NATIONAL ATOMIC ENERGY AGENCY

NATIONAL REPORT OF POLAND

ON COMPLIANCE WITH THE OBLIGATIONS OF THE CONVENTION ON NUCLEAR SAFETY

Second CNS Extraordinary Meeting

MAY 2012

(blank page)

TABLE OF CONTENS

(blank page)

Introduction

This report has been prepared, according to the guidelines established by the Contracting Parties in order to ensure an efficient and effective review of the National Reports for the Extraordinary Meeting focused on actions, responses and new developments that have been initiated or influenced by the accident at the Fukushima Daiichi NPPs. This report is not focused on issues that have been developed on a "routine" basis and presented in previous reports during Review Meetings of the Contracting Parties of the Convention on Nuclear Safety held in Vienna in 1999, 2002, 2005, 2008 and 2011.

Being a Contracting Party **without nuclear installations** in the sense of the Article 2(i) of the Convention, in this report Poland will address Topics 4, 5, and 6 (i.e. National Organizations; Emergency Preparedness and Response and Post-Accident Management; and International Cooperation). Additionally, taking into the consideration governmental decision on embarking on nuclear power and obligation to transpose Council Directive 2009/71/Euratom establishing the Community Framework for the nuclear safety of nuclear installations, also Topics 1, 2 and 3 (i.e. External Events; Design Issues; and Severe Accident Management and Recovery (On Site);) are addressed in this report to the applicable extent - that is mainly in activities performed by the regulator as a body responsible for setting safety rules by means of drafting regulations for establishing regulatory framework.

Description of activities performed by the operator in all 6 areas are provided by the operators of the nuclear installations other than defined in the article 2(i) of the Convention, namely: a research reactor MARIA with its technological pool, at National Centre for Nuclear Research (NCBJ), a research reactor EWA in decommissioning at the Radioactive Waste Management Plant and spent nuclear fuel storage facilities at the Radioactive Waste Management Plant.

1 Topic 1 - External Events

1.1 Overview of the performed analysis

The Amended Atomic Law includes the rule stating that a nuclear facility shall be located on a terrain that makes possible to assure nuclear safety, radiological protection, and physical protection during commissioning, operation and decommissioning of a nuclear facility as well as effective execution of emergency preparedness procedures in the case of a radiation emergency. It is assumed that, according to the rule that the licence holder is liable for nuclear safety, the investor of a nuclear facility, being the future licence holder, shall independently evaluate the terrain for the prospect site of a nuclear facility using methods of evaluation which yield quantifiable results and appropriately reflect the actual conditions of such terrain. Such an evaluation is the prerequisite for site selection for a nuclear facility, and concerns following groups of factors: seismic, tectonic, geotechnical, hydrological, hydro-geological and meteorological conditions; external events – natural and caused by human activity; terrain infrastructure; population density and land use development; as well as possibility of implementing emergency preparedness procedures over the site area in case of a radiation event.

The investor should prepare the results of the evaluation of a terrain for the prospect site of a nuclear facility, together with results of tests and measurements that are the basis for such evaluation, in form of so called site evaluation report. The site evaluation report will be subject to assessment by the NAEA President (PAA), in the course of procedure for issuing a construction licence for a nuclear facility. No separate siting licence from PAA is required.

The draft regulation on the detailed scope of the assessment of site dedicated for siting of a nuclear facility, and report on requirements for siting nuclear facility supporting siting requirements is now (April 2012), as a final draft preliminary accepted by the Government, on the stage of European consultations.

1.2 Activities performed by the operator

Multipurpose high flux reactor MARIA is situated at Swierk near Warsaw and is operated by the National Centre for Nuclear Research (NCBJ). MARIA is a water and beryllium moderated, water cooled reactor of pool type with pressurized fuel channels containing concentric multi-tube fuel assemblies. Fuel contains uranium enriched to 36% of U-235; recently the reactor is launching the procedure of conversion to low enriched uranium (LEU) fuel.

The re-evaluation of environmental factors that may affect the safety of MARIA reactor has been performed, including such natural external phenomena like earthquake, flooding, extreme weather conditions like rainfall, snowfall or gale. Other external events, considered by the Safety Analysis Report (SAR) e.g. the airplane crash or missile attack were not reviewed here as not initiated or influenced by the accident at the Fukushima Daiichi NPPs.

Earthquake

The Mazovia region, where the MARIA reactor is located, belongs to the Trans European Suture Zone (TESZ), separating the mobile Phanerozoic terranes from the ancient Precambrian structure. In spite of it the reactor site can be considered as an aseismic or pen

seismic (rare and weak earthquakes) area. The only historical earthquake jolted the region in 1680 and did not exceed the magnitude 5 on the Richter scale.
Earthquake hazard map in peak ground acceleration (PGA) with the 90% probability of non-exceedance within 105 years (the return period of 1000 years) is shown on Fig. 1[1]. For the MARIA site the PGA limit is <0.05g.
The original design of the reactor did not take into account the risk of an earthquake. The re-evaluation inspired by the Fukushima accident implies that the risk of an earthquake should be incorporated to the Safety Analysis of the MARIA reactor. The PGA for the Designed Basis Earthquake should be subsequently set at 0.1g.

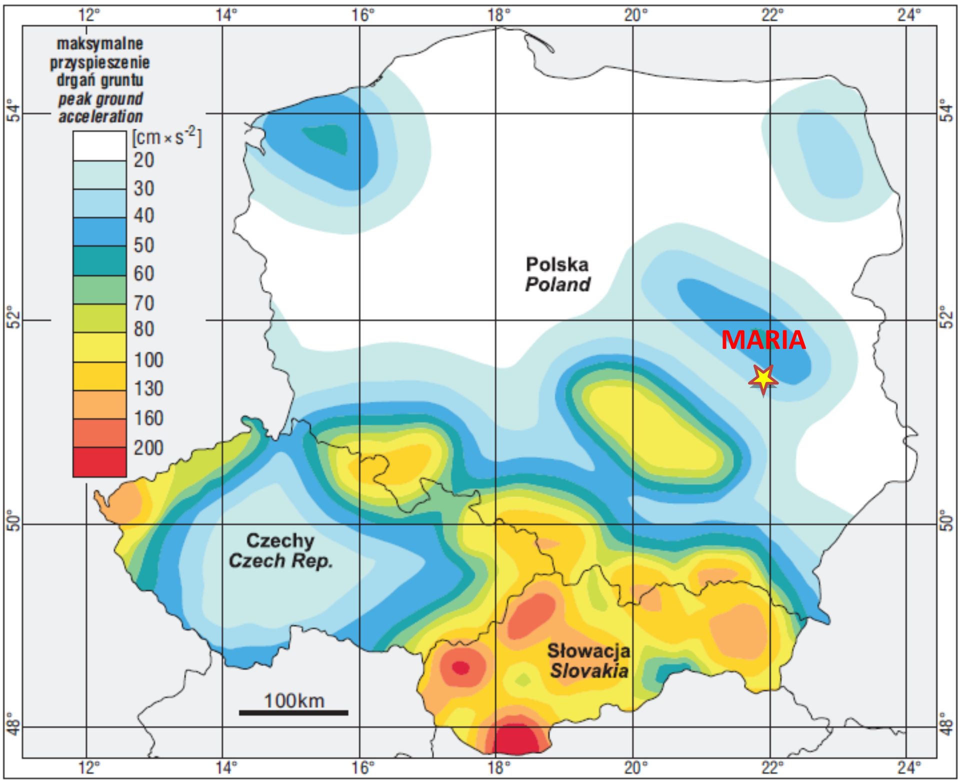

Fig.1.

