



HUNGARIAN ATOMIC ENERGY AUTHORITY Nuclear Safety Directorate

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RECENT DEVELOPMENTS IN NUCLEAR SAFETY IN HUNGARY

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General

Safety Performance Assessment of Nuclear Facilities

HAEA continuously evaluates the safety performance of the operators of the nuclear facilities.

According to our new process we collect and evaluate the results more often and we publish the most interesting data as a short interim report. The main areas of data collection supporting the assessment are: regular and event reports of the licensees, periodic regulatory inspections, comprehensive regulatory inspections focusing on certain specific areas, reactive inspections and inspection of the training of operating personnel.

As a summary the general evaluation of nuclear safety condition of nuclear facilities showed appropriate results in the first and second quarters (Q1 and Q2) of 2012.

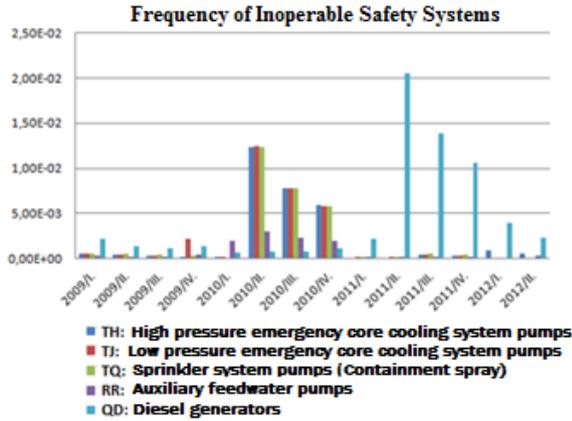
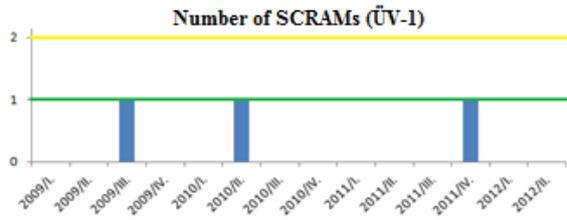
1. Paks Nuclear Power Plant



The number of reportable events was low (4) in Q1 and average (8) in Q2. None of the events that took place reached the INES-1 or higher classification on the INES scale.

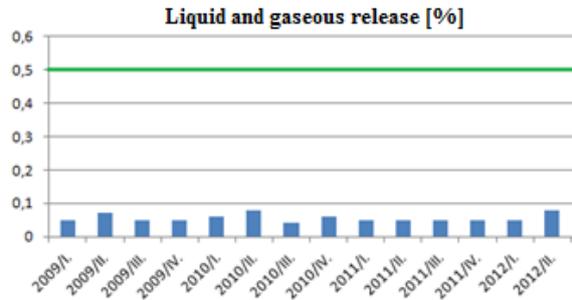
One event of September was classified as INES-1; see the Events of interest section below.

There was no reactor scram in this period.



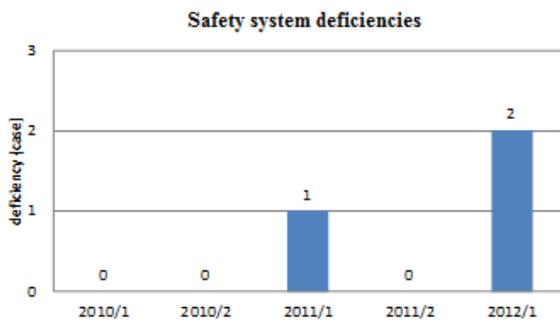
The frequency of safety system inoperability was appropriate except the diesels. Due to the corrective actions there is an improving trend.

The environmental releases never exceeded the limit values. The liquid and gaseous releases have been constantly low in the recent years.



