IAEA

Emergency Preparedness Review

EPREV

FOLLOW-UP TO THE PEER APPRAISAL OF THE ARRANGEMENTS IN HUNGARY REGARDING THE PREPAREDNESS FOR RESPONDING TO A RADIATION EMERGENCY

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International Atomic Energy Agency

FOREWORD

Within the United Nations system, the International Atomic Energy Agency (IAEA) has the statutory functions of establishing standards of safety for the protection of health against exposure to ionizing radiation and of providing for the application of these standards. In addition, under the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention), the IAEA has a function, if requested, to assist Member States in preparing emergency arrangements for responding to nuclear accidents and radiological emergencies.

In response to a request from the Government of Hungary, the IAEA fielded an Emergency Preparedness Review (EPREV) mission in 2016 to conduct, in accordance with Article III of the IAEA Statute, a peer review of Hungary's radiation emergency preparedness and response arrangements vis-à-vis the relevant IAEA standards. Subsequently, Hungary requested a follow-up mission to review the implementation of actions related to the findings of the 2016 EPREV mission. This report summarizes the activities of the EPREV follow-up mission conducted in July 2022.

The number of recommendations, suggestions and good practices is in no way a measure of the status of the emergency preparedness and response system. Comparisons of such numbers between EPREV reports from different countries should not be attempted.

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EXECUTIVE SUMMARY

At the request of the Government of Hungary, an international team of experts conducted an EPREV follow-up mission from 4 to 8 July 2022. The purpose of the EPREV follow-up mission was to review the actions undertaken to address the recommendations and suggestions made during the EPREV mission conducted in Hungary in 2016. The review compared Hungary's emergency arrangements related to the findings of the 2016 EPREV mission against the IAEA safety standards for preparedness and response for a nuclear or radiological emergency.

The mission focused on preparedness for nuclear and radiological emergencies as defined in IAEA Safety Standards Series No. GSR Part 7, Preparedness and Response for a Nuclear or Radiological Emergency [1].

The EPREV follow-up mission team consisted of international emergency preparedness and response (EPR) experts from five IAEA Member States as well as a team coordinator and a deputy team coordinator from the IAEA Secretariat. The EPREV follow-up mission consisted of a review of reference materials provided by Hungary, site visits, and interviews. During the follow-up mission, the EPREV team interacted with government officials and response organizations at all levels, including operators.

The review team noted that Hungary has made significant progress in developing and revising emergency arrangements since the 2016 EPREV mission. In particular, the EPREV team identified strengths in Hungary's EPR framework, including:

- A strong commitment to nuclear and radiological emergency preparedness, reflected in the efforts to improve their emergency arrangements.
- A comprehensive annual training and exercise plan as well as a long-term training plan for the Hungarian Nuclear Emergency Response System.
- Completion of the highest level of a three-level radiation protection training program by higher management at the National Institute of Oncology.

The team also made suggestions for further strengthening EPR in Hungary, including:

- The working group that was established to adapt the National Nuclear Emergency Response Plan to GSR Part 7 should finalize their review and assessment based on a clearly defined timeline.
- The Government should enhance coordination at the national level to ensure first responders are equipped with detectors to identify radiological conditions they may face during their duty, enabling them to respond effectively. The Hungarian Atomic Energy Authority (HAEA) should ensure that all doses received by emergency workers are recorded in the National Personal Dosimetry Register.
- The Government should ensure that general medical practitioners are adequately trained to recognize symptoms of acute radiation exposure.

The EPREV follow-up mission included an exchange of experiences about the effects of pandemic situations on EPR and how different organizations adjusted to the COVID-19 pandemic.

This report serves as the final record of the EPREV follow-up mission. The IAEA will continue to work with Hungary to enhance its national EPR arrangements as appropriate [1].

1. INTRODUCTION

1.1. Objective and Scope

The purpose of this EPREV follow-up mission was to conduct a review of the actions taken to address the findings of the 2016 EPREV mission. The follow-up mission did not conduct a comprehensive review of Hungary's nuclear emergency preparedness and response arrangements.

The EPREV follow-up mission focused on the arrangements for nuclear or radiological emergencies as defined in IAEA Safety Standards Series No. GSR Part 7, Preparedness and Response for a Nuclear or Radiological Emergency (hereafter: GSR Part 7) [1]. The review was carried out by comparing the revised emergency arrangements in the country against the IAEA safety standards for emergency preparedness and response.

It is expected that the EPREV follow-up mission will facilitate improvements in Hungary's emergency preparedness and response arrangements, and those of other Member States, through the knowledge gained and experiences shared between Hungary and the EPREV team and through the evaluation of the effectiveness of Hungary's arrangements, capabilities and good practices.

1.2. Preparatory Work and Review Team

At the request of the Hungarian Government, the IAEA conducted an EPREV mission to Hungary from 13 to 24 June 2016. Following the mission, Hungary undertook the development and implementation of an Action Plan to revise and update emergency arrangements in accordance with the findings of the review team, and to ensure that good practices were retained for sustainability.

Following the implementation of the national action plan, in April 2019, Hungary requested an IAEA EPREV follow-up mission to conduct a peer review of the revised emergency arrangements. The preparatory meeting was held on April 24, 2020, via videoconference. During the preparatory meeting, agreement was reached on the arrangements for the EPREV follow-up mission and the tentative composition of the EPREV review team of experts.

1.3. Reference for the Review

The primary reference for the review is GSR Part 7. In addition, IAEA Safety Guides GSG-2, Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency [2]; GS-G-2.1, Arrangements for Preparedness for a Nuclear or Radiological Emergency [3]; GSG-11, Arrangements for the Termination of a Nuclear or Radiological Emergency [4]; GSG-14, Arrangements for Public Communication in Preparedness and Response for a Nuclear or Radiological Emergency [5]; and SSG-65, Preparedness and Response for a Nuclear or Radiological Emergency Involving the Transport of Radioactive Material [6] were used as review criteria.

The terms used in this report are consistent with those found in the IAEA Safety Standards referred to in the above paragraph.

2. ACTIONS RELATED TO THE FINDINGS ON GENERAL REQUIREMENTS

2.1. Emergency management system

The 2016 EPREV mission actions related to the emergency management system include a single suggestion.

2016 EPREV Suggestion 1
Observation: The current version of the NNERP and relevant documents addressing EPR in Hungary are based on GS-R-2 which has been superseded by GSR Part 7. Hungary already started with the alignment of relevant documents with this new standard.
Basis for suggestion: GSR Part 7 paragraph 4.1 states: "The government shall ensure that an emergency management system is established and maintained on the territories of and within the jurisdiction of the State for the purposes of emergency response to protect human life, health, property and the environment in the event of a nuclear or radiological emergency."
Suggestion: The High Level Working Group should consider accelerating the revision of the NNERP and other relevant documents to align them with the revised IAEA safety standard on EPR, GSR Part 7.