External flooding

The MARIA reactor is situated at an elevation of 121 meters above the sea level and 16 meters above the water level in the nearest river Swider, distanced 920 meters away from the reactor building. The Swider river is the main hydrographic element of the area and on the whole has an infiltration character. Average flow rates of the river are within the range of $4.6 \div 4.9\ m^3/s$. Typically, there are two freshets yearly, due to the spring thaw and the summer rainfall. In the past 50 years the flood waters never approached the site at a distance closer than 600 m.
Thus, the Swider river does not determine a flooding hazard to the reactor site.
Groundwater water level at the reactor site is in average at a depth of 5 m beneath the ground. MARIA site region underground water level is monitored by means of piezometers, built in the special tube wells. All the piezometers are benchmarked.

[1] V. Schenk, Z. Schenkova, P. Kottnauer, B. Guterch, P. Labak – Earthquake hazards maps for the Czech Republic, Poland and Slovakia. Acta Geoph. Pol. , 49, 3: 287-302, 2001

In the reactor operation history there has been one incident, where the thawing water (after heavy snowfall) appeared in the basement of the reactor auxiliary building without affecting the safety important components. Among others the battery room, located at the level -3m below the ground level, was slightly inundated by a dozen or so centimeters of water. The necessary measures have been taken by the operator (see 2.2)

Internal flooding

There are three considerable water reservoirs in the reactor building or nearest vicinity, namely the reactor and the temporary pools, containing ca. 250 tons of water each and the cooling tower tank with ca. 900 m^3 capacity.

The reactor has the rain-drain water sewage systems located in the region of the pumping station and the cooling tower where the water from cooling circuits can be discharged.

Hypothetically, the unintentional release of water from the reactor pools or other water installations (e.g. water supply system) may lead to a flooding of basement premises of the reactor building. The analysis pointed out, that the most sensitive from the point of view of resistance of the reactor to the loss of power supply is the battery room. It’s location -3m below the ground level creates unfavorable conditions for protection against flooding of important onsite power supplies, namely the 220 V emergency power supply from two sets of batteries as well as 24 V and 48 V DC batteries.

The rest of onsite power supply components i.e. the DC/AC invertors, diesel generators with their start-up batteries etc. are located on the ground level or above and cannot be affected by the local flooding.

Extreme weather conditions

Some extreme weather conditions such as heavy rainfalls or snowfall, gales or icing can affect the MARIA reactor site. Due to geographical reasons such phenomena like tropical cyclones and hurricanes or waterspouts do not appear in the region and are not considered.

The region of Warsaw is characterized by relatively low quantities of rain falling over the short periods of time. The highest rainfall recorded in a single day never exceeded 100 mm and is distinctly lower than the highest value of 180 mm recorded in 1996 at Lesser Poland (Małopolska).

One of the reactor roof loads considered in snow conditions. According to the civil codes of practice the reactor building withstands the overload of 0.7 kN/m^2 what is equivalent to some 70 cm of snow. At the Mazovia Lowland such level of snow cover however rare but happens. Once the snow layer exceeds 30 cm the intervention procedure is set up to remove snow from the roofs.

Dominating for Swierk are the west winds with the velocities (average 10 minutes values at the elevation of 10 m above the ground level, for the terrain roughness of 0÷1) not exceeding of 4 m/s (see map Fig. 2[2]).

Tornadoes pose a highest threat to the overhead supply lines. According to the recent governmental report[3] on the territory of Poland occur 1÷4 tornadoes per year (compared with ~1000 tornadoes per year for USA). Their magnitude does not exceed F3 in Fujita scale,

[2] *The Atlas of Polish climate* - edited by Haliny Lorenc, Institute of Meteorology and Water Management, Warsaw, 2005

[3] *Periodic threats that occur in Poland*- developed by Division of Analyses and Prognosis in the Office of Monitoring and Risk Analysis of Government Security Center, September 2010

what corresponds to the peak wind velocity within the range of 50÷100 m/s. The strongest historical tornado, with the magnitude of F3÷F4 hit the city Lublin in 1931.

Also a heavy snowfall or icing can overload mechanically the off-site high voltage lines. The combination of snowfall or icing and wind can bring the lines into oscillations and cause their damage. In summer 1985 the combination of heavy wind (velocity reached 30 m/s) and intense rainfall did not affect the reactor installations but caused the collapse of 440 kV overhead lines pylons and loss of off-site power supply. The main power supply break lasted 2 weeks and the reactor and other plant systems were powered by the DGs.

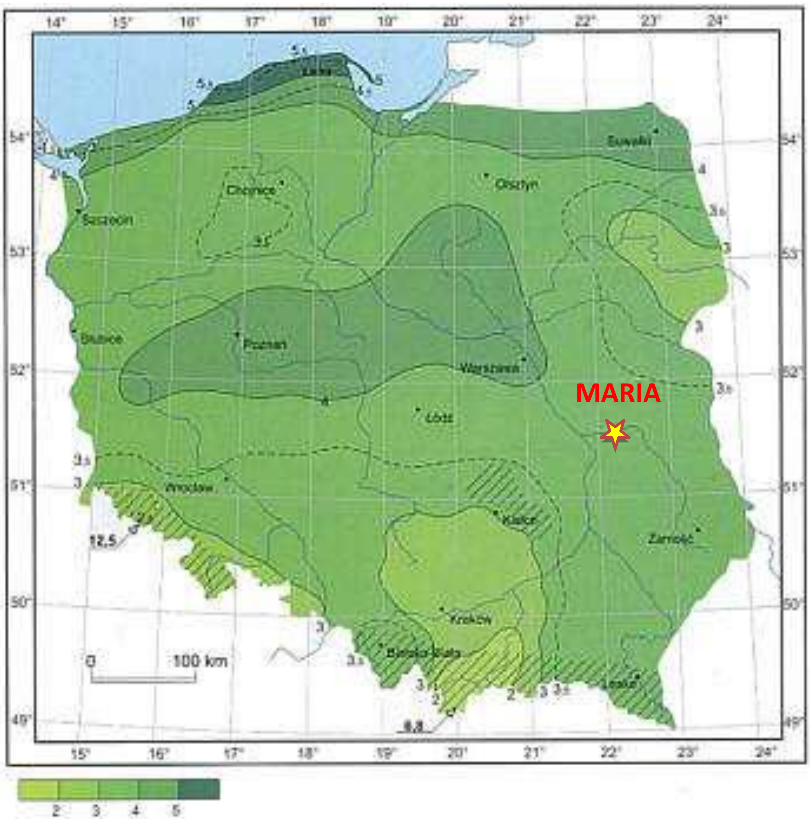

Fig. 2

Black-Out stress test applied to MARIA reactor

External events considered in the periodic MARIA Safety Analyses and re-assessed within the frame of post-Fukushima action do not pose a threat to the reactor safety if occur separately. Only the coincidence of external events, no matter how unlikely, can trigger off the serious incident.

After careful analysis the plant black-out scenario has been chosen as an envelope stress test case. The following initiating events have been assumed:

- Strong wind/tornado or intensive icing cause the damage of the off-site overhead high voltage line.
- Coincidentally, e.g. due to the local flooding (water supply system rupture) the battery room is subject to inundation, what brings on the loss of uninterruptible emergency power supply.
- Coincidentally, two DGs cannot be actuated, depriving the site of the on-site emergency power supply.

In normal conditions, the reactor systems response to the loss of off-site power supply (both lines) is the following:

- Immediately (~1.3 sec.) the reactor is scrammed from the voltage signal decay.
- After ~3 seconds automatic switching over the pump supply on the uninterruptible battery/invertors source, causing primary cooling flow reduction by 50%.
- Meanwhile, the operator starts setting in motion the one out of the two DGs. The switching over the DG emergency power supply to occur within 30 minutes after the reactor shut-down.
- After 1 hour forced cooling (the pumps powered by DGs) the reactor can be left for the natural convection cooling.