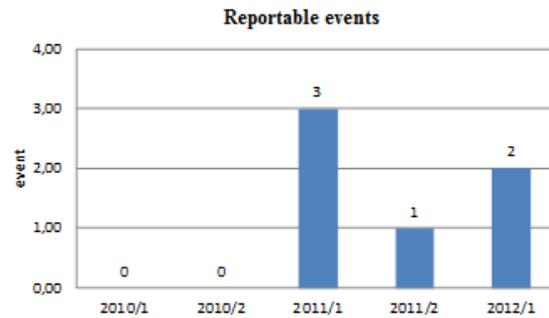
2. Training Reactor of Budapest University of Technology and Economics Institute of Nuclear Techniques

In case of the Training Reactor only annual and semi-annual data are available because of the reporting system.



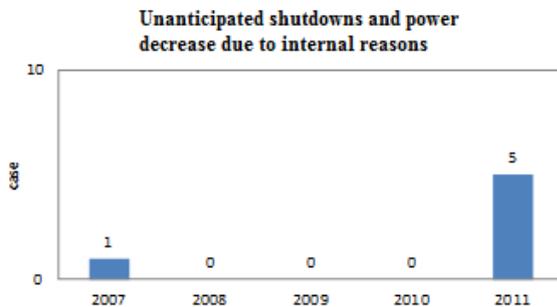
There were two safety system deficiencies in the first half-year of 2012. This is the worst value in the recent years. With some corrective actions and the reconstructions planned for the next periods will hopefully result in a steady-state on a good level.

The number of reportable events is strongly depending on the age of the components. Although there is no trend, the regulatory body expects the getting better of the indicator after the planned reconstructions.



3. Budapest Research Reactor

In case of the Research Reactor only annual data are available because of the reporting system.

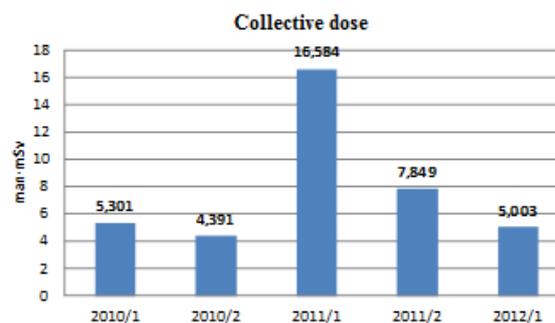


In 2005-2011, 11 out of the 16 cases belonging to this indicator occurred due to the deficiencies of the Cold Neutron Source (CNS). CNS is not part of the reactor operational systems but the protection of the CNS may require power decreases. There were no safety consequences on the reactor.

4. Interim Spent Fuel Storage Facility

In case of the Spent Fuel Storage Facility only annual and semi-annual data are available because of the reporting system.

In 2011, the indicator got first time into the „Non-acceptable” region. The relatively high value is in accordance with the number of planned radiation works, that was twice as high as in the former year. The 2011/2 and the 2012/1 collective doses revert to the previous average values.



HAEA internal

Stress Test action plan evaluation

To follow the implementation of the results of the Stress Test, HAEA prescribed to submit the action plan of the fulfilment of the measures and further analyses in its decision (HA5444) until 30th June, 2012.

The action plan had been submitted in 28. June by the licensee and will be evaluated in the frame of an inspection process by the regulatory body.



Visco elastic dumpers



Hydrogen recombiners



Diesel pumps



Mobile diesel generator

The European Commission released on 4 October 2012 a Communication on the comprehensive risk and safety assessment ("stress test") of nuclear power plants in the European Union and related activities. The stress test results indicate that the Paks Nuclear Power Plant complies with the strictest European safety requirements. The HAEA will continue to work on both the domestic and the international level to improve the safety and security of the nuclear industry, and will consider the merits of all future proposals of the European Commission fully.

Nuclear Power Plant Paks

1. Lifetime-extension of Paks Nuclear Power Plant

The units of the Paks NPP have been put into operation between 1982 and 1987 with a designed lifetime of 30 years.

The management of the power plant has decided the extension of the units' lifetime by 20 more years in 2001. The technical preparation activities covered the determination of the aging effects and aging processes requiring treatment, the status of the systems and system components, the evaluation of the existing aging management programs, and if necessary, the amendment or development of new programs.

The nuclear safety regulatory process of the lifetime-extension is determined by the governmental decree on the nuclear safety requirements for nuclear facilities and the procedures of the Hungarian Atomic Energy Authority.