Changes since the 2016 EPREV mission

After the 2016 EPREV mission, the protection strategy was published, and the national legislation and the National Nuclear Emergency Response Plan (NNERP) were amended, which continued the process to align with GSR Part 7. In addition, a working group was established under the High Level Working Group (HLWG) with the objective to determine the compliance and necessary amendments to reach complete compliance with all the requirements of GSR Part 7. The working group started this work in 2018. However, this exhaustive analysis has not been completed, the main reason for this delay being the COVID-19 pandemic.

The EPREV mission team was informed that approximately 60% of the requirements had been reviewed and that 40% of these reviewed requirements are still not in compliance with GSR Part 7. The evaluation is still in progress, as a significant amount of work remains. The EPREV team was informed that the HLWG agreed that the version of NNERP fully in line with GSR Part 7 would be prepared by the end of 2023.

The team considers that the establishment and sharing of a rigorous monitoring table to compare the requirements of GSR part 7 and the prevailing Hungarian regulations is a good approach. An established timeline is likely to inspire confidence in the rigor with which the work is carried out. The designation of specific individuals (and not only responsible organizations) is also likely to ensure accountability of future work to ensure compliance with the requirements of GSR part 7.

Status of the finding

Suggestion 1 remains open because the review process is not yet completed. However, the work that went into the compilation of the table to compare GSR Part 7 requirements, section-by-section, with the NNERP is commended as a necessary and fundamental step.

2.2. Roles and responsibilities in emergency preparedness and response

The 2016 EPREV mission actions related to the roles and responsibilities in emergency preparedness and response include two recommendations and a suggestion.

2016 EPREV Recommendation 1
Observation: The NNERP does not fully reflect the changes recently made to the legislation. The NNERP does not identify a main organization responsible for every critical task.
Basis for recommendation: GSR Part 7 paragraph 4.7 states: "The government shall ensure that all roles and responsibilities for preparedness and response for a nuclear or radiological emergency are clearly allocated in advance among operating organizations, the regulatory body and response organizations."
Recommendation: The High Level Working Group should ensure that the NNERP reflect the recent changes in legislation and also identify a primary organization responsible for the implementation of a critical task.

Changes since the 2016 EPREV mission

Since the 2016 EPREV mission, the NNERP has been revised twice. The NNERP was amended to be in line with legislation issued before the main EPREV mission. It is regularly revised to be in line with new legislation. Version 3.0 of the NNERP was issued in February 2018, and includes Table 3.1, which lists critical tasks and the organizations with the primary responsibility for these tasks. This table is based on the Guideline on the Critical Tasks of the National Nuclear Emergency Preparedness System, which provides detailed explanations of the critical tasks included in the table and defines the basic personnel, material, organizational and regulatory conditions necessary for successful implementation.

Status of the finding

Recommendation 1 is closed on the basis of completed actions by HAEA to identify organizations responsible for critical tasks.

2016 EPREV Suggestion 2
Observation: Staff at some facilities (Agroster Co Ltd. and the National Institute of Oncology) are not aware of their roles and responsibilities as conveyed in the emergency response plan of the facility.
Basis for suggestion: GSR Part 7 paragraph 4.10 states: "The government shall establish a national coordinating mechanism to be functional at the preparedness stage, consistent with its emergency management system, with the following functions: (a) To ensure that roles and responsibilities are clearly specified and are understood by operating organizations, response organizations and the regulatory body …"
Suggestion: Agroster Co Ltd. and the National Institute of Oncology should consider ensuring that roles and responsibilities are understood by their staff.

Changes since the 2016 EPREV mission

Since the 2016 EPREV mission, HAEA, National Institute of Oncology (NIO), and Agroster Co Ltd. made significant progress on the creation of tools to ensure that staff at the facilities are aware of their responsibilities as reflected in the facility emergency response plans of the respective organizations.

The amendment of Govt. Decree 487/2015. Korm. (from May 2022 Decree of the President of the HAEA 2/2022) that entered into force on 1 March 2018, has significantly extended the scope of the mandatory workplace radiation protection rules, including the regulation of the management of extraordinary events and accidents. The new requirements are included in Item 6.2 of Annex 8 of the Decree.

The HAEA Guidelines SV-1, 'licensing and notification obligations corresponding to the use of radioactive materials', and SV-2, 'development of the operation licence application for equipment generating ionizing radiation not containing radioactive material', were amended in September 2019. The current versions of these documents do not encompass all the guidelines to comply with the suggestion of the 2016 EPREV. However, new versions of SV-1 and SV-2 are in draft.

The EPREV Team took note of the working drafts of the SV-1 and SV-2, which address Suggestion 2. The team was also assured that these versions will be approved without major modifications.

The NIO drafted and approved *The Workplace Radiation Protection Rules* (WRPR) containing an Emergency Response Plan that can be consulted by all hospital staff at any time. The WRPR also contains the roles, responsibilities, notification points and contact details.

NIO also established an in-house obligatory radiation protection training that includes a special emphasis on the possible accident situations, tasks, and the respective roles and responsibilities. Newcomers must also take part in this radiation protection training.

The NIO put in place three levels of training, depending on the participant's function. This training material is also made available via e-learning as refresher.

The NIO informed the EPREV Team that the higher management of the hospital has undertaken the highest level of the training available. The EPREV Team acknowledges this as a demonstration of good performance.

The Emergency Response Plan has not been exercised since 2016, however, NIO committed to conduct an exercise as soon as the COVID-19 situation allows.

Agroster Co Ltd. has been conducting training and exercises on an annual basis. However, the results are not registered in a formal report. The last training took place on 5 July 2021. New employees must also take part in radiation protection training.

Agroster Co Ltd. has *Workplace Radiation Protection Rules* (WRPR) in place containing an Emergency Response Plan (ERP) that can be checked by all six staff members. The ERP, as part of the WRPR, is also displayed in the office of the facility. The WRPR is under revision and the new draft already includes criteria for termination of an emergency.

Status of the finding

Suggestion 2 is closed on the basis of progress made and confidence in effective completion.