The natural convection plays an essential role in removing of the residual heat from the fuel channels. At the initial period after disengagement of the primary circulation pumps and vanishing of water flow through the fuel channels due to pumps' coast down, in the channel cooling circuit is being established the convection flow through the fuel channels and the bypasses. The schematic distribution of coolant flow in this period is shown on Fig. 3. This distribution of flow is defined as mode I of natural convection and has been confirmed experimentally.

After a certain period (from several to tens of hours after reactor shutdown) this mode of circulation vanishes and the natural convection appears in individual channels (mode II). In this mode the two convection cells are arisen in the fuel channel. The coolant flow distribution among the fuel tubes in both modes are shown in Fig. 4.

Both the modes provide an effective mechanism of the heat transfer from the fuel channel to the reactor pool. Experimentally measured fuel outlet temperatures were usually few degrees higher than those in the pool. It is worthwhile to mention that the pressure inside the fuel channel remains high (by 0.6 MPa) what corresponds to the water saturation temperature of 160°C compared with the pool saturation temperature within the range of 100÷116°C (depending on the depth). Thus, the parallel arrangement of fuel channels within the open reactor pool can be considered as an effective heat exchanger to remove the residual heat from the core.

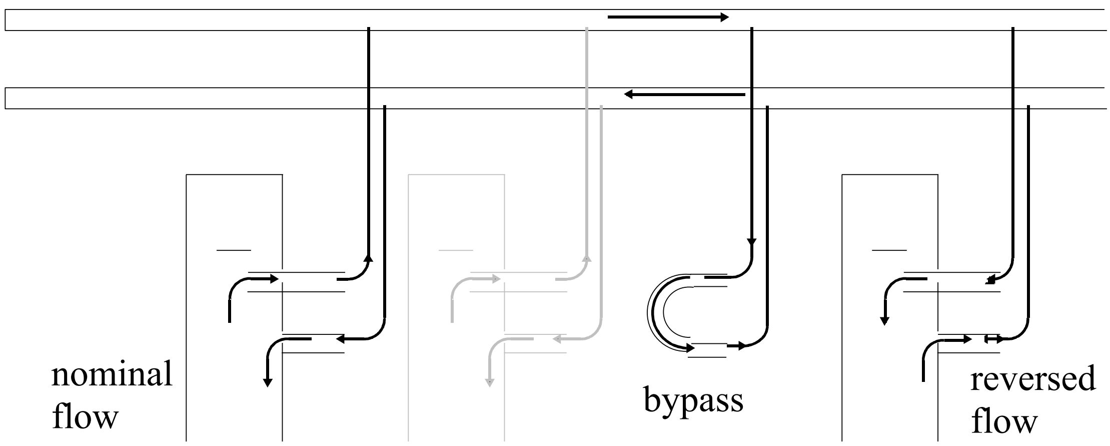

Fig. 3.

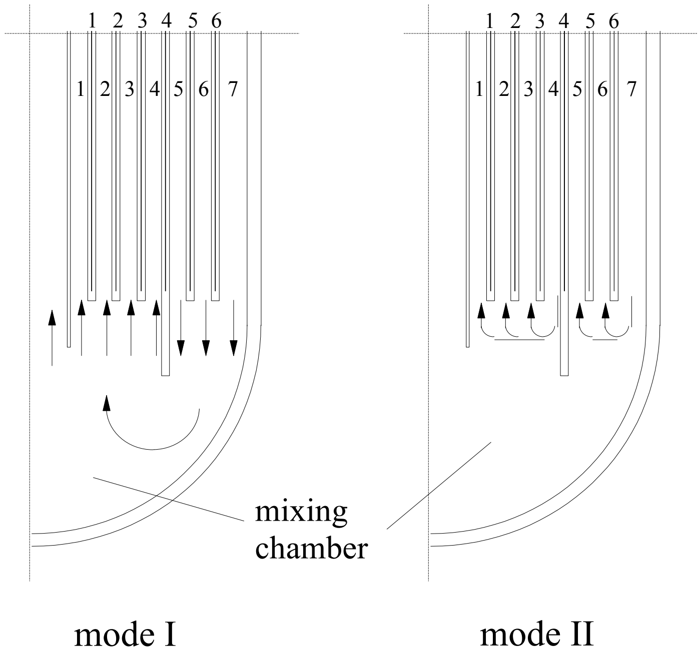

Fig. 4.

Assuming that the forced cooling ceases 10 minutes after the reactor shutdown and the reactor pool becomes the ultimate heat sink one can calculate the average pool water temperature growth. After 100 hours the average water temperature does not exceed 75°C. Thanks the huge amount of water in the reactor pool the time period to fuel damage (without any operator intervention) is rather exotically long – counted in years.

Similar analysis for the spent fuel stored in the technological pool requires estimation of the total residual power released from that fuel. The reactor MARIA is refueled successively and the overall residual heat in the spent fuel storage reaches equilibrium at ~30 kW. The natural convection provides sufficient mechanism of heat removal from the spent fuel storage. The impact of loss of power supply on spent fuel heat removal is negligible.

1.3 Activities performed by the regulator

On the early stages of regulation drafting process, analyses were carried out for the implementation of international requirements and adapting them to the Polish conditions, all that to ensure top safety level requirements. The regulation on the detailed scope of the assessment of site dedicated for the location of a nuclear facility, and report on requirements for siting nuclear facility has been drafted from 2009. Following this process, the references have not been made on the site assessment components such as active volcanoes and tsunamis, because such phenomena do not occur in Poland (although with regard to seismic induced waves on the inland Baltic Sea, it is expected to evaluate uplifts of the sea level/waving). Instead of these, it is focused on such elements of site, which do occur in the country, such as induced seismic events or floods and their after-effects (where incorporation of induced seismic events and their after-effects is a novum, which especially levels the safety up). Taking into account the first conclusions from the events in Fukushima Daichii was also possible, as at the time of Fukushima accident (FA), the draft regulation was still being before its official procedure of consultations and governmental approval.

Regulations in Polish legislation traditionally are mainly set on prescriptive basis, nevertheless evidence approach is also in use. Because of this facts and to maintain consistency with other regulations (for example - the Building Law) the siting regulation introduces precise ranges as the basis for assessment areas: on-site – being an area within the borders of estates dedicated for the NPP territory; site vicinity as area of 5 km radius and site region as area of 30 km radius. However, realizing that the conditions may vary from site to site, as well as to avoid a cliff-edge effects, the regulation states also that site vicinity and site region have to be treated as minimum zones for consideration of particular issues, and if it is necessary expansion of that area is required. After the events in Fukushima Daichii the draft was reviewed, but no changes were incorporated. Conclusions made from this review confirmed the approach that has been used in the site assessment regulation as a solution providing high level of site safety assessment and being consistent with international standards and best practices as well as in line with country specifics - both with regard to the natural conditions as well as legislative approach.

2 Topic 2 - Design Issues

2.1 Overview of the performed analysis

In present legislation no separate licence to design a nuclear facility is set forth, however the Amended Atomic Law defines the fundamental conditions that must be met by a nuclear facility in view of nuclear safety and radiological protection as well as safe operation of technical devices installed and used at a nuclear facility.

Detailed requirements on design issues is set by draft regulation on requirements for nuclear safety and radiological protection, which should be reflected in the design of a nuclear installation. It is now (April 2012), as a final draft preliminary accepted by government, on the stage of European consultations.

Drafting that regulation was based on an analysis of current and recent world adopted requirements (basically the most recent versions of relevant IAEA Safety Standards). Basic requirements for Generation III Reactors had been included, WENRA safety objectives for new NPPs (as declared in November 2010) taking into account. Moreover, the formulation of specific design requirements also included the basic conclusions from the accident at the Japanese Fukushima Daiichi Nuclear Power Plant, as well as flood in American Fort Calhoun Nuclear Power Plant, in particular with regard to ensuring:

- nuclear installation resistance to shock loads due to seismic and flood hazards;
- a reliable power supply and reliability of the nuclear facility external cooling systems.