The nuclear safety regulatory approval process requires a program to be submitted by the NPP four years before the expiration of the operational license. Paks NPP submitted the lifetime-extension program at the end of 2008 to the regulatory body to justify the establishment of the operating conditions and safe operation beyond the designed lifetime. The enclosure of the program included several documentation to demonstrate either the suitability of the systems and system components for extended operation or the process of ensuring it. HAEA evaluated the program, and ordered the implementation of the program with certain prescriptions.

At the end of 2011 - one year before the expiration of the planned operating time - Paks NPP submitted the license application of the operation of Unit 1 beyond the designed lifetime according to the legal requirements.

HAEA is currently evaluating the approximately 30,000 pages of license application documentation. The studies concluded that the licensee has left tasks for 2012 as well, mainly to complete the equipment qualifications and the fatigue and lifetime calculations.



Public hearing

Regarding the licensing procedure of the lifetime-extension a public hearing was held on 4th October, 2012 in Paks according to the requirements of the act on general rules and procedures of the public administration.

Regarding the results of the public hearing HAEA will consider each opinion, comment and note raised until the end of 2012.

Application for lifetime-extension



At the end of the evaluation process, HAEA will issue a regulatory decision which will be published by public notice in the concerned settlements - Paks, Dunaszentbenedek and Uszod - and also will be available at the website and in the office building of the HAEA as well.

2. New project company established for Paks NPP expansion

A new company, **MVM Paks II. Atomerőmű Fejlesztő Zrt.**, will carry on the tasks of the Lévai Project preparing the planned expansion of the Paks Nuclear Power Plant. The subsidiary owned 100 per cent by MVM Hungarian Electricity Ltd. will be responsible for examining all important aspects of the project to allow a responsible decision to be made on the basis of detailed studies and assessments on the plan to construct the new unit(s) at Paks, also stated in the National Energy Strategy.

3. Adaptation of the ASME Code at Paks NPP

Paks Nuclear Power Plant (NPP) consisting of four Russian designed VVER-440 model 213 units, was commissioned in the eighties with a design life of 30 years. VVERs are Russian designed PWRs, 440 refers to the original nominal electric capacity in MW, model 213 means that it is the second generation of the VVER-440s. Paks NPP is preparing the operational life extension of the individual units up to



50 years. The Hungarian regulation's licensing procedure of the extended period shows similarity to the U.S. NRC approach in license renewal according to 10 CFR 54. Together the life extension program the plant owner decided to adapt the ASME Code (American Society of Mechanical Engineers) requirements for those operations and inspection / maintenance activities. The adaptation's most fundamental objectives are to review and adjust the plant's In-Service Inspection (ISI) and In-Service Testing (IST) programs to meet the ASME Code XI. requirements. From the Regulatory point of view, this is a special case because Paks NPP has not been constructed, commissioned and operated up to now in line with the relevant sections of ASME Code. But the new Hungarian regulatory rules do not explicitly determine the applicable codes and standards neither for plant construction nor for ISI and IST. The only statement is that codes and standards must be "authoritative".

Current Status of the Works

The task is being implemented. It is important that the Hungarian Standardization Institution plans to issue of ASME III. and XI. Code edition as a Hungarian Standard (MSZ 27003 and 27011) in Hungarian language. The design review with the modified ISI and IST programs regulatory review is going on. The inspector training courses are started but further training will be required. It is planned that the third party inspection company will be MVM ERBE Ltd.

Other Nuclear Installations

1. Commissioning of Spent Fuel Storage Facility extension in Paks

The construction and commissioning of the new chambers at the Interim Spent Fuel Store Facility is going on in a modular way in pace with the accumulation of the spent fuel at Paks NPP.

The facility's plans include the construction of total of 33 chambers. After the 16 chambers built in two phases until 2007, the extension was carried on by building of 4 new chambers. The new chambers can accommodate 527 fuel assemblies each, in contrast to the 450 assemblies' capacity of the older chambers.

