



HUNGARIAN ATOMIC ENERGY AUTHORITY Nuclear Safety Directorate

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RECENT DEVELOPMENTS IN NUCLEAR SAFETY IN HUNGARY

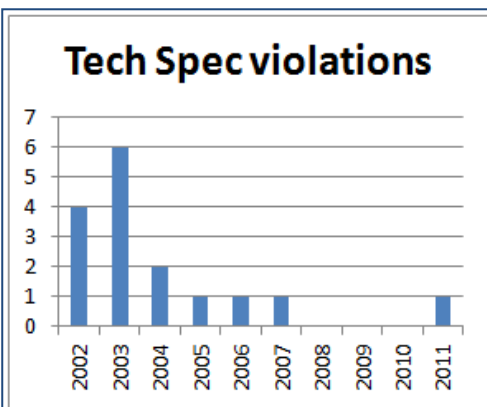
May 2012.



General

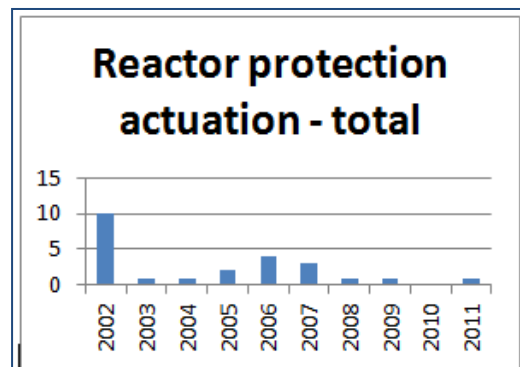
1. Paks NPP Safety Performance Assessment 2011

HAEA continuously evaluates the safety performance of the operators of the nuclear facilities. The main areas of data collection supporting the assessment are: regular and event reports of the licensees, cyclic 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 2011. The numbers of reportable events were low. None of the events that took place in 2011 reached the INES-1 or higher classification on the seven-stage International Nuclear Event Scale used for the information of the public. The Budapest Research Reactor, the Training Reactor



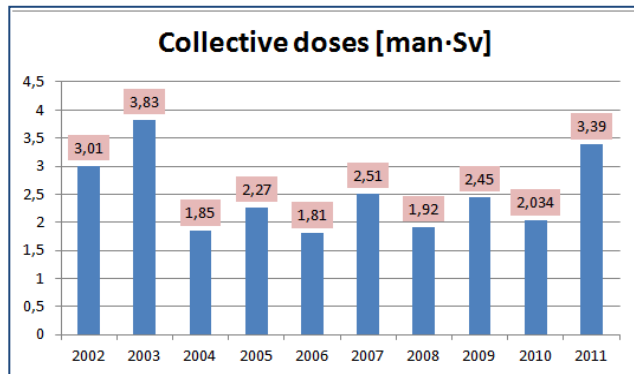
and the Spent Fuel Interim Storage Facility operated in accordance with the parameters specified in the operating and licensing documents.

There was one event where a limit of the operating and licensing document was violated at

Paks NPP, see the article on the inoperability of a diesel generator, below.

There was one automatic reactor protection actuation signal during the subcritical state of the reactor at Unit 3.

The collective dose rate was higher than in the previous years due to some extra works during outage.



The deficiencies revealed during the authority inspections did not jeopardize nuclear safety and the environmental releases nowhere exceeded the limit values.

Legal and regulatory framework

1. Legislative changes – nuclear safety requirements and legal processes

According to the Act on Atomic Energy, the safety requirements of use of nuclear energy must be regularly reviewed and modernized taking into account the achievements of sciences and international experience. Governmental decree 89/2005.(V. 5.) describes that the Nuclear Safety Code must be reviewed and updated if necessary at least in every five years. As a result of the review, the governmental decree 118/2011. (VII. 11.) on nuclear safety requirements of the nuclear facilities and on the related legal activities was issued and has come into force on August 10, 2011. The reviewed Nuclear Safety Code were published as annexes of the government decree.