2016 EPREV Recommendation 2
Observation: In some facilities the requirements already defined in the newest legislation are not fully implemented. This applies, among others, to the coordination between safety and security, implementation of training and exercise programmes, analysing the response and the emergencies and off-site/on-site coordination.
Basis for recommendation: GSR Part 7 paragraph 4.12 states: "The regulatory body is required to establish or adopt regulations and guides to specify the principles, requirements and associated criteria for safety upon which its regulatory judgements, decisions and actions are based [7]. These regulations and guides shall include principles, requirements and associated criteria for emergency preparedness and response for the operating organization (see also paras 1.12 and 4.5)."
Recommendation: HAEA should complete its regulatory guide to facilitate the preparation of the emergency response plans of the operators to be submitted as a part of their radiation protection plan, and further enforce the implementation of the new EPR related requirements at facilities.

Changes since the 2016 EPREV mission

HAEA has made a significant and successful effort to complete its suite of regulatory guides. Foremost, a broad regulatory basis was established by the amendment of Govt. Decree 487/2015. Korm. (entered into force on 1 March 2018 and since superseded by Decree of the President of the HAEA 2/2022). This decree expands the mandatory scope of the workplace radiation protection rules significantly. Annex 8, Number 6 establishes extensive requirements on the management of incidents and extraordinary events including nuclear emergencies.

HAEA is currently preparing to supplement the HAEA Guidelines SV-1 and SV-2 in order to provide radiation protection experts with further details on how to fulfil the requirements from Decree 2/2022 HAEA Annex 8, Number 6. The current draft version of SV-2 is aligned with these requirements. This will conclude the regulatory guidance and allow for appropriate enforcement when published.

Status of the finding

Recommendation 2 is closed on the basis of completed actions.

2.3. Hazard Assessment

The 2016 EPREV mission actions related to hazard assessment include one recommendation.

2016 EPREV Recommendation 3
Observation: There are no specific arrangements to identify facilities and locations with a significant likelihood of encountering dangerous sources.
Basis for recommendation: GSR Part 7 paragraph 4.21 states: "The government shall ensure that the hazard assessment identifies those facilities and locations at which there is a significant likelihood of encountering a dangerous source that is not under control."
Recommendation: The HLWG should ensure that all facilities with potential of encountering dangerous sources are identified in order to develop the necessary procedures and analytical tools and be able to identify dangerous sources and contaminated material and respond accordingly.

Changes since the 2016 EPREV mission

Since the 2016 EPREV mission, the amendment of the Govt. Decree 490/2015. (XII.30.) Korm. that entered into force on 1 March 2018 contains the list of facility types where dangerous radioactive sources might be found. According to the decree, HAEA, with the involvement of the concerned organizations, identifies and registers those particular facilities, where hazardous radiation sources may be discovered. Accordingly, HAEA contacted the competent authorities with jurisdiction over those organizations for the collection of the information. As a result, HAEA was provided with the names, site locations and contact details of the operators holding a valid waste management licence in the following five categories: metal trading, waste management, waste incinerators, environmental waste and custom yards.

HAEA developed two guidelines: SV-21 (Guidance for radiation portal monitor operators on the action plans in the event of a suspected radioactive material detection) and SV-22 (Identification of radioactive sources and basic safety measures). These two guidelines were published on the Authority's website in June 2020. Training of the concerned organizations and their duty officers about the contents of the guidelines is in progress.

Status of the finding

Recommendation 3 remains open based on the need for a designated coordinating body to ensure that the identified facilities are aware of the procedures and analytical tools to recognize the risk associated with radiation and notify the competent authorities.

2.4. Protection strategy for an emergency

The 2016 EPREV mission actions related to protection strategy for an emergency include one recommendation.

2016 EPREV Recommendation 4
Observation: In the NNERP generic intervention levels in terms of avertable dose and generic action levels are considered to determine what protective actions and other response actions should or could be taken.
Basis for recommendation: GSR Part 7 paragraph 4.28 states: "Development of a protection strategy shall include, but shall not be limited to, the following: … (2) "A reference level expressed in terms of residual dose shall be set, typically as an effective dose in the range 20–100 mSv, acute or annual, that includes dose contributions via all exposure pathways. This reference level shall be used in conjunction with the goals of emergency response (see para. 3.2) and the specific time frame in which particular goals are to be achieved …"
Recommendation: The HLWG should review the existing reference levels and align them with GSR Part 7, Appendixes 1 and 2.

Changes since the 2016 EPREV mission

Based on a proposal developed by the HLWG, the NNERP and Govt. Decree 487/2015. Korm. (superseded by Decree of the President of the HAEA 2/2022) were revised.

Section 9 (1) a) of Decree of the President of the HAEA 2/2022 requires the NNERP to fix specific reference levels for the general public in emergency exposure situations in the range between 20 mSv and 100 mSv effective dose.

NNERP emergency reference levels are set in accordance with GSR Part 7.

Status of the finding

Recommendation 4 is closed on the basis of completed actions.

3. ACTIONS RELATED TO THE FINDINGS ON FUNCTIONAL REQUIREMENTS

3.1. Managing emergency response operations

The 2016 EPREV mission actions related to managing emergency response operations include one suggestion.

2016 EPREV Suggestion 3
Observation: The Emergency Response Plan for the Training Reactor is loosely embedded and articulated with the more general Emergency Response Plan of the Campus.
Basis for suggestion: GSR Part 7, paragraph 5.2 states: "For facilities in categories I, II and III, arrangements shall be made for the on-site emergency response to be promptly executed and managed without impairing the performance of the continuing operational safety and security functions both at the facility and at any other facilities on the same site. The transition from normal operations to operations under emergency conditions on the site shall be clearly specified and shall be effectively made. The responsibilities of all personnel who would be on the site in an emergency shall be designated as part of the arrangements for this transition. It shall be ensured that the transition to the emergency response and the performance of initial response actions do not impair the ability of operating personnel (such as operating personnel in the control room) to ensure safe and secure operation while taking mitigatory actions."
Suggestion: The Training Reactor should consider further integrating its Emergency Response Plan with the Emergency Response Plan for the Campus of the University.

Changes since the 2016 EPREV mission

The ERP of the Training Reactor was completely overhauled in 2017. In addition to changes with respect to the internal organization, the tasks of the Property and Institute Safety Section of the university were included in the ERP of the training reactor. Thus, the tasks of the university's central organizations in case of an accident in the Training Reactor, are described in the ERP. The head of the Property and Institute Safety Section of the university must co-approve the ERP in order to assure awareness of roles and responsibilities during an emergency.

Status of the finding

Suggestion 3 is closed on the basis of completed actions.

3.2. Identifying, notifying and activating

The 2016 EPREV mission actions related to identifying, notifying and activating include one recommendation and one suggestion.