The four new chambers got ready for commissioning by the middle of 2012. The suitability was proved by the successful system level tests prescribed by the Commissioning Program. The operator applied for commissioning licence by submitting the documentation, which proved that the requirements and conditions prescribed in the Commissioning Program were met. The HAEA judged the submitted documents with the involvement of competent co-authorities and issued the licence to carry out the commissioning. The commissioning started with the loading of a spent fuel assembly into the storage tube in the new chamber No 17. The HAEA frequently inspected the commissioning works.

The operator submitted an application to the authority for the operational licence with the documentation containing the experiences of the commissioning phase and the new safety documentation of the facility reflecting to the modifications made by the extension. The HAEA NSD has started to review the application with the participation of the involved co-authorities.



2. Reconstruction of safety and control rod drive mechanism at the Budapest Training Reactor

The mechanical parts of the safety and control rod drive mechanism of the Budapest Training Reactor (TR) has been working without any major modification since the

construction of the TR 40 years ago. In the recent decades there were replacements of some parts and a modification of the sensor type, but by now it became impossible to obtain new spare parts. The original drive mechanism carried out their job, but the operational anomalies and obligate shutdowns often influenced the operational programs. These deficiencies however did not cause decrease of the nuclear safety due to the inherent safety of the reactor. The HAEA has prescribed the reconstruction of the rod drive mechanism in the decision terminating the TR's Periodic Safety Review.

The reconstruction was carried out by the replacement of the control rod drive mechanism. The acquired new equipment has the same construction as the old one, but it is built up of new mechanical and up-to-date electronic components. The design and manufacturing was performed by Hungarian companies having supplier qualification to the Paks NPP.



The prototype of the new equipment was subject of operational and durability tests in the factory. The tests were supervised by the HAEA NSD. The prototype version was finalised on the base of the test experiences and it achieved the prescribed operational parameters. Following the replacement the fulfilment of the operational requirements was inspected by active tests under the surveillance of the HAEA.

The successful reconstruction significantly increased the operational safety of the rod drive mechanism, which indirectly resulted in the increase of the TR's nuclear safety.

International co-operation

1. Participation in the 2nd Extraordinary Review Meeting of the Convention on Nuclear Safety

In April 2011, during the 5th Review Meeting of CNS – as a reaction to the Fukushima Dai-ichi nuclear accident, which happened just a couple of weeks earlier – it was decided that an extraordinary review meeting will be arranged in August 2012, in order to evaluate the lessons learned by the contracting parties from the accident. The structure of the extraordinary meeting was elaborated by February 2012, in which it was stipulated that the contracting parties were expected to submit an extraordinary national report by May 13th 2012, according to 6 specific topics:

1. External natural events (earthquake, flooding, extreme weather)
2. Design issues (arrangements for loss of offsite power, loss of ultimate heat sink, maintaining containment integrity, loss of heat removal from spent fuel pool)
3. Severe accident management and recovery (on site)
4. National organizations
5. Emergency Preparedness & Response and Post-accident Management (off-site)
6. International cooperation

Hungary has prepared and submitted the national report by the requested deadline. The first three topics were based on the National Report, which was prepared earlier for the European stress test exercise.

In the extraordinary meeting, HAEA was represented by a 3 member delegation (Dr. József Rónaky, director general; Gyula Fichtinger, deputy director general and Dr. Gábor Petőfi, deputy section head). Hungary also delegated an officer for the review meeting (Dr. Ferenc Adorján, chief advisor of the HAEA NSD), who acted as the review coordinator of topic 6.

Unlike at the regular CNS review meetings, the review did not go in country groups, but it was arranged according to the above listed topics. Hungary did not receive any specific question in any of the topical meetings, which implicitly meant that the community of the contracting parties has accepted the Hungarian report.

In addition to the review of the country reports, the Extraordinary Meeting also dealt with the possible improvement of CNS effectiveness, especially in the light of the Fukushima event. In this context, prior to the meeting amendment proposals to the text of CNS were submitted by two contracting parties (Switzerland and Russian Federation) and also eleven contracting parties have submitted amendments to the guidance documents specifying the reporting and review process in the framework of the CNS (INFCIRC/571, /572 and /573). Special working groups were set up to finalize the proposals by the next regular review meeting in 2014.