2.2 Activities performed by the operator

National Centre for Nuclear Research (NCBJ)

MARIA has been designed with a high degree of flexibility to provide possibilities of production of radioisotopes, of physical experiments and material testing. Operational power is 30 MW and the thermal neutron flux in the centre of the core attains $3{\cdot}10^{14}$ n/cm^{2}s.

The primary cooling system consists of two independent circuits: the fuel channel cooling (FCC) one and the circuit designed for reactor pool cooling (PCC).

FCC is the pressurized (maximum 1.7 MPa) close loop system containing ca. 20 tons of water. The fuel channels are connected in parallel to the headers, situated in the reactor pool above the core.

The open reactor pool, containing ca. 250 tons of water, constitutes a part of the pool cooling circuit. PCC removes heat generated in beryllium and graphite matrices and all other core internals, including some 500 kW transferred to the pool by the hot outlet piping of the fuel channel.

Additional technological pool, adjacent to the reactor pool, serves as a spent fuel storage and it contains 250 tons of water.

Both primary cooling systems remove heat to common secondary cooling circuit which gives it off to the atmosphere through the cooling tower (ultimate heat sink from the reactor and spent fuel storage).

Considering the context of the accident at the Fukushima Daiichi NPP one has to mention the power supply system of MARIA reactor. The offsite power is supplied by means of two independent basic mains 380/220 V (2230 kVA).

The reactor has the following onsite power supplies:

- Emergency power 220 V from two diesel generators (DG) 250 kW each.

- An uninterruptible 220 V power supply from two batteries, each of 1000 Ah capacity and DC/AC inverters.
- 24 V DC from two batteries of 360 Ah capacity each (supply for nuclear instrumentation).
- 48 V DC from two batteries of 200 Ah capacity each (supply for alarms, signaling, radiation monitoring etc.).

The re-evaluation of the ability of the MARIA reactor to prevent or mitigate the consequences of extreme occurrences yield some improvements regarding to the on-site emergency systems:

- The measures has been proposed to prevent from internal flooding of the battery room on the -3 level. This includes the protection against water infiltration from intensive spring thaw and rainfalls and also the new signalization of water leakage to the battery room.
- Start-up batteries for the DGs have been lifted up to minimize the risk of flooding.

Within the scope of conversion of MARIA reactor from HEU to LEU fuel, the replacement of primary cooling pumps is foreseen. The necessity to replace the pump facilities has consequences to consider the mode for the shutdown and emergency cooling. In the present system for that goal the main pumps operating at half rated revolutions are being used which is ensured by using the two-speed motors. This kind of solution – beyond certain profits (minimization of number of facilities, reliability and effectiveness to be confirmed by experience gained for many years) – it also possess faults of which the major one is based on the fact that the intensity of flow rate in the shutdown regime substantially exceeds the level to be needed for reactor core cooling after shutdown. This fact doesn’t create any threat from the viewpoint of normal shutdown status, however, it imposes univocally negative impact on the course of LOCA type accident, because it brings about to quick loss of coolant from the circuit. Beyond that the applied two-speed motors are unique facilities of large weight and overall dimensions and their repair and overhauls are troublesome.
The above arguments incline to assign the shutdown and emergency reactor cooling tasks to a separate shutdown pumps system with parameters to be matched to the real needs to be arisen from the course of reactor power shutdown.

Radioactive Waste Management Plant (ZUOP)

Under Article 114 The Atomic Law Act a state-owned facility was created under the name "The Radioactive Waste Management Plant", whose scope of activities covers management of radioactive waste and spent nuclear fuel, and above all ensuring a permanent possibility of disposal of radioactive waste and spent nuclear fuel.
The activities of the RWMP are nationwide and of the public service nature, and they include the following tasks:

- collection of radioactive waste,
- transport of waste,
- processing and solidification of waste,
- quality control of waste forwarded to repositories,
- storage and disposal of nuclear waste,
- decontamination of contaminated equipment, facilities and sites,
- liquidation of radiological accident consequences.

The Radioactive Waste Management Plant is the operator of the National Radioactive Waste Repository (NRWR) located in Rozan, which is the only one on territory of Poland. This site is intended for the storage of short-lived low and intermediate level radioactive waste and temporary storage of long-lived waste. Only solid or solidified waste may be stored at the NRWR and they must meet the following quality requirements:

- they should not expel gas products (except for waste containing isotopes decaying into gas products, such as Ra-226),
- they should not contain explosives, flammable substances or have a chemical affinity to the protective barriers,
- they should not contain liquids unbound above 1% of the total weight of waste,
- leaching from solidification products of low level radioactive waste should not be higher than 10^{-2} g × cm^{-2} x d^{-1}, and for intermediate level radioactive waste 10^{-3} × g cm^{-2} × d^{-1},
- waste containers should be tightly closed in a manner that protects waste against falling away.

Alpha radioactive long-lived waste is stored in chambers of concrete buildings of the fort. The thickness of the walls and ceilings in the buildings is 1.2 - 1.5 m, which provides full biological protection of the waste placed inside. The waste, before the final closing of the repository in Rozan, will be moved to another repository. The largest group of alpha radioactive waste in terms of volume constitute smoke detectors with sources Am-241, Pu-239 and Pu-238 which are being withdrawn from use, and radium sources already withdrawn from operation.

According to the report approved by the President of the National Atomic Energy Agency (PAA), the operating period of the NRWR in Rozan has been fixed until 2020. In implementing of the Polish Nuclear Power Program, the Radioactive Waste Management Plant (ZUOP) shall be operator of radioactive waste repositories as nowadays, including, in the future, construction of one for high level waste.

In connection with the planned closing of the so far operated repository in Rozan, there are intensive works in progress on choosing the location of a new radioactive waste repository. The estimated date of commencement of the new repository operation is in 2020.

In addition, the Radioactive Waste Management Plant operates two storage facilities for spent nuclear fuel type "wet":

- **Storage facility 19** is used to store spent fuel type EK-10 from the first period of operation (years 1958-1967) of EWA reactor. This facility is also used as the place to store some solid waste from decommissioning of EWA reactor and from operation of MARIA reactor as well as some spent gamma sealed sources of high activity. The basic element of the storage facility is a concrete body, in which four cylindrical chambers are located in a square grid. The chambers are lined with stainless steel lining, and inside them there are storage tanks with separators for appropriate arrangement of spent nuclear fuel elements.
- **Storage facility 19A** (of similar design) was used for storage of fuel type WWR-SM and WWR-M2 coming from operation of EWA reactor in the years 1967-1995. Spent fuel from MARIA reactor is kept in the technological pool of this reactor. This fuel, as opposed to the fuel used in EWA reactor, has a higher degree of enrichment (36 and 80%).

2.3 Activities performed by the regulator

After events in Fukushima Daichii during planned inspections performed by PAA in research reactor MARIA issues concerning off-site power loss have been highlighted. There were two major findings and conclusions:

- the DGs room is situated on ground level without water-resistant door, when the entrance is located in the lowest point of surrounding area. That could possible cause flooding of start-up batteries for the DGs during intensive rainfall. The start-up batteries should be placed on higher level than floor level - the necessary measures have been taken by the operator (see 2.2)
- On-site tests performed to verify the Safety Analysis Report proved that during off-site power blackout batteries could power two pumps and ventilation for 3 hours till the diesel generators will be turn-on.

In the future, during next planned inspections, it is planned to highlight other issues concerning local external events and design issues typical for research reactor as for example safety issues in windy and snowy conditions.