2016 EPREV Recommendation 5
Observation: The classification of emergencies described in the Budapest Research Reactor's Emergency Response Plan is not consistent with the postulated emergencies and resulting consequences referred to in this Plan.
Basis for recommendation: GSR Part 7 paragraph 5.14 states: "The operating organization of a facility or activity in category I, II, III or IV shall make arrangements for promptly classifying, on the basis of the hazard assessment, a nuclear or radiological emergency warranting protective actions and other response actions to protect workers, emergency

workers, members of the public and, as relevant, patients and helpers in an emergency, in accordance with the protection strategy (see Requirement 5). This shall include a system for classifying all types of nuclear or radiological emergency …"
Recommendation: The Budapest Research Reactor should make arrangements to ensure that the hazard assessment and classification of the emergencies are aligned.

Changes since the 2016 EPREV mission

Since the 2016 EPREV mission, the original calculations were revisited. Within the model-assumptions made by the operator, hazard assessment and emergency classification are aligned.

During the follow-up mission, it was noted that the operator plans to repeat the calculations with a more conservative parameter set.

The EPREV team was assured that the emergency classification will be aligned with the outcome of the hazard assessment.

Status of the finding

Recommendation 5 is closed on the basis of progress made and confidence in effective completion.

2016 EPREV Suggestion 4
Observation: The first responders at the airport are equipped with electronic dosimeters, but general first responders (ambulance, police, firefighters) are not equipped.
Basis for suggestion: GSR Part 7, paragraph 5.17 states: "For facilities and activities in categories I, II and III, and for category IV, arrangements shall be made: (1) to promptly recognize and classify a nuclear or radiological emergency; (2) upon classification, to promptly declare the emergency class and to initiate a coordinated and preplanned on-site response…"
Suggestion: The Ministry of Interior and the Ministry of Human Capacities should consider providing relevant first response teams with simple radiation detectors able to alert them about hazardous conditions.

Changes since the 2016 EPREV mission

Since the 2016 EPREV mission, the Fire Brigade (National Directorate General for Disaster Management (NDGDM)), National Police Headquarters, and National Ambulance Services each conducted a survey to determine the necessary supply of dosimeters to their personnel for radiation detection and alert purposes. The indicated organizations agree that it is important to equip the first responders with dosimeters.

The NDGDM has 102 dosimeters and placed a purchase order for an additional 166 dosimeters, but they are awaiting delivery, which has been delayed due to COVID-19.

At the end of 2019, based on the information provided by the Hungarian Atomic Energy Authority regarding risk areas, the Ministry of Human Capacities assessed how many and what types of dosimeters are needed for the Emergency Medical Technician units. In 2020, the National Ambulance Service assessed that according to their calculations, the purchase of 107 dosimeters would be justified. However, due to the COVID-19 pandemic, sufficient funds for

the purchase could not be secured from the central budget. Therefore, to date, the National Ambulance Service and Hungarian Police do not have radiation detection capabilities.

During the mission interviews and document reviews, the EPREV team was informed that each organization advocates for themselves to request funding for procurement of electronic dosimeters from the central government budget via the Ministry of Interior.

The EPREV team noted that there is a need for a comprehensive and coordinated strategy to equip first response organizations with dosimeters.

Status of the finding

Suggestion 4 remains open. Although the responsible organizations pursued the procurement of dosimeters, the necessary means are not yet in place to enable first responders to identify radiological conditions they may face during their duty as required by GSR Part 7 paragraph 5.17. There is a need to coordinate this at the national level and secure funding for the procurement.

3.3. Providing instructions, warnings and relevant information to the public

The 2016 EPREV mission actions related to providing instructions, warnings and relevant information to the public include one suggestion.

2016 EPREV Suggestion 5
Observation: DMCC should consider having arrangements to provide information (instructions, warnings and relevant information to the public) in other languages for the transient population groups within the emergency planning zones and emergency planning distances.
Basis for suggestion: GSR Part 7 paragraph 5.45 states: "For facilities in category I or II and areas in category V, arrangements shall be made to provide the permanent population, transient population groups and special population groups or those responsible for them and special facilities within the emergency planning zones and emergency planning distances (see para. 5.38), before operation and throughout the lifetime of the facility, with information on the response to a nuclear or radiological emergency. This information shall include information on the potential for a nuclear or radiological emergency, on the nature of the hazards, on how people would be warned or notified, and on the actions to be taken in such an emergency. The information shall be provided in the languages mainly spoken by the population residing within the emergency planning zones and emergency planning distances. The effectiveness of these arrangements for public information shall be periodically assessed."
Suggestion: DMCC should consider having arrangements to provide information (instructions, warnings and relevant information to the public) in other languages for the transient population groups within the emergency planning zones and emergency planning distances.

Changes since the 2016 EPREV mission

A calendar is edited and delivered by MVM Paks Nuclear Power Plant Ltd to every household in a 30 km radius around the NPP (Urgent Protective Action Planning Zone). This has been ongoing since 2000. 97 000 copies are printed and distributed each year. A multi-lingual information page (3 languages: English, German and Russian) was developed and has been

maintained since 2017. This page gives basic information to the population: informing them that they live in the urgent protective action planning zone and that a siren-based alarm system exists and can inform inhabitants in case of any danger. The calendar shows the dates of the monthly tests of the sirens.

During an emergency, the Public Notification and Alarm Siren System (MoLaRi) is used in the 30 km radius and informs all residents on the territory of three counties (Bacs-Kiskun, Fejer and Tolna). The siren-based alarm system is suitable for broadcasting both alarms signals and live speech. Pre-recorded announcements can be made in 6 different languages (Hungarian, English, German, Croatian, Slovakian and Russian). Radio and television networks are also involved in the information network and can also display information in different languages.

Status of the finding

Suggestion 5 is closed on the basis of completed actions.

3.4. Protecting emergency workers and helpers in an emergency

The 2016 EPREV mission actions related to protecting emergency workers and helpers in an emergency include two recommendations and one suggestion.

2016 EPREV Recommendation 6
Observation: Emergency Workers are not designated in several facilities of categories II and III.
Basis for recommendation: GSR Part 7 paragraph 5.49 states: "Arrangements shall be made to ensure that emergency workers are, to the extent practicable, designated in advance and are fit for the intended duty. These arrangements shall include health surveillance for emergency workers for the purpose of assessing their initial fitness and continuing fitness for their intended duties ..."
Recommendation: HAEA should ensure that emergency workers are designated in advance to the extent practicable.

Changes since the 2016 EPREV mission

Since the 2016 EPREV mission, HAEA has made significant progress ensuring that emergency workers are designated in advance, to the extent practicable, by all stakeholders involved in the response to a radiological or nuclear emergency.

HAEA integrated the tasks related to preliminary designation of emergency workers into the guidelines SV-1 and SV-2. Also, HAEA informed the EPREV Team that to allow the enforcement of this function, they included in the inspection HAEA Procedure ME-5-2-22 the need to check the preliminary assignment of emergency workers when performing regulatory inspections of the licensees.