An important decision of the meeting was to include in the next national reports for the 2014 CNS review meeting a specific section on the national actions taken and planned as response to the Fukushima Dai-ichi accident.

2. Communication of the European Commission on the results of the European “stress test”

On October 4th 2012, the European Commission has issued a Communication to the Council and the European Parliament on the results of the safety assessments of the European NPPs (“stress test”).

The “stress tests” (more accurately: Targeted safety re-assessment) of the 164 European nuclear power plants were initiated by the European Council as a reaction to the Fukushima Dai-ichi accident. This re-assessment process lasted from July 2011 to April 2012 in several phases, according to the specifications and methodology elaborated the ENSREG (European Nuclear Safety Regulators Group), comprising more than 500 man-year effort. On the 25th of April 2012 the ENSREG finalized its report on the results of the stress test. On the next day the final report was endorsed by the European Commission and a common communiqué was issued, emphasizing the high quality of the work. These documents are available on the web page of ENSREG (www.ensreg.eu). The ENSREG have decided on its meeting of April 25th, the proposed national actions to further improve the safety of the European reactors shall be followed upon, and to this end each member state shall prepare a National Action Plan by the end of 2012. Hungary is preparing its action plan, accordingly.

In relation to the October 4th Communication of the Commission ENSREG have issued its objections. Neither the ENSREG nor the representatives of the national nuclear safety regulators did participate in the preparation of the material. Without references, it is not clear where are those information taken from which are not mentioned in the ENSREG report.

According to the opinion of several nuclear safety regulators of the member states – including HAEA – the conclusions of the Commission do not reflect properly the results of the stress test. It contains false information at several points, misses the real messages to be drawn from the stress test by flagging all the proposed action of improvement as severe shortcomings of the safety of the power plants. By this attitude, it causes severe impairment to the nuclear industry and unjustified public mistrust. The real message of the results of the European stress test was that even during some extreme and unexpected natural event – comparable to the one happened at the East Coast of Japan in March 2011 – no similar severe nuclear accident would happen at the European nuclear plants. In spite of that, all the countries have found such options which could improve the safety of the plants even further. The completion of these options is the goal of the national action plans.

3. News from WENRA Working Group on Waste and Decommissioning

The Western European Nuclear Regulators' Association was created in 1999 with the aim to harmonize the safety requirements of nuclear safety and radioactive waste safety.

The WENRA RHWG (Reactor Harmonisation Working Group) established so called 'safety reference levels' on nuclear safety of the nuclear power plants in Europe.

Other working group (WENRA WGWD) deals with the safety of storage and disposal facilities, and with the safety of decommissioning.

Originally 77 safety reference levels have been established for storage of spent fuel and/or radioactive waste packages and 81 ones have been elaborated for decommissioning. The presence of these common agreed requirements in the national legislations has been investigated in benchmarking processes. The first benchmarking exercise identified the missing requirements of the original national legislation in order to develop an action plan for the implementation.

The second benchmarking processes (re-benchmarking) assess the amended legislations (laws, decrees, or regulatory guides).

This re-benchmarking process started in 2012 for the storage safety reference levels and will start in 2013 for the decommissioning reference levels.

Based on the experiences gained from the first benchmarking exercises WENRA WGWD modified the original safety reference levels significantly. The second editions of the WENRA WGWD reports contains 61 and 62 safety reference levels for storage and decommissioning, respectively.

A new and very important task for the WENRA WGWD is the elaboration of safety reference levels for disposal facilities. The final draft of the disposal report has been developed by October 2012 and it was sent to the WENRA directors for approval. As to be expected the first disposal report will be published for comments to the stakeholders by the end of 2012 or in the first half of 2013.

The HAEA has taken into account the safety reference levels for the spent fuel storage and the decommissioning of nuclear facilities for elaboration of the new Nuclear Safety Standards.

In 2012 a working group consisting of representatives from the HAEA and the National Public Health and Medical Officer Service started consultations about legal adaptation of the above mentioned safety reference levels for non-nuclear installations.