3 Topic 3 – Severe Accident Management and Recovery (On Site)

3.1 *Overview of the performed analysis*

In order to manage any consequences of a nuclear or radiological emergency a legislative framework is established: the Act of parliament of 29 November 2000 'Atomic Law' with amendments and corresponding regulations, including Regulation of the Council of Ministers of 20 February 2007 on the emergency plans for radiation emergency and Regulation of the Council of Ministers of 27 April 2004 on intervention levels for various intervention measures and criteria for cancelling intervention measures.

In Poland there is no special regulation devoted to emergency response to severe nuclear accidents at NPP due to lack of such facility in Poland. Regulation of the Council of Ministries of 20 February 2007 on emergency planning in case of radiological emergencies clearly defines services and persons in charge responsible for emergency action depending on a scale of the accident. There are three types of radiation emergencies: on-site, regional and national. As long as the impact of radiation emergency is limited to the area within the site boundaries of organizational entity, the event is classified as an on-site emergency (entity/facility level). During the on-site emergency, the actions aimed at the elimination of the hazard and of the consequences of the emergency are conducted by the licensee (in co-operation with police, fire brigade etc. if needed, under content-related supervision of PAA through its Radiation Emergency Centre CEZAR). The response to the emergency event must be conducted in accordance with the appropriate emergency plan.

A radiation emergency on regional scale means that the impact of radiological emergency is limited to the territory of single region. During a radiation emergency on a regional scale, the actions aimed at the elimination of the hazard and of the consequences of the emergency are directed by the region's governor in cooperation with the state regional sanitary inspector.

During radiation emergency on a national scale the actions aimed at elimination of the hazard and the consequences of the radiation emergency are directed by the minister competent for home affairs, with the assistance of the NAEA's President (PAA).

A part of the response to the radiation emergency are intervention measures, described in the 'Atomic Law' and in the Regulation of the Council of Ministers of 27 April 2004 on the intervention levels for various intervention measures and criteria for cancelling intervention measures. Intervention levels are implemented and directed by regional governor or minister competent for home affairs. The decision of intervention measures implementation is made after receiving the message from the PAA, that consequences of radiation emergency may result in exceeding the intervention levels.

3.2 *Activities performed by the regulator*

The President of the NAEA (PAA) as the authority issuing the licenses for the activities related to the nuclear materials, spent nuclear fuel and nuclear facilities conducts the regulatory control of these activities. The primary responsibility for management of nuclear accident lays on the operator, nevertheless the President of NAEA (PAA) has got also legal responsibilities with regard to response to a nuclear or radiological emergency. In case of radiation emergency the President of NAEA (PAA) will supervise and control the operator

activities aimed at elimination of the emergency as well as provide needed assistance to the operator.
On basis of the safety analysis for the research reactor Maria the occurrence of the accident classified on INES levels 5 to 7 is unexpected.

Currently it is planned to include the new recommendations concerning the radiation emergency response (documents GSG-2) in the PAA's recommendations or guidelines and in the Radiation Emergency Centre's internal procedures. The new requirements resulting from the new BSS directive, which is currently under preparation, will be also implemented in the Polish legislation.

4 Topic 4 – National Organizations

4.1 Overview of the performed analysis

Government resolution of 01.13.2009, committed the PGE SA (Polish Energy Group SA – operator of future NPP) to cooperate with the Government Commissioner for Nuclear Power in the preparation of the Nuclear Power Program for Poland (PEJ) and its implementation. In line with the PEJ in 2009 works began on creating of infrastructure for nuclear power (following the guidelines of the IAEA NS-G-3.1 *Milestones in the Development of a National Infrastructure for Nuclear Power*), including the safety infrastructure (according to the SSG16): by providing a legislative framework (the new *Act on the Preparation and Implementation of Investment in Nuclear Power and Associated Investment* and *Amended Atomic Law Act*– in force from July 2011) and regulatory framework (organizational changes, staffing and building of PAA competence for performing regulatory functions with respect to the nuclear installations - including nuclear power plants).

In 2009, the Government invited the IAEA expert missions - namely INIR and IRRS to assess progress in the building infrastructure for nuclear power (2012) and the nuclear regulatory framework (2013). The Ministry of Economy and PAA carried out in 2010 the initial self-assessment, which is continued at the present.

In 2011 the organizational structure of PAA has changed (November 2011) and staffing has started according to schedule endorsed in 2011 (the planned increase in staff by 39 jobs by 2014). Building competencies is supported by the IAEA national program - POL9/021 to be implemented in the years 2012-2013.

4.2 Activities performed by the operator

National Centre for Nuclear Research (NCBJ) came into existence on September 1, 2011 in effect of merging the former Institute of Atomic Energy POLATOM with the former Andrzej Sołtan Institute for Nuclear Studies (IPJ). NCBJ pure/applied research profile combines nuclear power-related studies with various fields of sub-atomic physics (elementary particle physics, nuclear physics, hot plasma physics etc.). The Centre is strongly involved in developing nuclear technologies and promoting practical applications of nuclear physics methods. Major market products manufactured in the Centre include radiopharmaceutics and a range of particle accelerators for science, various industry sectors and medicine.

The Centre is is planning to be an IT and R&D background infrastructure to provide expert support for decision-makers in the project to develop in the coming years nuclear power industry in Poland.

Within the structure of NCBJ the Świerk Computing Centre has mission to achieve the status of the largest and best provider of cutting-edge computing services for state administration units (including Regulatory Body - PAA) and units investing in the development of the nuclear sector in Poland.

4.3 Activities performed by the regulator

At the present many actions of PAA as a Regulatory Body are focused on building competences due to future tasks for implementing of Nuclear Power in Poland. For supporting that activity PAA is strongly involved in the implementation of the IAEA Action Plan on Nuclear Safety on national basis, namely for each of the following actions:

No	Action	NAEA involvement (selected activities)
1	Safety assessments in the light of the accident at TEPCO's Fukushima Daiichi Nuclear Power Station - *Undertake assessment of the safety vulnerabilities of nuclear power plants in the light of lessons learned to date from the accident*	Poland have no Nuclear Power Plant and for NPP planned to operate in 2020 (according to the Nuclear Power Program for Poland – PEJ) sites and technology providers are not yet determined therefore participating in the 'stress tests' the same way as the 'nuclear 'countries is not possible. 'Stress tests' are applicable for specific installations in specific sites which do not yet exist in Poland, but still they can be used for training, and be applied to a limited extent for nuclear installations other than Nuclear Power Plants (for example, in 2011, MARIA reactor were inspected due to the effectiveness of emergency power systems in a loss of external power supply and its protection against flooding in the event of extraordinary precipitation). See more in Topic 6.
2	IAEA peer reviews - *Strengthen IAEA peer reviews in order to maximize the benefits to Member States*	PAA is preparing to IRRS mission in 2013, organized by the IAEA in response to an invitation from year 2009. Also PAA has delegated representatives topeer review stage of the European' stress tests' .
3	Emergency preparedness and response - *Strengthen emergency preparedness and response*	PAA system is constantly improving procedures for response to radiation emergencies at the national level in the course of cyclical domestic and international exercises and in preparation in Poland to UEFA EURO 2012 (in 2011 PAA in cooperation with the Ministry of Internal Affairs and Administration developed the concept of security procedures for CBRN). In the first half of 2012 there is a plan to update the voivodship response plans, as well as PAA Radiation Emergency Centre 'CEZAR') procedures and media communication in case of a radiological emergency.
4	National regulatory bodies - *Strengthen the effectiveness of national regulatory bodies*	In 2009 in PAA works began on an internal review, in order to strengthen the effectiveness of regulatory body and preparation for new tasks related to Nuclear Power Program for Poland (PPEJ), due to the need to: - create a legal framework and adapt the