The main changes are as follows:

- The adaptation of the development of the international prescriptions. Besides that we have taken into account the changes in the IAEA's standards during the review, which have also built in the WENRA reference levels. The Western European Nuclear Regulators Association (WENRA) decided that it would harmonize the nuclear safety requirement systems of the European countries operating nuclear facilities. The WENRA members took on to build in the harmonized requirements until 2010 and they would commit anything in order to enforce the WENRA requirements in the NPPs working in their countries.

- Changes of requirements related to modifications: Due to the changes of rules of modifications the regulatory surveillance will become more flexible. The focus of activity is shifted from licensing to inspection in accordance with the general international practice. With the implementation of the regulation the licensee of the facility will act more independently with wider freedom of decision making and bigger responsibility. At the same time the HAEA can focus on the regulatory surveillance to the activities, which are really important from nuclear safety point of view.
- Expansion of the regulation to the entire lifetime of the facilities: The national regulation also includes the detailed nuclear safety requirements according to the lifecycle intervals in compliance with the IAEA Safety Standards. The siting and decommissioning volumes have been published within the new regulation as completion of the existing ones.
- Utilization of experience derived from practice: Since the issuance of the governmental decree, significant amount of experience derived from the use of requirements have been accumulated at both of the regulator and the licensee. These were also built into the new decree during the review.

Recently the requirements related to the new nuclear facilities have been elaborated (Volume 9. of Nuclear Safety Code) and the extended set of regulations has come into force on 1st of April, 2012 by the government decree 37/2012 (III. 9.).

2. Adopting Council Directive EURATOM on Spent Fuel and Radioactive Waste Management into the National Legislation

The COUNCIL DIRECTIVE 2011/70/EURATOM on establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste was issued on 19 July 2011. According to the final provisions (Article 15, Transposition) Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive before 23 August 2013. HAEA established a working group for amendment of the relevant national regulations. This revision touches the Act on Atomic Energy and some governmental or ministerial decrees, too.

3. Independent technical experts

Based on the nuclear safety codes in the field of nuclear safety it is mandatory to present independent technical expert's opinion to the license applications for plant modifications. The registration and evaluation process of these technical experts is prescribed in the Atomic Energy Act (Act Nr. CXVI of 1996) and its executive decree (Government decree 247/2011).

The registration process of the Hungarian and EGT experts is made by the Hungarian Engineer Chamber with the aim of a Qualifying Committee. The members of the Qualifying

Committee were invited by the leaders of the Hungarian Atomic Energy Authority and the Hungarian Chamber of Engineers.



Qualifying Committee kick-off meeting

Expert can apply for registration who meets the following requirements: university degree in the field specified in the application, in case of MSc degree at least 5 years experience in his or her field and clean record. The experts can be registered in the following fields:

1. Reactor physics, neutron physics and behavior of nuclear fuels;
2. Thermo hydraulics;
3. Probabilistic Safety Assessment;
4. Mechanical engineering;
5. Nuclear pressure vessels;
6. Material science, material examination;
7. Civil engineering, statics, building structures and materials;
8. Electric power technology;
9. Measurement and control technology;
10. Chemistry, radiochemistry;
11. Radiation protection;
12. Non-proliferation;
13. Nuclear security;
14. Transport of nuclear or radiological materials;
15. Emergency Preparedness and Response;
16. Quality management, quality assurance, quality control.

The list of the qualified technical experts and other useful information regarding the applications can be found at the homepage of the Hungarian Engineer Chamber: www.mmk.hu.

HAEA internal

1. Changes in the HAEA NSD management



*Mr. Gyula Fichtinger
Deputy Director General*

The Minister of National Development has appointed Gyula Fichtinger for Deputy Director General of the HAEA, in charge of the Nuclear Safety Directorate, from 1st of January, 2012. Mr. Fichtinger has been working at the OAH since its foundation in 1991. He had worked first as a nuclear safety inspector,



*Mr. Szabolcs Hullán
Head of Department*

then as head of section, later as head of department and since 1st of August, 2011 he was acting Deputy Director General. He graduated in Moscow as a thermal physics engineer and later at the Budapest University of Technology as nuclear engineer. He speaks English and Russian. Mr. Fichtinger is participating in the OECD CNRA Working Group on Inspection Practices and he is member of the European Nuclear Safety Regulators Group (ENSREG).