HAEA Guidelines SV-1 and SV-2, amended in September 2019, still do not encompass all the guidelines to comply with Recommendation 6 of the 2016 EPREV. Nevertheless, the EPREV Team took note of the working drafts of SV-1 and SV-2 where the dispositions related to Recommendation 6 of the 2016 EPREV mission will be considered. The Team was also assured that these versions will be approved without major modifications.

Status of the finding

Recommendation 6 is closed on the basis of progress made and confidence in effective completion.

2016 EPREV Recommendation 7
Observation: There are no arrangements in place to keep records of the doses received by off-site emergency workers.
Basis for recommendation: GSR Part 7 paragraph 5.58 states: "Arrangements shall be made to assess as soon as practicable the individual doses received in a response to a nuclear or radiological emergency by emergency workers and helpers in an emergency and, as appropriate, to restrict further exposures in the response to the emergency (see Appendix I)."
Recommendation: The Ministry of Human Capacities should make arrangements to establish a national system for recording doses received by emergency workers.

Changes since the 2016 EPREV mission

Since the 2016 EPREV mission, a modification to the existing electronic database of the national personal dosimetry register (NPDR) developed by the National Public Health Centre (NPHC), formerly under the Ministry of Human Capacities, was carried out in 2017. The database was initially developed for planned exposure situations and has now been updated to include records from emergency exposure situations.

The NPHC started developing a plan to:

- Elaborate training topics of first responder information and methodology to ensure appropriate knowledge about health risks caused by ionising radiation.
- Contact and coordinate with the Police, National Ambulance Service and National Disaster Management in order to comply with the GSR Part 7 requirements for first responders and other emergency workers involved in the response.
- Develop the radiation protection system of the National Ambulance Service; organize their radiation protection training; equip them with monitoring devices (personal dosimeters and surface contamination meters), decontamination tools and other personal protective equipment; and prepare the technical specification of a public purchase procedure for purchasing technical equipment.
- Develop a proposal to amend the Decree of the President of the HAEA 2/2022. in such a way that the employers of radiation workers shall be obliged to supply data for the national register.
- Update the NNERP Guideline 7.4 (Radiation Protection of Emergency Workers) to include a section describing how to report the radiation exposure of the emergency workers to the NPDR.
- Further develop the NPDR software to be able to receive online reporting of radiation exposure of emergency workers.

While some of this work is ongoing, much still remains to be done. Meanwhile, the database was transferred to HAEA on 1 January 2021.

Status of the finding

Recommendation 7 remains open because most of the planned actions are still pending, no firm budgets are in place, and there are no planned dates for completion.

2016 EPREV Suggestion 6
Observation: There is no national system in place to ensure that protection of helpers in an emergency will be provided as this is not considered necessary given the current arrangements.
Basis for suggestion: GSR Part 7 paragraph 5.52 states: "The operating organization and response organizations shall ensure that arrangements are in place for the protection of emergency workers and protection of helpers in an emergency for the range of anticipated hazardous conditions in which they might have to perform response functions …".
Suggestion: The DMCC should consider developing arrangements to protect helpers in an emergency.

Changes since the 2016 EPREV mission

The concept of emergency helpers is taken into consideration within the protection strategy, established after 2016, and included in Guideline 3.3 by MoI NDGDM (for the use of NNERP). The NNERP was amended accordingly in 2018.

Hungary established a mechanism for the involvement of emergency helpers in EPR, based on Govt. Decree 234/2011. Korm. on disaster prevention and the amendment of certain related laws. Applications of helpers and their fitness for duty are reviewed by the responsible authorities.

Additionally, personal dosimetry devices for volunteer organizations were purchased. Dosimeters are stored at 3 different counties located within the 30 km radius around the Paks NPP, to be delivered to emergency helpers in case of an emergency. A preparation drill was conducted on the use of dosimeters.

Status of the finding

Suggestion 6 is closed on the basis of completed actions.

3.5. Managing the medical response in a nuclear or radiological emergency

The 2016 EPREV mission actions related to managing the medical response in a nuclear or radiological emergency include one recommendation.

2016 EPREV Recommendation 8
Observation: There are no systematic arrangements in place for general practitioners and medical emergency staff to be made aware of the symptoms of radiation exposure.
Basis for recommendation: GSR Part 7 paragraph 5.63 states: "Arrangements shall be made for medical personnel, both general practitioners and emergency medical staff, to be made aware of the clinical symptoms of radiation exposure, and of the appropriate notification procedures and other emergency response actions to be taken if a nuclear or radiological emergency arises or is suspected."
Recommendation: The Ministry of Human Capacities should make arrangements for medical personnel, both general practitioners and emergency staff, to recognize the symptoms of radiation exposures.

Changes since the 2016 EPREV mission

Since the 2016 EPREV mission, the secondary vocational training, and higher education and training programmes were transferred from the health sector of the Ministry of Human Capacities to the Ministry of Innovation and Technology, then to the Ministry of Culture and Innovation.

The EPREV team was informed that the incorporation of knowledge into higher education curriculum became difficult and that consultations are in progress for the mandatory training program for medical professionals.

Status of the finding

Recommendation 8 remains open due to a lack of progress to implement the recommendation.

3.6. Mitigating non-radiological consequences

The 2016 EPREV mission actions related to mitigating non-radiological consequences include one suggestion.

2016 EPREV Suggestion 7
Observation: The NNERP does not address arrangements for the mitigation of non-radiological consequences.
Basis for suggestion: GSR Part 7 paragraph 5.89 states: "Non-radiological consequences of a nuclear or radiological emergency and of an emergency response shall be taken into consideration in deciding on the protective actions and other response actions to be taken in the context of the protection strategy (see Requirement 5)."
Suggestion: The HLWG should consider developing arrangements and articulate them in the NNERP to address non-radiological consequences

Changes since the 2016 EPREV mission

Provisions regarding non-radiological consequences in nuclear or radiological emergencies were defined in the amended versions of Govt. Decrees 165/2003. Korm. and 167/2010. Korm. The NNERP was amended accordingly in 2018.

Status of the finding

Suggestion 7 is closed on the basis of completed actions.

3.7. Terminating an emergency

The 2016 EPREV mission actions related to terminating an emergency include one suggestion.

2016 EPREV Suggestion 8
Observation: There is no process in place for terminating an emergency in several emergency response plans.
Basis for suggestion: GSR Part 7 paragraph 5.95 states: "Adjustment of protective actions and other response actions and of other arrangements that are aimed at enabling the termination of an emergency shall be made by a formal process that includes consultation of interested parties."
Suggestion: HLWG should consider revising the relevant guideline to consider the termination of an emergency.

