RADIOACTIVE WASTE MANAGEMENT PROGRAMMES IN OECD/NEA

MEMBER COUNTRIES

POLAND

2011

NATIONAL NUCLEAR ENERGY CONTEXT

There is no commercial utilization of nuclear power in Poland yet. The only research reactor Maria, applied also for production of radioisotopes is operated in Swierk (National Centre for Nuclear Research). More than 90% of the electricity in Poland comes from coal; the rest from oil and gas. Renewable energy sources generate less than 3%. In 2008, Poland was responsible for 298.69 Mt of CO_2 emissions.

The document „Polish Energy Policy until 2030" adopted by Poland's Council of Ministers takes into account the nuclear option to ensure the national energy security. According to the plans of national electricity supply development, the first nuclear power plant in the country will be put in operation around the year 2020. Government's Commissioner for Nuclear Energy nominated in 2009 is charged with the coordination and supervision of the measures for the preparation of the regulatory and institutional environment, necessary for the nuclear power plant commissioning. Responsibility for the plant's construction rests with PGE Polish Energy Group SA, the largest power supplier in Poland.

Breakdown of electricity sources in %, 2008

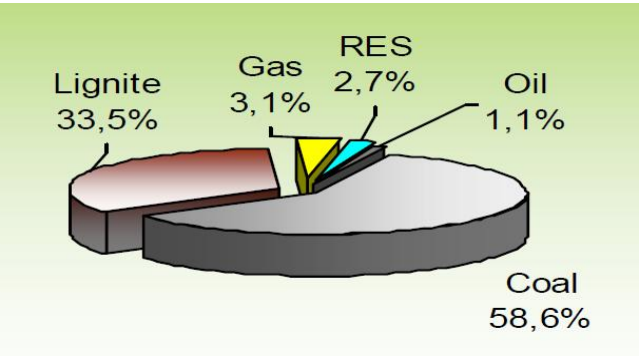


Fig.1

The draft of nuclear power program was developed and submitted to the Council of Ministers by the Government's Commissioner in early 2011; this program shall determine the nuclear power plants' number, size and possible sites.

The Council of Ministers obliged Minister of Economy (in cooperation with Minister of State Treasury) to prepare new national strategy regarding radioactive waste and spent fuel management. The document describing the strategy is expected to be ready in 2012. According to the Frame Programme for Nuclear Power Implementation in Poland prepared in July 2009 by Government's Commissioner for Nuclear Energy, by the end of 2013 the selection of the 3 potential sites for low and medium-level radioactive waste repository will be done, the design of the repository in 2013-2014 and by the year of 2020 the repository will be put in operation.

SOURCES, TYPES AND QUANTITIES OF WASTE

Radioactive waste in Poland arises from research reactors and from applications of radioisotopes in industry, medicine and science. There is no waste from power reactors' operation or spent fuel reprocessing activities in Poland. The research reactor Maria, the pool-type one, which is used mainly for material testing and radioisotopes production, is in operation since 1976 at the National Centre for Nuclear Research in Swierk. The other nuclear facilities are: the first research reactor EWA (at the end of 2nd stage of decommissioning according to IAEA definition), spent fuel facility in Maria research reactor pond, spent fuel facilities (2 water ponds) at Radioactive Waste Management Plant (RWMP).

Polish Atomic Law classifies radioactive waste into three categories according to its activity level:

1. low level radioactive waste
2. medium level radioactive waste
3. high level radioactive waste

These categories are further subdivided into subcategories according to the half-life of radioisotopes contained in the waste:

1. transitional waste – waste, which decays below the value of exemption within the period of three years,
2. short-lived waste – waste that contains radioisotopes of half-life <30 years with long-lived isotope concentration in individual waste packages restricted to 400 Bq/g,
3. long-lived waste – waste that contains long lived radioisotopes of activity exceeding 400 kBq/kg.

Disused sealed radioactive sources (SRS) form additional category of radioactive waste. These sources are classified into the three categories according to the level of their activity:

1. low level spent sealed radioactive sources
2. medium level spent sealed radioactive sources
3. high level spent sealed radioactive sources

These groups are further subdivided according to the half-life of contained radioisotopes into short-lived and long-lived subcategories.

All the radioactive waste is collected, processed and prepared for disposal in Radioactive Waste Management Plant (RWMP) – state-owned, public utility, located in Swierk, near Warsaw. Radioactive Waste Management Plant is responsible for operating the National Radioactive Waste Repository in Rozan. Rozan site is the only radioactive waste repository in Poland, operated since 1961. The repository is located in former military fort constructed in the beginning of XIX century, which is a storage facility for long-lived waste, as well as disposal site for low- and intermediate level, short-lived waste. It is expected that repository may be completely filled by 2020. The total volume of the waste disposed in Rozan repository since 1961 is 3500 m^3 of total activity ca. 34.4 TBq (2008).