József Rónaky, Director General of HAEA, has appointed Szabolcs Hullán to head the NPP Supervision Department from 1st of February. Mr. Hullán stays in charge of the Department of Nuclear Technology and Safety Assessment too.

2. Peer review of the Hungarian Stress Test results

Following the topical review phase of the post-Fukushima European Stress Test process, the country and plant visits by the peer review teams took place during March. Hungary was among the first countries to host such a team consisting of 8 experts from Austria, Bulgaria, Slovenia, Germany, the Czech Republic, Romania and the European Commission institutions.

During the first day of the visit that took place between March 12 and 14, the floor was opened for the country representatives, the HAEA and Paks NPP, to respond to the questions obtained in advance. The second day was devoted to a plant tour of Paks NPP consisting of 19 locations to visit that covered the most important features and arrangements corresponding to the stress test review. The finalization of the country report was the

programme for the third day based on the draft report sent preliminary by the Stress Test Secretariat and on the answers and evidences provided during the country visit.

Among the main conclusions the team has not identified any further place for improvement in relation to the protection and robustness of Paks NPP for the cases considered in the stress test. The peer review confirmed that the actions identified by the plant operator and the regulatory body are appropriate to carry out the desired improvements. The report, however, draws the attention of the regulatory body to carefully oversee the licensee's activities to ensure that the safety improvements, especially those that create cross-connections of the safety systems will not imply negative side effects. Finally the experts commended the severe accident requirements of the regulatory body and the already implemented and ongoing modifications of the operator in this area.

As the summary results of the reassessments Paks NPP is to compile an action plan containing all the improvements decided and submit it for approval to the HAEA.

3. Preparation for IRRS mission

According to Article 9.3 of the Directive 2009/71/EURATOM: *“Member States shall at least every 10 years arrange for periodic self-assessments of their national framework and competent regulatory authorities and invite an international peer review of relevant segments of their national framework and/or authorities with the aim of continuously improving nuclear safety...”*

In 2010 the management of Hungarian Atomic Energy Authority (HAEA) has decided establishment of Integrated Regulatory Review Service (IRRS) project. The objective of the project is preparation for reception an IRRS mission in 2015. The first step of the preparation is completion a self-assessment. According to the decision of HAEA management the self-assessment will be completed for the HAEA Nuclear Safety Directorate (NSD).

According to the project plan at the end of 2012 NSD will complete the self-assessment in conformity with Self-Assessment Tool (SAT) elaborated by International Atomic Energy Agency. The end item of the self-assessment is an action plan containing methodology for elimination our weaknesses and utilization our opportunities. The proposed follow-up mission will be held in 2017.

Nuclear Power Plant Paks

1. Repatriation of damaged fuel assemblies

The works dealing with the removal of the fuel assemblies damaged during the incident that occurred on April 11, 2003 at Paks Nuclear Power Plant (in the revision shaft of Unit 2) was finished. Full recovery from the consequences of the incident and conditions for normal use of the revision shaft were reached at the end of April 2007.

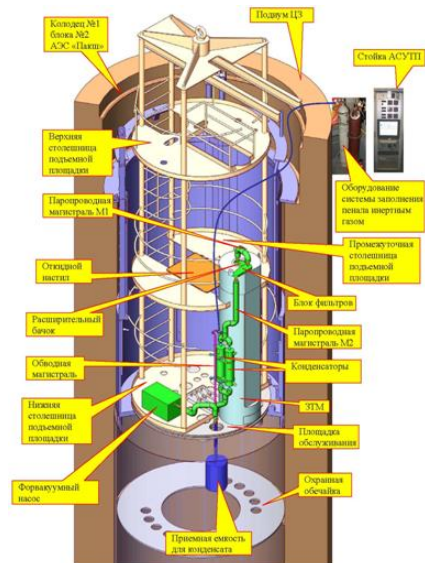
Following the approval of the technology of principle and the design of tools, the main contractor formulated the