Events of Interest

Breaching of the Technical Specifications

In September 3rd 2012 an isolation valve of Paks NPP Unit 1 was set to open, disconnected position because of planned modification. This fast acting slide-valve and two other similar (operable) valves are part of the system supporting the hermetic compartment ventilation systems with chilled water.

In September 5th the operating staff had noticed that the duration of opened and disconnected position of the slide-valve exceeded the time limit of the Technical Specifications, because this state of the slide-valve is permitted only for 24 hours. The cause of this event was that it was not realized during the planning phase that this modification cannot be carried out on an operating reactor unit.

The event had not direct safety relevance. In case of an occasional event with operation of the safety injection system it was possible to operate the valve manually. Because of breaching the Technical Specifications the event was classified to INES-1.

Emergency Preparedness

1. Revision of the National Nuclear Emergency Response Plan

A High-level Working Committee (HWC) was established in 1999 with the purpose of preparing the National Nuclear Emergency Response Plan (NERP). The first version of the NERP was completed and approved in 2002. Since that the plan was revised twice, the latest version 2.1 was approved in November 2011.

The HWC performs its activities on maintaining the NERP to reflect changes in the legal background that substantially restructured the national disaster management system and to incorporate the most recent international initiatives. The latest revision was based on the following aspects: consider changes in organizations and responsibilities, review flow charts, unified description of the concepts of operation, to provide first aid and care of contaminated or radiation injuries. These changes initiated the revision of the document.

In respect of international initiatives, mainly the experiences of the Fukushima Daiichi accident were taken into consideration: external organizations involved in the emergency response at the nuclear facility, temporary removal of flight ban above the NPP for emergency purposes, protection of Hungarian citizens in the countries affected by the radiation emergency, concept of operation of the National Nuclear Emergency Response System in a remote emergency (i.e. mainly public information).

2. Recent nuclear emergency response exercises in Hungary

In Hungary in favor of proper preparedness to nuclear and radiological emergencies, several and different type of exercises are held. For preparing to these exercises, a Central Preparatory Committee has been established by the Hungarian Atomic Energy Authority (HAEA) and the National Directorate General for Disaster Management (NDGDM). Members of this committee are delegated experts from the central, departmental, territorial and local organizations involved in the Hungarian Nuclear Emergency Response System (HNERs). Four exercises have been recently held or planned for the near future:

1. "Northern counties' exercise" – 27 September 2012.
2. Management exercise of the HNERs – planned to 28 November 2012. Participating organizations will be: Paks Nuclear Power Plant (NPP), counties around the NPP (Tolna, Bács-Kiskun and Fejér counties), the HAEA and the National Emergency Center.
3. "ONER-3-2013" exercise - full scope, national, 2-day, management and field exercise in 2013.
4. ConvEx-3 exercise (international) – To be held in 2013, the expected scenario is a terrorist act in Morocco.

3. Nuclear emergency response exercise with northern counties



Emergency at the Slovakian Mochovce NPP! What is supposed to be done in this situation, who and how protects the citizens of the country? The answer is in the regulations: in the early phase of a nuclear emergency it is the duty of the head of the county defense committee to determine the urgent protective actions based on the information and proposal received from the HAEA. The aim of the so-called "northern counties' exercise", which was held on 27 September 2012, was to exercise this role. In this

exercise, participants were: the closest four counties to the Mochovce NPP (Győr-Moson-Sopron, Komárom-Esztergom, Pest and Nógrád counties), HAEA and the NDGDM. The two national organizations initiated the alert and supplied technical information, while the counties were required to act according to their emergency plan.

At the exercise which was prepared by the HAEA, the task of the county and local defense committees was to determine urgent protective actions based on the suspected severe accident (with radioactive release) of the NPP. The decisions made during the exercise contained the following actions: monitoring, traffic control, precautionary protection of the food chain and water base (in order to protect the public and the environment), and preparation of the health organizations. Based on the rapid evaluations, the exercise was successful in terms of increasing preparedness to effects of low probability nuclear emergencies and general emergencies.