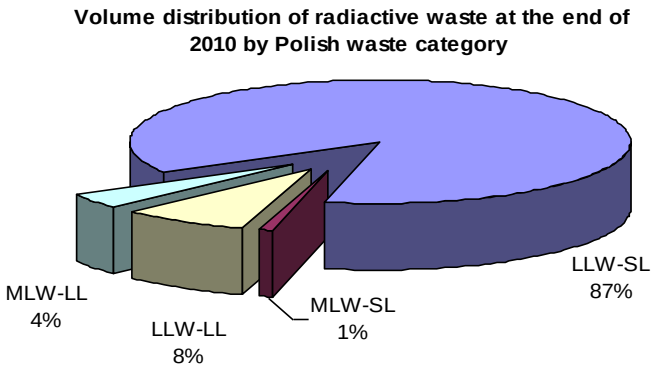


Fig.2.

Mining of uranium in Poland was ended in 1968, and processing in 1973. As a result, 100 dumps of waste rocks ($1.4x10^6$ m^3) were left and one tailing pond, which remediation was finished in 2004 in the scope of the project partly funded by the EC.

RADIOACTIVE WASTE MANAGEMENT POLICIES AND PROGRAMMES

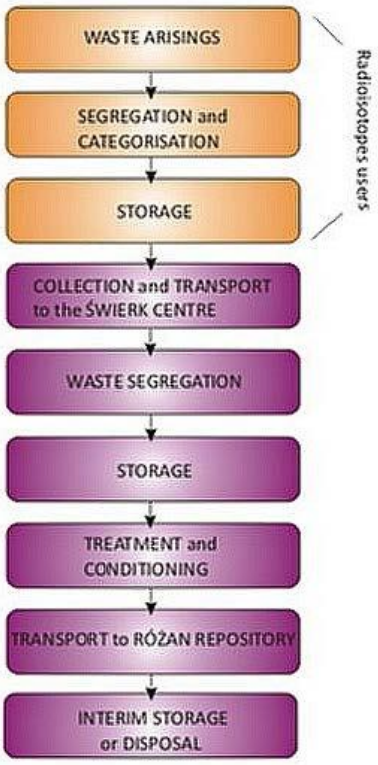
The responsibility for radioactive waste management is delegated to the Radioactive Waste Management Plant (RWMP) in Swierk (near Warsaw). RWMP performs the collection, segregation, and treatment, conditioning and interim storage/final disposal of all radioactive waste arising in the country. It is also in charge of the transport of conditioned waste to the National Radioactive Waste Repository in Rozan (NRWR) and the operation of this repository. The users are responsible for the proper segregation and categorization of the waste before they are collected by RWMP.

The scheme of radioactive waste management system in Poland is as follows: waste arising in nuclear centres --- segregation by the users --- temporary storage --- collection and transport to RWMP in Swierk ---segregation --- temporary storage in RWMP --- treatment and conditioning --- transport to Rozan repository --- interim storage or final disposal (Fig.3).

The system of radioactive waste management facilities at RWMP includes radioactive waste management farm (comprising several storage tanks of different volume), radioactive waste treatment station (with evaporator, chemical treatment station, reverse osmosis plant, bailing equipment and

cementation plant), temporary waste storage facility (for conditioned waste before shipment to the repository, smoke detectors, waste for decay), decontamination building (for decontamination of small equipment, smoke detectors dismantling area and laundry) and radioactive waste repository in Rozan.

The National Radioactive Waste Repository (NRWR) in Rozan is a surface type, being the first and the only radioactive waste repository in Poland. According to the waste acceptance criteria, the waste can be disposed in Rozan repository only in solid or conditioned form.



The diagram of the radioactive waste management system in Poland.

Fig.3

Since 1968, short-lived low- and medium level waste has been disposed in the part of the dry moat in the Rozan fort. The bottom and slopes of the moat have been covered with 20 cm thick concrete layer. The waste is arranged in the ‘layer by layer’ mode, and the free space between waste packages is filled with concrete. Long-lived waste is placed in separate facility with the intention of retrieval.

The wastes stored in this facility are mainly spent radioactive sources and solid short-lived and long-lived waste. In order to continue radioactive waste storage and disposal in Rozan NRWR until 2020, its enlargement has been planned.