Capsule pressurizer valves

the construction document. The documentation of licensing in principle, and the applications for import and manufacturing

license were elaborated on the basis of the design of the principle and construction documents. The given elements were designed and manufactured by sub-contractors. The factory acceptance tests are ongoing. The supply of tools and training of operators are planned for beginning of fall 2012. The drying works and transport to Russia are planned for 2013-2014.



Drying equipment

Other Nuclear Installations

1. Preparations for the Budapest Research Reactor safety review in 2013

According to the actual legislation, the periodic safety review (PSR) of the nuclear facilities must be conducted in each 10 years.

The main purpose of the PSR is to prove that the technical conditions of the facility and its features related to nuclear safety are in compliance with the design base and the international best practice, taking into account ageing processes, environmental conditions and operating experience. Additional task of the systematic review carried out regularly is to establish the operational license of the BRR for the next 10 years, which is issued within the framework of a HAEA NSD process and to prove that the risks, originating from operation, are acceptable. The BRR's next PSR is due in 2013.

As part of preparations for the PSR, HAEA NSD has worked out a guideline for the licensee (Hungarian Academy of Sciences Centre for Energy Research). The document summarizes the purpose of the review, the legislative requirements and the timing of its accomplishment. It provides guidance on the content and form of the chapters of the PSR and provides insight into the regulatory review process also. The guidance takes into account the legislation changes and the experience of former reviews too.

Among the requirements of safety analyses, it is mentioned for first time the need of the national utilization of the lessons learned from Fukushima nuclear accident.

2. Licensing Commissioning of the Spent Fuel Storage Facility in Progress



Facility extension before commissioning

The Interim Spent Fuel Storage Facility (SFISF) in Paks is operating with 16 vaults. The extension of the facility continues module by module as the spent fuel is produced at the Paks NPP. The plan of the facility includes the construction of as much as 33 vaults. Building and occupancy licenses for modules 17-20 were issued by HAEA NSD in 2009 and 2012, respectively. Now licensing of commissioning for the new module is in progress.

There are minor technical changes for operational and manufacturing reasons which, however, practically do not affect the environmental impact of the facility. A more significant change is the number of spent fuel assemblies stored in the new vaults, which, in turn, is well covered by safety analyses. The operator Public Radioactive Waste Management Ltd. (PURAM) applied for the commissioning license based on the safety documentation prescribed by the Nuclear Safety Codes.

According to the legislation (Government Decree 112/2011) the competent co-authorities are involved in the licensing process. Co-authorities responsible for supervising environmental protection,

physical protection, fire protection issues prescribed different obligations. Assessment and approval of the modified Emergency Response Plan are also in progress.



Extended charging platform

Events of Interest

1. Iodine release in Hungary

On November 11, 2011 the Austrian Ministry of Agriculture, Forestry and Environment turned to the Hungarian Atomic Energy Authority (HAEA) – as to the national competent authority – and requested information whether any release had occurred in Hungary in the recent period, because I-131 concentrations higher than the background were measured at several Austrian monitoring stations.

The HAEA started to collect the air sample measurement results (in cooperation with the other competent authorities) throughout the country. It was immediately confirmed that no I-131 release from nuclear facilities took place and the concentrations in the air samples around Paks NPP was below the detection limit. This result was reported to the Austrian counterparts and to the IAEA that also started collecting information and clarify the source of release based on a Czech request.

It turned out during the following days that the source of the I-131 in the air can be the Institute of Isotopes Company, which produces iodine for medical purposes. The investigations showed that although the amount released from the facility during production was well below the annual activity limits, the values started to grow. The reason was a new filtration system recently installed.