		PAA structure and resources to the needs of PEJ and to implement of the Directive2009/71; - prepare self-assessment report for the IRRS mission originally planned for year 2012. As a result a set of strategic actions has been identified (a draft amendments to the Atomic Law, strengthening the independence, financing and development of staff in PAA) and also 10 tasks for the current implementation were set out (including- implementation of the Directive 2009/71 in the amendment to the Atomic Law in terms of adjustment to PEJ, the new information policy, restructuring of the PAA office, establishment of the Council for Nuclear Safety, providing support of TSO and consultants, expand staffing in Department of Nuclear safety and the introduction of an integrated management system, transferring from the PAA responsibilities that are not directly related to nuclear regulatory functions). Tasks performed successively from 2009 required cyclic reviews, namely for the reorganization of PAA, staffing, training, etc.
5	Operating organizations - *Strengthen the effectiveness of operating organizations with respect to nuclear safety*	Regulatory framework implemented in Poland within the amendments to the Atomic Law, in force from 13 July 2011 require in all stages of NPP life (construction, operation and decommissioning) actions in accordance to Integrated Management System (IMS) approved by the President of NAEA (PAA). At the request of PAA the IAEA established the national program POL/9/021 (in 2012-2013) for strengthening regulatory framework in terms of PEJ, including, among others IMS overseeing issues. As one of the tasks in POL/9/021 expert mission on IMS is planned in autumn 2012.
6	IAEA Safety Standards - *Review and strengthen IAEA Safety Standards and improve their implementation*	PAA has representatives in all 4 committees (NUSSC, RASSC, WASSC i TRANSSC) and track all changes in IAEA Safety Standards. IAEA Safety Standards were basics for preparing draft of amendments to the Atomic Law and are use in drafting supporting regulations.

7	International legal framework - *Improve the effectiveness of the international legal framework*	Poland is a contracting party of all essential international conventions (CNS, JC, CPPNM, NPT, etc.) and bodies (ENSREG, WENRA, NEA, IAEA) aimed and implementation of international nuclear safety and security regime.
8	Member States planning to embark on a nuclear power programme - *Facilitate the development of the infrastructure necessary for Member States embarking on a nuclear power programme*	Existing infrastructure is commensurate to current activities conducted in Poland (ionizing radiation uses, radioactive waste management, research reactor operation) but due to governmental decision on embarking on nuclear power it needs some adjustment. As a basis for this adjustment IAEA Safety Standards, WENRA reference levels and EU directives are used. Compliance with above mentioned guidelines will be confirmed by IRRS and INIR missions.
9	Capacity Building - *Strengthen and maintain capacity building*	In Poland, country embarking nuclear power, one responsible for encouraging capacity building is Government Plenipotentiary for Nuclear Power Program. PAA takes care of its own capacity building and within the state inspection authorities preparing for the overseeing of nuclear power plants in the system coordinated by PAA in accordance with art. 66 para. 3 of Atomic Law, it also supports capacity building of independent TSOs. In cooperation with Ministry of Economy and Polish Energy Group (PGE) PAA points to areas requiring capacity building. Within the organization PAA implements the hiring new employees, training them and motivating for continuous training and certification.
10	Protection of people and the environment from ionizing radiation - *Ensure the on-going protection of people and the environment from ionizing radiation following a nuclear emergency*	Poland, as a country which has not operated the NPP, has no experience in removing the damaged nuclear fuel and waste caused by a nuclear accident. Therefore it could not be a source of such information for the country dealing with the consequences of a nuclear accident. But it is in the interest of PAA to expanding knowledge of experts, and thus to have access and use of information, expertise and techniques for removing damaged nuclear fuel and radioactive waste from nuclear accidents and their utilization.
11	Communication and information	During last amendment of Atomic law special

	dissemination - *Enhance transparency and effectiveness of communication and improve dissemination of information*	provisions were introduced to provide means of communication between operators, regulator and public on different stages of nuclear facility lifetime. Currently similar provision regarding radioactive waste disposal facility are under preparation. Additionally representative of NAEA (PAA) is taking part in NEA/OECD Working Group on Public Communication of Nuclear Regulatory Organisations (WGPC
12	Research and development - *Effectively utilize research and development*	NAEA (PAA) is building network of scientific and technical institutes to assure itself necessary expertise. At the same time institutes willing to serve as support organisations for regulatory body or government are working on establishing cooperation with international community conducting research in field of nuclear safety.

5 Topic 5 – Emergency Preparedness and Response and Post-Accident Management (Off Site)

5.1 *Overview of the performed analysis*

In order to be prepared for and manage any consequences of a nuclear or radiological emergency a legislative framework is established:

- the Act of parliament of 29 November 2000 'Atomic Law' with amendments and corresponding regulations,
- Regulation of the Council of Ministers of 20 February 2007 on the emergency plans for radiation emergency,
- Regulation of the Council of Ministers of 27 April 2004 on intervention levels for various intervention measures and criteria for cancelling intervention measures,
- Regulation Of The Council Of Ministers of 27 April 2004 on prior information to the general public in the event of a radiation emergency,
- Regulation Of The Council Of Ministers of 17 December 2002 on the station for early detection of radioactive contamination and on the units that conduct measurements of radioactive contamination,
- Regulation Of The Council Of Ministers of 27 April 2004 on the determination of entities competent to inspect maximum permitted levels of radioactive contamination of foodstuffs and feeding stuffs following a radiation event.

The three types of radiation emergency are described in the topic 4.1 (on-site emergency, emergency on regional scale and emergency on national scale).

Referring to the control of contaminated goods please note that in Poland the radiometric control is continuously performed by Border Guards at the Polish border crossing points located at the external border of the UE. One of the aims of the radiometric control is to protect Poland and the EU against import and export of contaminated goods.

The existing legal regulations constitutes all essential actions necessary to be taken in the case of accident at the nuclear research reactor in Poland.

5.2 *Activities performed by the operator*

According to Agreement No. 1/OR/2012 of 13 December 2011 concluded by and between the President of the National Atomic Energy Agency, and the Radioactive Waste Management Plant, the RWMP (ZUOP) acts as the Emergency Service of the President of the NAEA (PAA). The responsibilities under this Agreement are as follows:

1) ensuring the readiness of departure and departure of a dosimetric crew to the place of an emergency radiation event (event), by car owned by the Contractor, within three hours of receipt of a command to leave from the Center officer on-duty;
2) ensuring the maintenance - using their own technical means – of 24-hour telephone communication between the Center officer on-duty and the Contractor;
3) conducting measurements on the emergency site, using portable equipment, enabling:
    a) determination of the value of spatial equivalent of gamma radiation dose at least in the range of 0.1 µSv / h to 5 Sv / h at photon energies from 40 keV to 2.0 MeV at the height of 1m above the surface;
    b) determination of the value of surface radioactive contamination originating from radioactive isotopes alpha, beta and gamma, expressed in the quantity of