Before the year 2009 spent nuclear fuel from Maria reactor was temporary stored in Maria reactor operated by Institute of Atomic Energy (now incorporated into National Centre for Nuclear Research) and

storage facility at RWMP. Spent fuel from Ewa reactor (including high-enrichment uranium fuel) was stored in two spent fuel storages operated by RWMP. Within GTRI framework Poland implemented Russian Research Reactor Fuel Return Programme (RRRFR). In the years 2009-2010 five spent fuel shipments were performed and all high enrichment spent fuel from Ewa reactor and the most of the spent fuel (80% enrichment) form Maria reactor was shipped back to the country of origin. According to the intergovernmental agreements the continuation of the program is going on in 2011 and repatriation comprises also low enrichment spent uranium fuel from Ewa reactor. Due to the fact that Maria reactor is still operating with the use of 36% enriched fuel (HEU), it is expected that the shipment of this fuel to the Russian Federation will take place in the next years, after the expiry of a period which is necessary for fuel cooling down.

In relation to the Plan of Polish Nuclear Energy the Council of Ministers obliged the Ministry of Economy to prepare national plan for radioactive waste and spent fuel management. It is expected that the document describing the strategy of management will be ready in 2011. In the scope of the plan the following issues will be taken into account:

- Siting and construction of the new, near-surface radioactive waste repository for low and intermediate level waste,
- Continuation of activities connected with closure of Rozan repository,
- Suggestions for spent fuel and high level waste management with consideration of deep geological disposal and reprocessing options.

The past programs related to radioactive and spent nuclear fuel

The Strategic Governmental Programme established by the Council of Ministers for years 1997-1999 covered all aspects of radioactive waste management in the country. In the scope of the programme a strategy for radioactive waste and spent fuel management was developed: new techniques and technologies (conception of closing-down Rozan repository, safe storage of spent fuel by encapsulation, radioactive waste treatment and conditioning methods, e.g. reverse osmosis for liquid waste concentration) were elaborated, national legislation was updated and new organisation established, several sites for near-surface new repository were investigated resulted in 19 sites being chosen for in-situ geological investigations.

The localization of the new underground repository for spent nuclear fuel and high-level radioactive waste was studied in the frames of the Strategic Governmental Programme. Several places with geological structures suitable for deposition of high-level radioactive waste were selected and considered as an eventual repository site. Different formations were chosen comprising magma and metamorphic rocs, clay formations and salt deposits. There is no on-going project concerning the selection of location of deep geological repository now.

The PHARE project on the closure of the Rozan repository was finished in 2004. The project considered decommissioning options regarding facilities No 2 and 3 at the site, including waste retrieving, repacking and redisposing.

To achieve the goals related to interim dry storage of spent fuel from research reactors in case of no possibility of SNF return to the manufacturer, an EU PHARE project entitled „Development of the technology and procurement of equipment for encapsulation of spent nuclear fuel from Polish research reactors" was established. The project aimed at assessing the possibility and implementing a new storage

route for SNF. This route relied on encapsulation of SNF elements and storage in dedicated container installed inside the shaft of decommissioned Ewa reactor, which provided shielding. Part of the project related to encapsulation process of EK-10 fuel has been successfully completed. Nevertheless, works connected with construction of dry storage facility were frozen, as its future development depends on final decisions regarding scope of RRRFR initiative and possible embarking on nuclear power.

RESEARCH AND DEVELOPMENT

R&D work in radioactive waste management area is performed by research institutions. The main institutes involved in these issues are:

- Institute of Nuclear Chemistry and Technology (radioactive waste treatment, processing of spent fuel and high-level RW, actinide partitioning, new technologies of waste fossilization)
- National Centre for Nuclear Research (studies on spent fuel storage)

The research is founded partly directly from the governmental budget, and partly from different research grants, among them EC framework projects, structural funds, IAEA cooperation projects and other international cooperation programmes.

Development of Polish Nuclear Power Program implies necessary activities concerning establishment of research and training programs that will provide the scientific and technical support for the first NPP. Universities and research institutes linked to nuclear sciences area are involved in various scientific and educational projects related to nuclear issues. They already participate in European Framework Programs and EURATOM projects sharing the experience with European institutions that enhance their scientific potential and readiness for supporting the Polish Nuclear Energy Program.

In 2011 the first strategic project concerning the research supporting nuclear energy development in the country was funded by Ministry of Science and Higher Education. One part of the project (app. 2,5 million EUR) is devoted to the studies on radioactive waste treatment.