The case revealed several deficiencies at the company, and the environmental and health authorities in charge, together with the operator assessed the situation and concluded the necessary actions to avoid the recurrence of such a case. Among the reasons problems the producing technology, deficiencies in release measurement and in communication with authorities were identified.

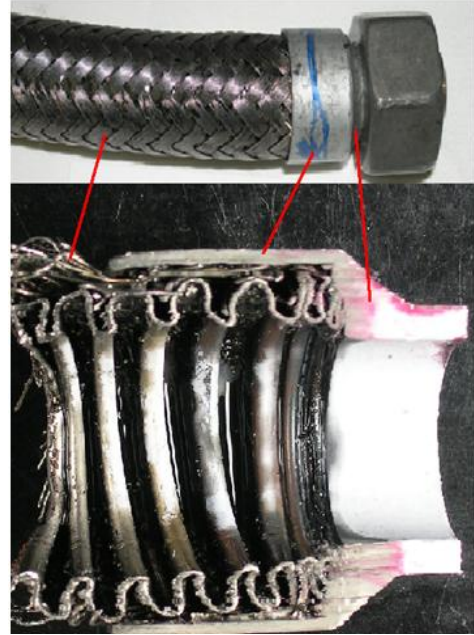
The iodine release and environmental measurements taken during and after the event were made available for the international organizations by the HAEA.

2. Inoperability of a diesel generator due to a leakage in the lubricating oil system

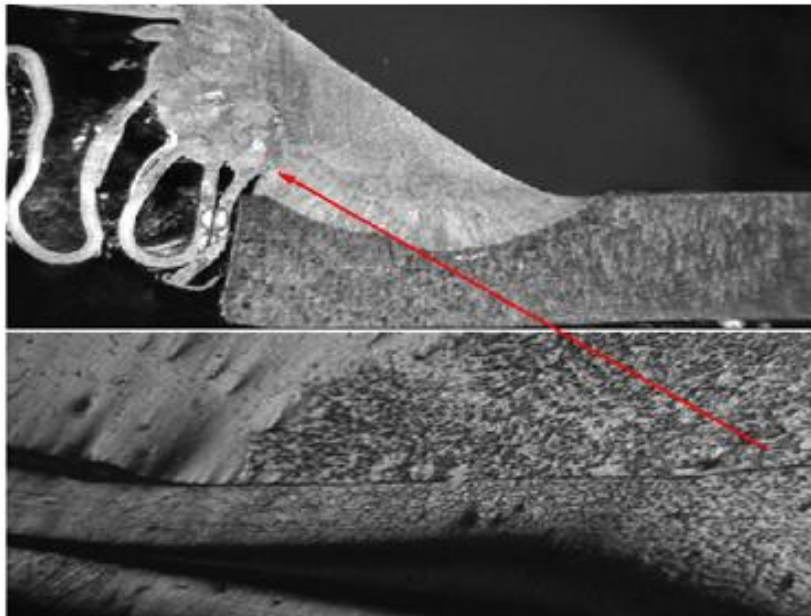
On 7th March 2012, on the Unit 3 during the periodical load sequencer program test (LSP1) a leakage on flexible tube of lubricating oil system was observed by filed operator.

The diesel generator was shut down, and during the maintenances the diesel generator was inoperable for 1'40". The direct cause of the leakage was fatigue crack because the fatigue stress was not taken into consideration during the design of lubricating system.

The Licensee began the review the life-time and the conditions of the flexible tubes and a modification started to identify proper spare parts.