Changes since the 2016 EPREV mission

Since the 2016 EPREV mission, HAEA has made significant progress to put in place a process and approve criteria for terminating radiological and nuclear emergencies.

The amended Govt. Decree 487/2015. Korm. (Decree of the President of the HAEA 2/2022) states in Item 6.2.2.1.3. of Annex 8 that the emergency response plan for facilities and workplaces belonging to radiation protection category I and II and containing radioactive material, shall contain the criteria for terminating an emergency.

By proposal of HAEA, Chapter 9 of the NNERP was modified to include criteria for the termination of a nuclear and radiological emergency, of international recommendations, GSG-11 of the IAEA. In line with the change of the NNERP, Guidelines 5.1 on the *Development and Continuous Maintenance of Organizational Nuclear Emergency Response Plans* was also modified.

HAEA is also developing a guide containing support to stakeholders for setting criteria for the termination of an emergency, as well as a detailed description of the process for termination. The EPREV Team acknowledges this as a demonstration of good performance.

Concerning, the emergency response for MVM Paks NPP the termination criteria are defined in the Comprehensive Emergency Response Plan. This termination of the emergency on-site is declared by the head of the emergency response organization and the national emergency organization must be informed immediately of this decision.

Status of the finding

Suggestion 8 is closed on the basis of completed actions

4. ACTIONS RELATED TO THE FINDINGS REQUIREMENTS FOR INFRASTRUCTURE

4.1. Organization and staffing for emergency preparedness and response

The 2016 EPREV mission actions related to organization and staffing for emergency preparedness and response include two suggestions.

2016 EPREV Suggestion 9
Observation: Adequate staffing for all shift positions in response organizations has been identified as a concern.
Basis for suggestion: GSR Part 7 paragraph 6.10 states: "Appropriate numbers of suitably qualified personnel shall be available at all times (including during 24 hour a day operations) so that appropriate positions can be promptly staffed as necessary following the declaration and notification of a nuclear or radiological emergency. Appropriate numbers of suitably qualified personnel shall be available for the long term to staff the various positions necessary to take mitigatory actions, protective actions and other response actions."
Suggestion: The HLWG should consider developing a proposal to the DMCC to review and identify all required positions and the required human resources necessary to fill the positions in a nuclear or radiological emergency.

Changes since the 2016 EPREV mission

Prior to the conduct of the EPREV mission in 2016, a survey was carried out by the HLWG in 2015. A questionnaire was circulated among concerned organizations within the scope of the self-assessment process to identify required positions and the required human resources necessary to fill the positions for preparedness and response to nuclear or radiological emergencies. The outcome of the survey was reported by the HLWG to the Disaster Management Interministerial Coordination Committee (DMCC) in 2018. The DMCC issued Resolution 3/2018 based on the report of the survey.

The EPREV team was informed that following this proposal to the DMCC, the existing staffing deficiencies could be eliminated by inter-ministerial coordination.

Status of the finding

Suggestion 9 is closed on the basis of completed actions.

2016 EPREV Suggestion 10
Observation: Numerous organizations have experienced departure of key professional staff and there is a lack of succession management planning and knowledge transfer to carry out emergency preparedness activities.
Basis for suggestion: GSR Part 7 paragraph 6.10 states: "Appropriate numbers of suitably qualified personnel shall be available at all times (including during 24 hour a day operations) so that appropriate positions can be promptly staffed as necessary following the declaration and notification of a nuclear or radiological emergency. Appropriate numbers of suitably qualified personnel shall be available for the long term to staff the various positions necessary to take mitigatory actions, protective actions and other response actions."

Suggestion: The HLWG should carry out an analysis and propose to the DMCC to develop and implement a succession management programme to ensure a sustainable capacity for emergency preparedness and response.

Changes since the 2016 EPREV mission

Following the EPREV mission in 2016, Nuclear Emergency Management Technical Scientific Section (NEM TSS) prepared a proposal on the amendment of the Govt. Decree 167/2010. Korm. for the DMCC. DMCC Resolution 7/2020 was issued in light of the pending amendment of the Decree (expected by the end of 2022). The items related to knowledge transfer, maintenance of human resources and arrangements regarding succession management are included in the Resolution. The contents of a training programme on preparedness and response to nuclear emergencies are in Annex 1 of the Resolution.

Status of the finding

Suggestion 10 is closed on the basis of completed actions.

4.2. Logistical support and facilities

The 2016 EPREV mission actions related to logistical support and facilities include one recommendation.

2016 EPREV Recommendation 9
Observation: The NPP's alternate Emergency Operations Centre lacks protection from natural and radiological hazards.
Basis for recommendation: GSR Part 7 paragraph 6.24 states: Emergency response facilities or locations to support an emergency response under the full range of postulated hazardous conditions shall be designated and shall be assigned the following functions, as appropriate: (a) Receiving notifications and initiating the response; (b) Coordination and direction of on-site response actions; (c) Providing technical and operational support to those personnel performing tasks at a facility and those personnel responding off the site; (d) Direction of off-site response actions and coordination with on-site response actions; (e) Coordination of national response actions; (f) Coordination of communication with the public; (g) Coordination of monitoring, sampling and analysis; (h) Managing those people who have been evacuated (including reception, registration, monitoring and decontamination, as well as provision for meeting their personal needs, including for housing, food and sanitation); (i) Managing the storage of necessary resources; (j) Providing individuals who have undergone exposure or contamination with appropriate medical attention including medical treatment."
Recommendation: The MVM Paks NPP Ltd. should review the need for an alternate Emergency Operations Centre and/or implement modifications in the current alternate EOC to ensure its operation under emergency conditions.

Changes since the 2016 EPREV mission

Following an assessment on the need for an adequate alternate emergency operations centre (EOC), a decision was made in 2018 to construct a new backup command centre (BCC) and its construction started in 2020 under the regulatory control of HAEA.

This new alternate EOC is located approximatively 5 km from the NPP site. It is a new building and not a renovation of the backup emergency centre visited during the EPREV mission in 2016.

The construction deadline was initially the end of 2021, but it is delayed and is expected to be completed by the end of 2022.

The visit to the BCC site revealed that construction work is well advanced.

Status of the finding

Recommendation 9 is closed on the basis of completed actions.

4.3. Training, drills and exercises

The 2016 EPREV mission actions related to training, drills and exercises include one suggestion.