impulses in relation to the volume of the background radiation, including identification of non-durable (removable) radioactive contamination and preliminary qualitative identification of isotopes;
    c) detection of isotopic neutron sources and determination of the flux density of neutrons emitted by such sources;
    d) detection and preliminary identification of nuclear materials.
4) immediately sending by phone, to the Centre, measurement results, referred to in paragraph 3 and after consultation with the Center officer on-duty:
    a) verification of the zone designated around the emergency site or designating of such a zone, covering the area in which there may occur any non-durable (removable) radioactive contamination or a dose rate exceeds the value of 100 µSv / h (of the emergency zone), in order to mark such a zone and prevent access for the outsiders;
    b) performance of additional measurements allowing a preliminary assessment of external exposure and contamination of people on the site of the event;
    c) carrying out other activities to help persons in charge to manage the activities on the site of the event;
    d) sampling of contaminated materials, radioactive sources, radioactive substances and radioactive waste, and their transport to the laboratory for determinations referred to in paragraph 7) and 8), subject to the point f;
    e) where uncontrolled sources are found, transport to the laboratory for determinations referred to in paragraph 7) and 8);
    f) where presence of nuclear materials is found on the site of the event, their further handling in the manner agreed with the Center officer on-duty (including the possible transport to the laboratory for sampling and determinations referred to in paragraph 9);
5) cooperation, after consultation with the Centre officer on-duty, with other services acting on the site of the event, including law enforcement authorities;
6) transfer of a report on each action to the Center, within 2 days after completion of activities on the site of the event, which includes: a description of the situation existing on site, the results of measurements taken, a brief description of their own activities and of the person in charge to manage the activities on the site of the event and a preliminary assessment of the radiation risks caused by the event, including a preliminary assessment of possible health effects in people who have been in contact with radioactive substances in the course of the event;
7) performance of laboratory qualitative and quantitative determinations of radioactive isotopes in collected samples, using spectrometric methods;
8) if the spectrometric methods prove inadequate, performance of laboratory determinations using radiochemical methods;
9) performance of laboratory determination of percentage isotopic composition of nuclear materials from the site of the event;
10) classification and registration of waste and its storage until it is collected by an approved body;
11) storage of radioactive sources and nuclear materials until they are collected by an approved body;
12) sending to the Centre, as soon as possible but no longer than 2 weeks after sampling, the results of determinations referred to in paragraph 7) and 8), the results of

determinations referred to in paragraph 9) and a description of the treatment of waste, radioactive sources and nuclear materials;

13) at the direction of the President of the NAEA (PAA), preparation of nuclear materials samples to be delivered to the laboratory of the Institute for Transuranium Elements (ITE) in Karlsruhe (Germany);

14) participation - at the direction of the President of the NAEA (PAA) - in training sessions related to responding to radiation events.

This Agreement is implemented by the staff and equipment of the RWMP:

- 6 employees with licenses of the radiological protection officer,
- 2 drivers with certificates of training for drivers transporting dangerous goods, class 7,
- 4 employees with certificates of operators of storage facilities for spent nuclear fuel,
- 1 employee with a certificate to keep records of nuclear materials,
- Peugeot Boxer, registration number WFA 423E, adapted to carry radioactive materials and waste (production year 1998, total permissible weight of 3500 kg, maximum load capacity of 1310 kg, six passenger seats),
- Renault Premium adapted to carry radioactive materials and waste (production year 2005, total permissible weight of 11990 kg, maximum load capacity of 7200 kg, one passenger seat),
- Mercedes Benz adapted to carry radioactive materials and waste (production year 2007, total permissible weight of 3490 kg, maximum load capacity of 1365 kg, five passenger seats),
- Volkswagen Candy adapted to carry radioactive materials and waste (production year 2010, total permissible weight of 2490 kg, maximum load capacity of 700 kg, five passenger seats).

The intervention teams are equipped with the following instruments and dosimetric equipment:

- monitors of radioactive contamination EKO-C / S,
- direct reading dosimeters ISOTRAK - DoseGUARD,
- contamination radiometers RKP -2,
    - Roentgen radiometers DP-75,
- a universal radiometer RUST 3-2,
- digital radiometers RK-100,
- digital radiometers FH40GL-10,
- a universal radiometer RUM-1,
- Berthold LB 1210D,
- a radiometer Colibri TTC,
- probes SSU 3-2,
- probes SSA-1P,
- a probe SGB-2P,
- a probe SGB-3P,
- a probe FHZ 382,
- a neutron probe SPNT-3,
- probes RK-100,
- a probe FHZ 502-P,
- a probe FHZ 612-10,

- chemical reagents and materials to carry out decontamination,
- materials for sampling and swabs,
- special protective clothing.

Spectrometric analyses are performed by the Radiometric Laboratory of the RWMP (ZUOP) using a spectrometer with a semiconductor germanium detector HPGe type GC1520-7500SL, serial No. b 92042 with relative efficiency of 15% and resolution FWHM - 1.78 keV to 1332 keV - Co60 with the protective house of lead with wall thickness of 11.5 cm, make CANBERRA.

The following are also used in the analyses:

- an instrument "Porfamess 913 (x) pH" to measure pH and temperature,
- a conductometer "703 Laboratory" to measure conductivity and temperature,
- a large-area proportional counter "Berthold Multi - Logger LB 5310" with a diameter of 200 mm to measure alpha and beta radiation,
- a multifunctional manual radiation monitor PM 1401K with a scintillator CSJ / Tl, used to:
    - identify composition of radioisotopes contained in the tested substances,
    - measure surface contamination with alpha and beta emitters,
    - measure power of the spatial dose equivalent of photon radiation H * (10),
    - recording, collection and storage of scintillation spectra of photon radiation,
    - search (detection and location) of radioactive and fissionable materials, using registration of gamma rays and X-rays, neutron, alpha and beta rays.

In the near future the RWMP(ZUOP) intends to buy:

- a stationary dosimetric gate for the whole body;
- a stationary dosimetric gate type "hands-legs";
- a portable spectrometer;
- radiometers to measure a dose rate.

The events that took place in Fukushima have influenced raising of the priority measures aimed at reduction of the possibility of potential radiological emergencies, and the procedures followed in the event of their occurrence. Analyses have been performed to verify the currently applied practices. Based on the analyses development and improvement strategies applied by the RWMP(ZUOP) quality system have been developed.

Special emphasis has been placed on the activities of the RWMP(ZUOP) in the scope of Radiation Emergency Service of the President of the NAEA (PAA). In the period since the accident at the nuclear power plant in Fukushima there have been two training sessions in the RWMP(ZUOP) concerning procedures following an event of a radiological emergency. In addition, the crew of teams operating under the Emergency Service of the President of the NAEA (PAA) has been reinforced. In 2011, the Director of the RWMP (ZUOP) appointed a Plenipotentiary for Radiation Emergencies.

5.3 Activities performed by the regulator

The tasks of the President of NAEA (PAA) with regard to preparedness for a nuclear or radiological emergency are performed by the Radiation Emergency Centre established within the organizational structure of the PAA. The Radiation Emergency Centre, being the 24/7 national contact point, receives emergency notifications, conducts systematic assessments of the radiation situation in the country, collects, verifies and analyzes the information from the radiation monitoring system and from other sources (esp. the national meteorological service). The Radiation Emergency Centre uses databases (containing measurement results from Permanent Monitoring Stations, weather forecasts, licensees and devices) and information systems relevant for the assessment of radiological situation. In order to facilitate the emergency response essential detailed procedures are in place and periodically updated.

In order to review and update the radiation emergency plans, periodical exercises on national and regional level are performed at least once every 3 years by Ministry of Interior and regional governor, as appropriate.

Currently it is planned to include the new recommendations concerning the radiation emergency response (documents GSG-2 and ICRP recommendations) into the PAA recommendations or guidelines and in the Radiation Emergency Centre internal procedures. The new requirements resulting from the new BSS directive, which is currently under preparation, will be also implemented in the Polish legislation.

6 Topic 6 – International Cooperation

6.1 Overview of the performed analysis

Tasks aimed at maintaining the highest possible standards of nuclear safety and emergency preparedness and response have always had an essential importance for the Polish regulatory body (National Atomic Energy Agency – PAA). In that area the international cooperation plays a crucial role, in particular in the extraordinary situations as that which occurred at the Fukushima-Daiichi nuclear power plant in Japan, following the earthquake and tsunami of 11 March 2011. The accident has renewed political attention to the measures needed to minimise risk and guarantee the most robust levels of nuclear safety. As a consequence, a number of international meetings dedicated to the nuclear safety aspects related to that event, smaller and bigger, took place in various parts of the world; in some of them the representatives of PAA and other organizations participated.

6.2 Activities performed by the operator

The representative of MARIA team participates in the works of NEA Committee on Nuclear Regulatory Activities (CNRA) Task Group on the safety of research reactors. These works are aimed at the post-Fukushima Daiichi safety of research reactors.