The structure of the tube ending



The fatigue crack shown in different magnifications

Emergency Preparedness

1. New version of National Nuclear Emergency Response Plan issued

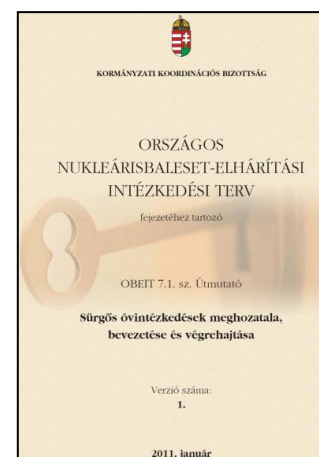


The High-level Planning Committee (HPC) was established originally in 1999 with the purpose of preparing the National Nuclear Emergency Response Plan (NERP). The HPC finished its work and the first version of the NERP was prepared and approved in 2002. The HPC was reestablished in 2005 in consequence of a lesson identified after the 2004 National Nuclear Emergency Exercise. The mandate of HPC has been refined to maintain and regularly update the National Nuclear Emergency Response Plan (NERP) and has been extended to elaborate technical guidelines for the harmonized

implementation of tasks described in the NERP. The new NERP version 2.0 was issued in 2008; it underwent major changes compared to the previous version. In its work the HPC followed the IAEA requirements related to emergency preparedness and response (GS-R-2, EPR-Method 2003 and others) and also domestic experiences were considered during previous national exercises and real events. It defined the four operational states of the National Nuclear Emergency Response System (NERS) and gave extended definitions for classification of nuclear and radiological emergency situations. Following its approval by the Minister responsible for disaster management all organs of the NERS were required to update their Emergency Response Plan in harmony with the national plan.

The newer version 2.1 of the NERP was approved in November 2011. Recognized editorial errors were improved, identified good practices were incorporated in the new version. Further, it reflects the revised responsibilities of the organs in NERS with emphasis on the new Governmental structure after the election. In order to reduce the volume of the NERP and increase its handy usability several attachments and appendices were removed and published in separate technical documents. The series of EPR technical guidelines related to the NERP can be ordered in hardcopy at the HAEA or can be downloaded in electronic format from the HAEA webpage (www.haea.gov.hu).

The HPC continues its activities on maintaining the NERP to reflect changes in the legal background that majorly restructure the national disaster management and to incorporate new international initiatives and experiences of the Fukushima accident.



2. National work plan items for nuclear emergency preparedness tasks

In Hungary, emergency preparedness regarding all types of disasters is coordinated by the Disaster Management Coordination Committee of the Government. The Committee is headed by the minister of the interior and the heads of the concerned public administration bodies are members with the right of consultation. The Committee works in line with annual work plans, in which the separate, deadlined items are assigned to responsible organizations. In the work plan for 2012, there are several tasks related to nuclear emergency preparedness:

Regular planning of training and exercises (T&E) in this field goes back to several years, when the evaluation of a national exercise concluded the need thereof. Since that the preparation of the personnel on government and local level is assisted by such an annual T&E plan. It contains, in addition to the emergency task specific training, the comprehensive and systematic radiation protection training, the alerting and communications drills and the various types of exercises ranging from the short methodology type drill to the complex national level exercises. The T&E plan is an attachment of the work plan.

The INEX-4 exercise of the OECD NEA with a scenario that included a radiation dispersion device took place in 2011 in Hungary. The most important lessons learned during the preparation and implementation of the exercise is concerned with the arrangements (training, procedures and equipment) of the first responders. A task of the work plan orders for the better specification of the developments to decide on the type, amount and use of protective equipment.

Of course, in relation to nuclear emergency preparedness, the year of 2011 was first of all about Fukushima. There have been already many international attempts to summarize the emergency lessons of the accident based on which, and also taking into account the national response experiences, the work plan requires the national bodies responsible for nuclear emergency management to collect and formulate the possible improvement actions concerning off-site emergency preparedness and response.

Preparation for response to a nuclear emergency in Hungary takes place in a cyclic manner. It means that the tasks are decided based on the evaluation and following major exercises to be held every 5 years. After two successful terms between 1998-2004 and 2004-2009, unfortunately the exercise terminating the cycle in 2009 could not be organized due to the financial and other reasons. Now, the next complex national exercise is to take place in the first half of 2013, the preparation of which, as laid down also in the work plan, should be commenced in the first half of 2012.

The HAEA is deeply involved in the performance of all the tasks above and keeps on pushing the co-organizations to use every effort to be better prepared for nuclear emergencies.