSv. Workers exposures are subject to optimization. For this purpose the radiation protection targets may be established by the management of facility. They are not subject to review or endorsement by the regulatory authority. On the contrary, the discharges of effluents to the environment are under control by the regulatory body and numerical values of relevant limits are usually included into the terms of licence. For the purpose of protection of population groups living in vicinity of nuclear facility the zone of limited use is established within such distance from the facility, that the effective dose at its perimeter does not exceed the value of 0.3 mSv.

Under the Atomic Law, the responsibility for compliance with the nuclear safety and radiological protection requirements rests upon the manager of the organizational unit conducting activities / practices involving exposure (Art.7). This exposure must not exceed the dose limits described above, established in the regulation issued under the Art. 25.1 of the Atomic Law. At the same time the principle of exposure optimization must be observed (Art.9). This means that the activity should be conducted in such way that – after reasonable consideration of economic and social factors – the number of exposed workers and members of general public and their doses are as low as reasonably achievable. According to this principle, **the manager** of the organizational unit shall perform an **assessment of the employees' exposure.** If it seems necessary from the exposure optimization analysis – the director shall establish the authorised limits **for the workers' exposure (dose constraints)** to ensure that their ionizing radiation doses will be not greater than these **limits**, which in turn are lower than **dose limits**. If the authorized limits are established in the license, the licensing authority has to be notified of the possibility of their overrun by the organizational unit manager. The assessment of the employees' exposure is based on the spot- check individual dose measurements or dosimetric measurements in the workplace. The workers whose exposure – according to the manager's assessment – can exceed 6 mSv in one year in the terms of effective dose or three tenths of dose limit values for skin, limbs and eye lens in terms of equivalent dose, shall be subject to the exposure assessment based on systematic individual dose measurements (category A workers). For these workers the organizational unit director is obliged to maintain a register of their individual doses based on systematic measurements conducted by properly accredited entities. The data concerning these exposures must be relayed systematically (in compliance with the requirements established in the *Regulation of the Council of Ministers of 5 November 2002 on the individual dose records*) to the authorized medical practitioner, who maintains medical records of these workers, and also to the central dose register of the NAEA President.

Fundamental set of nuclear safety and radiological protection requirements is established by the provisions of the Atomic Law Act of 29 November 2000 and also by the executive regulations to this Act. Detailed requirements, concerning specific facilities and activities conducted by individual organizational unit basing on the licence issued by the NAEA President, are specified in the licensing conditions. These conditions take into account the results of assessments and analyses performed to establish the operational conditions and limits assumed in safety reports for these facilities and activities.

The Act takes into account the Basic Safety Standards for radiation protection, accepted and recommended by a number of international organizations, e.g. IAEA or European Union. It is aimed at ensuring the compliance with the provisions of the EURATOM Treaty and appropriate EU directives. Besides of the Directive 96/29/EURATOM *on basic safety standards in health services, for the protection of workers and of the members of the public against the ionizing radiation risks*, the Atomic Law provisions introduce the requirements contained in other EU directives, relevant for the protection of workers and general public.

The necessity of ensuring full compliance of the Atomic Law with the European Union legislation resulted in the 2003/2004 work on the amendments to this Act and to the relevant executive regulations.