2016 EPREV Suggestion 11
Observation: The Training and Exercise Working Committee has not been operational for a number of years. While HAEA has tried to fill the gap, it cannot fulfil the role initially devoted to the Training and Exercise Working Committee.
Basis for suggestion: GSR Part 7 paragraph 6.30 states: "Exercise programmes shall be developed and implemented to ensure that all specified functions required to be performed for emergency response, all organizational interfaces for facilities in category I, II or III, and the national level programmes for category IV or V are tested at suitable intervals. These programmes shall include the participation in some exercises of, as appropriate and feasible, all the organizations concerned, people who are potentially affected, and representatives of news media. The exercises shall be systematically evaluated (see para. 4.10(h)) and some exercises shall be evaluated by the regulatory body. Programmes shall be subject to review and revision in the light of experience gained (see paras 6.36 and 6.38)."
Suggestion: The DMCC Scientific Council should consider reinstating a mechanism to coordinate the development of an annual training and exercise plan, and following up on the lessons learned from these activities.

Changes since the 2016 EPREV mission

The Nuclear Emergency Management Technical Scientific Section (NEM TSS) of the DMCC Scientific Council, responsible for the preparation of the relevant training and exercise programs was re-established after the EPREV mission was conducted in 2016.

Based on Resolution 11/2018 of the DMCC, the NNERP and the Rules of Procedures of the NEM TSS were modified.

Annual Training and Exercise Plans of the Hungarian Nuclear Emergency Response System were developed by the NEM TSS. The annual plan for 2022 was established and approved in 2021 and the long-term plan (for 10 years) was established and approved in 2020.

Status of the finding

Suggestion 11 is closed on the basis of completed actions

5. POLICY ISSUE: IMPLICATIONS OF THE PANDEMIC AND ASSOCIATED CHALLENGES ON ALL LEVELS OF EMERGENCY PREPAREDNESS AND RESPONSE

The regulatory body and competent authorities initiated a number of measures to maintain the delivery of their EPR functions and to contribute to the safe operation of facilities and conduct of EPR activities, during the COVID-19 pandemic. To contribute to the exchange of experiences and lessons learned between the EPREV Team and country institutions, a policy discussion was held on the effects of the COVID-19 pandemic. The discussions focussed on prioritizing resources and fulfilling safety requirements during a pandemic.

The experts shared their experiences by providing the following information:

- All participants shared their experiences on working remotely, organization of exercises, and training.
- Some international experts highlighted that functions related to EPR processes were not affected in their countries. The implementation of a graded approach was used to adjust the annual inspection plan in such a manner that safety would not be compromised.
- Competent authorities maintained their system and capabilities for the provision of a full response in case of an emergency. Major challenges for emergency preparedness included conducting training activities, drills, and exercises with other participating organizations, and adjusting to the use of virtual means.
- Organizations remained agile in their response to the pandemic and maintained readiness to respond to a nuclear or radiological emergency.

Appendix I: EPREV Follow-Up Mission Team Composition

No.	Name and LAST NAME	Position	Organization
1.	Mr Chris DIJKENS	Team Leader	Netherlands
2.	Mr Gurdal GOKERI	Team Coordinator	IAEA
3.	Ms Stacey HORVITZ	Deputy Team Coordinator	IAEA
4.	Mr Dominique NSENGIYUMVA	Reviewer	Canada
5.	Ms Nathalie TCHILIAN-TENG	Reviewer	France
6.	Mr João Oliveira MARTINS	Reviewer	Portugal
7.	Mr Wolfram ROTHER	Reviewer	Germany
8.	Mr Antero KUUSI	Reviewer[1]	Finland

[1] Participated in the preparation phase.

Appendix II: Mission Schedule

Agenda EPREV Follow-up Mission Version 20220630				Hungary only activity IAEA only activity IAEA and Hungary activity
Day	**Time**	**Location**	**Activity**	**Participants**
Sunday 2022-07-03	12:00 - 14:00	HAEA ground floor room	Briefing, refresher presentation, review mission plan, review preliminary observations and assignment of priorities	• IAEA team
	14:00 - 16:00	HAEA ground floor room	• Discuss schedule, final administrative arrangements and clarifications as required • Present latest changes in national framework (Hungary EPREV Coordinator)	• IAEA team • Hungary Coordinator
	16:00 - 17:00	HAEA ground floor room	Discuss impact of national changes on preliminary observations	• IAEA team
Monday 2022-07-04	**09:30 - 11:30**	HAEA ground floor room	**Entrance meeting:**	• IAEA team • Hungary representatives (senior management and focal points)
	09:30 - 09:40		• Opening remarks and introductions (HAEA Oversight Director)	
	09:40 - 09:50		• Opening remarks and introductions (IAEA Team Leader)	
	09:50 - 10:20		• EPREV objectives and process (IAEA Coordinator)	
	10:20 - 11:00		• Hungary's national framework for EPR (Hungary Coordinator)	
	11:00 - 11:20		• Review of arrangements for the mission (Hungary Coordinator)	
	11:20 - 11:30		• Group photo with all participants	
	11:30 - 12:30	HAEA	Lunch	
	12:30 - 16:00		**Meetings with stakeholders[2]:**	• Hungary representatives as needed[3]
		HAEA ground floor room	TEAM A: Meeting with High Level Officials	• IAEA Team A • Hungary representatives (HLWG)
		HAEA CERTA Training Centre	TEAM B: Interviews with HAEA representatives (Rec 1, 3, Sug 1)	• IAEA Team B • Hungary representatives (HAEA)
		HAEA C-1 Room	TEAM C: Interviews with HAEA and NIO representatives (Rec 2, 4, 6, Sug 2, 8)	• IAEA Team C • Hungary representatives (HAEA, NIO)
	16:00 - 17:00	HAEA ground floor room	IAEA team meeting with Hungary Coordinator to discuss open items	• IAEA team • Hungary Coordinator
	18:00 onwards	HAEA ground floor room	IAEA team meeting[4]	• IAEA team

[2] Interviews are expected to finish with clear statements from IAEA reviewer(s) about their perception about the status of the relevant recommendations/suggestions. This is for transparency purposes and due to time limitations.
[3] The specific timing for every entity is still under consideration.
[4] At the end of each day IAEA and Hungary coordinators will discuss details of next day activities, as needed.