Under the Agreement concluded in November 2003 by and between the U.S. Department of Energy, and the Minister of Economy and Labour and the Department of Public Health of the U.S. Department of Health, the American party under the implemented project The Global Threat Reduction Initiative (GTRI) has committed itself to fully finance the performance of additional mechanical and electronic security by the Polish party in order to improve protection against wilful taking or theft of high-level radioactive sources, in all places in Poland with such a source (the work has been already done in 51 sites). The Polish party has established the Radioactive Waste Management Plant – State-Owned Enterprise (ZUOP) as a project supervisor and prime contractor implementing the above Agreement.
In addition, under the GTRI project, the ZUOP successively exports spent nuclear fuel from Polish research reactors to the Russian Federation.

ZUOP specialists actively participate in bilateral meetings, conferences, seminars and training sessions related to nuclear power, management of radioactive waste and spent nuclear fuel, both at home and abroad.

The areas of international cooperation include all issues related to ensuring of the adequate level of nuclear safety and protection of nuclear power and nuclear materials facilities.

6.3 Activities performed by the regulator

The representatives of PAA participated in a number of international meetings dedicated to the nuclear safety aspects, namely:

- International Atomic Energy Agency Ministerial Conference on Nuclear Safety, Vienna, 20-24 June 2011; the idea of the IAEA Action Plant on Nuclear Safety was initiated as a result of that meeting;
- Nuclear Safety Conference in Brussels, 28-29 June 2011;
- International Experts' Meeting on Reactor and Spent Fuel Safety in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant, Vienna, 19-22 March 2012.

Since Poland is a Member State of the EURATOM Community, the PAA responded also to the initiatives of the European Union to the events at Fukushima. The representatives of the Polish regulatory authority (PAA), together with other national regulators, took part in a launched by the European Commission process to carry out EU-wide comprehensive risk and safety assessments of nuclear power plants ("stress tests"). High level PAA representatives participated in EC TREN (15 March 2011), WENRA (22-23 March 2011) and HLG ENSREG (12-13 May 2011) as well as in NEA-CNRA regulators forum (8 may 2011) meetings in Brussels, Helsinki and Paris. The initiative was supported by the European Parliament and endorsed by the European Council at its meeting of 24-25 March.

The mandate from the European Council also comprised the invitation for EU neighbouring countries to take part in the process (Switzerland and Ukraine accepted it). The scope, modalities and criteria of these tests were developed in a coordinated framework, making full use of available expertise. The whole process was to be done on the basis of a methodology shared among the Member States, thereby ensuring full transparency for the public.

The representatives of the PAA participated in works on two parallel tracks:

- A *safety track* to assess how nuclear installations can withstand the consequences of various unexpected events. These can range from natural disasters to human error or technical failure and other accidental impacts, such as transport accidents.
- A *security track* to analyse security threats and the prevention of, and response to, incidents due to malevolent or terrorist acts.

The *safety track* was fully within the competences of the Polish regulator (PAA)[4] whereas in case of the *security* one the PAA representative played only the role of expert in the group headed by the Internal Security Agency.

The experts of the Polish regulator (PAA) participated in activities undertaken in all three main areas to be assessed, defined by specifications on the safety track of the stress tests, namely:

- extreme natural events (earthquake, flooding, extreme weather conditions);
- response of the plants to prolonged loss of electric power and/or loss of the ultimate heat sink (irrespective of the initiating cause); and
- severe accident management.

The Polish experts' work comprised preliminary meetings in Helsinki (5 September 2011 and 3 October 2011) after which initial arrangements concerning a detailed programme elaboration were established and, furthermore, the participation in implementing tasks attributed to the above areas. An organisational meeting took place on 14 December 2011 and a follow-up one, dedicated to the review of country reports as well as to the preparation of additional questions, if any, to be posed during the country visits, was held from 5 to 17 February 2012, both in Luxembourg. Finally, the experts representing the Polish regulator (PAA) participated in March 2012 in the country visits to Germany, the Netherlands and Belgium.

[4] However Poland as a country without NPPs, initially was orly monitoring the stress tests activities in NPPs abroad by its delegates to ENSREG and participated more extensively only in the peer review stageof European stress tests.

Summary

Poland is a country which on one hand has no existing NPPs but on the other hand is preparing to launch national nuclear power programme in near future. In this complex situation Polish response to lessons arising from Fukushima Daiichi accident can be divided in to two parts.

Firstly - nuclear installations existing in Poland (research reactor and spent fuelstorages) were subject to safety reassessment in areas connected with natural eventsand with loss of external power. Scope and extent of those analysis were limited incomparison to stress tests applied to all European NPPs but sufficient according to gradedapproach principle. It is worth to mention that due to Polish participation in GTRI spent fuelrepatriation programme amount of spent fuel was significantly reduced over lastcouple of years making this kind of threat negligible.

Secondly - as one of the milestones of Polish nuclear power programme development legal framework was prepared by amending act of Parliament - Atomic Law and drafting of number of supporting regulations to be issued by Council of Ministries (e.g. on siting requirements, on design requirements and on scope of safety analysis to be performed prior to license application). Final stage of drafting of above mentioned documents has overlapped with nuclear accident in Japan. This situation allowed us to reconsider proposed requirements in the view of first outcomes of stress tests and other initial analysis of Fukushima Daiichi accident. Due to the fact that legislation prepared by Polish regulatory body NAEA (PAA) was based on international guidelines (IAEA, WENRA, ENSREG and NEA/OECD) and dedicated only to generation III/III+ reactors not many changes were needed. However minor adjustments were introduced referring for example to requirements regarding plant behavior in situation of loss of external power supply.

It is well understood that process of identifying all lessons learned from Fukushima Daiichi accident will be long lasting activity. Poland is a member of all essential international bodies (working under auspices of IAEA, EC, WENRA, NEA/OECD) aiming at implementation of international nuclear safety and security regime and is highly motivated to fully implement all results of international reviews of events in Japan to enhance safety of future

Summary table

Activity	Activities by the Operator*			Activities by the Regulator*		
	(Item 2.a) Activity - Taken? - Ongoing? - Planned?	(Item 2.b) Schedule Or Milestones for Planned Activities	(Item 2.c) Results Available - Yes? - No?	(Item 3.a) Activity - Taken? - Ongoing? - Planned?	(Item 3.b) Schedule Or Milestones for Planned Activities	(Item 3.c) Conclusion Available - Yes? - No?
Topic 1 – External Events						
Preparation of Council of ministers regulation on detailed scope of assessment with regard to site of nuclear facility and on content of siting report.	Ongoing	In force in 2nd half of 2012	Yes			
External hazards reassessment for research reactor				Taken/ ongoing		Partially
Topic 2 – Design Issues						
Reassessment of black-out scenario for research reactor				Taken		Yes
Preparation of Council of ministries regulation on design requirements for nuclear installations	Ongoing	In force in 2nd half of 2012	Yes			

Topic 3 – Severe Accident Management						
Issuance of guidelines based on GSG-2	Planned	2013	No			
Topic 4 – National Organizations						
IRRS mission	Planned	Self-assessment started, mission invited for 1st quarter 2013				
Implementation of IAEA action plan	Ongoing	Long-term activity				
Topic 5 – Emergency Preparedness and Response and Post-Accident Management (Off Site)						
Enhancement of Emergency Service of the President of the NAEA	Taken	Additional trainings	Yes	Taken	Additional trainings, number of involved staff enlarged	Yes
Topic 6 – International Cooperation						
Participation in the works of NEA Committee on Nuclear Regulatory Activities (CNRA) Task Group on the safety of research reactors	Ongoing			Ongoing		
Participation in expert peer review teams conducting European stress tests.	Taken	ENSREG report ready for publication				
Participation in international meetings dedicated to Fukushima lessons learned identification.	Ongoing					