DECOMMISSIONING AND DISMANTLING POLICIES AND PROJECTS

According to the Atomic Law a nuclear facility must be decommissioned in a manner ensuring nuclear safety and radiological protection of the staff and the whole society. The actions that could impact the future generations should be avoided during decommissioning and dismantling.

In compliance of Atomic Law decommissioning of a nuclear facility requires a license from the President of the National Atomic Energy Agency. It is granted on condition that applicant shall prove fulfilment of all requirements set forth in the Atomic Law Act and secondary legislation related to the decommissioning (generic), as well as will be able to fulfil the conditions, related to the particular facility to be decommissioned (facility specific), included in the license. The art. 38 b pt. 2 states, that the decommissioning plan, which is obligatory to be issued along with other documentations and assessments in the licensing procedure, shall be revised and updated at least every 5 years, and in case of the early closure of the facility (which is understood as equal to reduced exploitation period), the plan shall be revised and updated immediately and issued for an approval to the nuclear regulatory body. It has to include the assessment of the costs of decommissioning.

According to amendments to Atomic Law adopted in 2011, financial responsibility for decommissioning as well as radioactive waste and SNF management coming from the commercial facilities are to be held by the operator. The decommissioning /RW-SNF disposal fund(s) are to be set for any new nuclear facility. The rules and provisions for budgetary financed nuclear facilities remain the same and are guaranteed by the financing bodies. The funds for decommissioning and RWM/SNF management are to be saved on a separate bank account every month. For nuclear power plants, the source of funds is a designated part from the price of every 1 MWh produced by the NPP.

COMPETENT AUTHORITIES

President of the National Atomic Energy Agency and National Atomic Energy Agency (NAEA)

According to art.5, art. 36-39 and art. 63 of the Atomic Law Act, the legal authority to issue licenses, binding opinions and perform regulatory control of the siting, design, construction, commissioning, operation and decommissioning of nuclear installations in Poland is given to the President of the National Atomic Energy Agency. The activities of the President of the National Atomic Energy Agency (NAEA), as a central organ of governmental administration competent for the issues of nuclear safety and radiological protection, are regulated by the Act of Parliament of 29 November 2000 - Atomic Law (O.J. 2007, No 42, Item 276) and relevant regulations. Further tasks of the NAEA President result from many other legal acts. Since 1 January 2002 the NAEA President is supervised by the minister competent in environmental issues. NAEA President executes his tasks through the National Atomic Energy Agency, which internal organization is established by the statute conferred by the Minister of Environment.

Government Commissioner for Nuclear Power (in the rank of Undersecretary of State in the Ministry of Economy)

The position was established by Ordinance of Council of Ministers with the tasks of preparation and submission of the draft programme of Polish nuclear power, which determines the size and possible location of NPP. Ms. Hanna Trojanowska was appointed as a Commissioner by the Prime Minister on 15 May 2009. She cooperates with the Polish Energy Group SA on development and implementation of the Polish nuclear programme.

Department of Nuclear Energy, Ministry of Economy

The Department supports the Government Commissioner for Nuclear Power. It is responsible for the matters relating to the use of atomic energy for socio-economic needs of the country, including the implementation of the Polish nuclear power. The responsibility of preparation of the National Plan for Radioactive Waste and Spent Fuel management rests with this department of MoE.

Radioactive Waste Management Plant (RWMP)

Radioactive Waste Management Plant is a state-owned, public utility responsible for collecting, processing, and conditioning of the nuclear waste from all of Poland. As from January 1st, 2012 supervised and funded by Ministry of Economy. RWMP supervises and operates the National Radioactive Waste Repository (NRWR) in Rozan.

FINANCING

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 (since January 1st, 2012)
- state budget through the budget of National Atomic Energy Agency
- incomes from service activities of RWMP

Financial resources available are sufficient for routine activity of RWMP. No financial provision is made currently, which will enable to support safety for decommissioning, closure of the repository, and the appropriate institutional post-closure control and monitoring of the site. The subsidy from the national budget should be available when the decommissioning of the Rozan repository will be implemented.

PUBLIC INFORMATION

For more information, the websites of the relevant authorities and organisations are listed below.

Government:

Department of Nuclear Energy, Ministry of Economy: http://www.mg.gov.pl/Kontakt/DEJ

National Atomic Energy Agency: http://www.paa.gov.pl

Radioactive Waste Management Plant: http://www.zuop.pl

Research:

Institute of Nuclear Chemistry and Technology: http://www.ichtj.waw.pl

National Centre for Nuclear Research: http://www.ipj.gov.pl/o-centrum