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IAEA only activity
IAEA and Hungary activity

Tuesday 2022-07-05	TEAM D	09:00 - 12:00	HAEA ground floor room	TEAM D: Interviews (Rec 7, 8, Sug 4)	• IAEA Team D • Hungary representatives (HAEA, MHC, Hungarian Police)
		12:00 - 13:00		Lunch	
		13:00 - 15:00		TEAM D: Interviews (continued)	
	TEAM E	09:00 - 12:00	HAEA CERTA Training Centre	TEAM E: Interviews (Rec 5, Sug 3)	• IAEA Team E • Hungary representatives (HAEA, CER, BUTE INT TR)
		12:00 - 13:00		Lunch	
		13:00 - 15:00		TEAM E: Interviews (continued)	
	TEAM F	08:45 - 09:30		Travel to Agroster	
		09:30 - 12:00	Agroster	TEAM F: Visit and interviews (Rec 6, Sug 2, 8)	• IAEA Team F • Hungary representatives (Agroster)
		12:00 - 13:00		Lunch	
		13:00 - 15:00		TEAM F: Visit and interviews (continued)	
		15:00 - 15:30		Travel to HAEA	
	TEAM G	08:45 - 09:30		Travel to NDGDM	
		09:30 - 12:00	NDGDM	TEAM G: Visit and interviews (Sug 6, 7, 9, 10, 11)	• IAEA Team G • Hungary representatives (NDGDM, DMCC, HAEA)
		12:00 - 13:00		Lunch	
		13:00 - 15:00		TEAM G: Visit and interviews (continued)	
		15:00 - 15:45		Travel to HAEA	
	TEAM H	07:30 - 09:30		Travel to Paks NPP	
		09:30 - 13:00	Paks NPP	TEAM H: Visit and interviews (Rec 9, Sug 5, 8)	• IAEA Team H • Hungary representatives (Paks NPP)
		13:00 - 14:00		Lunch	
		14:00 - 16:00		Travel to HAEA	
		15:00 - 16:00	HAEA ground floor room	IAEA team meeting with Hungary Coordinator to discuss open items	• IAEA team • Hungary Coordinator
		18:00 onwards	HAEA ground floor room	• IAEA team meeting • Report writing	• IAEA team
Wednesday 2022-07-06		09:00 - 11:30	HAEA ground floor room	Meeting and additional interviews as needed[5]	• IAEA team • Hungary representatives (HAEA, NDGDM, MHC, MVM Paks NPP, and others, if needed)
		11:30 - 12:30		Policy discussion	
		12:30 - 13:30	HAEA	Lunch	
		13:30 onwards	HAEA ground floor room	• IAEA team meeting • Report writing • Prepare press release	• IAEA team
		18:00		Preliminary draft report and press release submitted to Hungary EPREV Coordinator	• IAEA team

[5] IAEA coordinator will communicate to Hungary coordinator the entities that are needed for those meetings. This communication will be done the day before.

Agenda
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Hungary only activity
IAEA only activity
IAEA and Hungary activity

Thursday 2022-07-07	08:00 - 08:30	HAEA ground floor room	Meeting to agree on press release content	• IAEA Coordinators • Hungary Coordinator
	08:30 - 12:00	HAEA ground floor room	Draft Executive Summary	• IAEA Coordinators • IAEA Team Leader
	08:30 - 12:00	HAEA C-1 room	Hungary team reviews report and prepares written comments	• Hungary team (HLWG)
	12:00 - 13:00	HAEA	Lunch	
	13:00		Hungary submits report with written comments	• Hungary Coordinator
	13:00 - 16:00	HAEA ground floor room	IAEA team meeting to finalize report	• IAEA team • Hungary Coordinator, as needed
	16:00 - 18:00	HAEA ground floor room	Meeting to agree on report and Executive Summary	• IAEA team • Hungary Coordinator • Hungary representatives, as needed
	18:00	Kéhli Restaurant	Farewell Dinner	• IAEA team • Hungary team
	20:00 onwards	HAEA ground floor room	IAEA team meeting to finalize Exit Meeting presentations	• IAEA team
Friday 2022-07-08	09:30		Delivery of agreed report	• IAEA team
	09:30 - 11:30	HAEA ground floor room	**Exit meeting:**	• IAEA team • IAEA IEC Director • Hungary team (senior management) • HAEA President
	09:30 - 09:40		• Introduction (Hungary Coordinator)	
	09:40 - 10:25		• Presentation of the main observations (IAEA Team Leader)	
	10:25 - 10:40		• Next steps (IAEA Coordinator)	
	10:40 - 11:00		• Questions (All)	
	11:00 - 11:15		• Closing remarks (HAEA President)	
	11:15 - 11:30		• Closing remarks (IAEA IEC Director)	
	11:30		EPREV Follow-up mission Ends	

Appendix III: Attendees to EPREV Follow-Up Mission Meetings

No.	Name	Organization
1.	András Áron GYŐRFI-NAGY	HAEA
2.	Anita KANTAVÁRI	HAEA
3.	Anita SZEITZ	NDGDM
4.	Attila NAGY	National Food Chain Safety Office
5.	Attila TORMÁSI	BUTE INT TR
6.	Béla András BALCZÓ	HAEA
7.	Csilla PESZNYÁK	NIO
8.	Szabolcs CZIFRUS	BUTE INT
9.	Ditta JUHÁSZ	Ministry of Agriculture
10.	Eszter RÉTFALVI	HAEA
11.	Erik TÓTH	Fejér CDC
12.	Gábor Csaba KIGYÓS-VARGHA	MoI
13.	Gábor WINDISCH	HAEA
14.	Imre SZABÓ	Hungarian National Police Headquarters
15.	István Zoltán HUSZÁR	Agroster Co. Ltd.
16.	János BANA	MVM Paks NPP
17.	László JUHÁSZ	Ministry of Defence
18.	Sándor KAPITÁNY	HAEA
19.	Kristóf SOMODY	HAEA
20.	Krisztina HERCZEG-MÁTÉ	NDGDM

No.	Name	Organization
21.	Réka KIRÁLY	NIO
22.	Miklós HARCSA	Ministry of Technology and Innovation
23.	Márton KERESZTES	HAEA
24.	Nándor FÜLÖP	HAEA
25.	Natália VERESZKI	Agroster Co. Ltd.
26.	Panna KŐNIG-SZÜCS	HAEA
27.	Péter JACKOVICS	NDGDM
28.	Péter JUHÁSZ	CER
29.	Péter ZAGYVAI	CER
30.	Géza SÁFRÁNY	NPHC
31.	Attila SZABÓ	NDGDM
32.	Tamás ENDRŐDI	Hungarian National Police Headquarters
33.	Tünde ÁDÁMNÉ SIÓ	National Food Chain Safety Office
34.	Zoltán MÉSZÁROS	Bács-Kiskun CDC
35.	Zoltán BÁRDOS	Fejér CDC
36.	Ildikó METZ	Tolna CDC
37.	Andrea Beatrix KÁDÁR	HAEA
38.	Zsolt STEFÁNKA	HAEA
39.	Lajos TYUKODI	Izotóp Intézet Ltd.
40.	Renáta SZŐNYI-PÁKAI	Izotóp Intézet Ltd.
41.	Szilvia ZÁGORI	MoI

References

[1] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL CIVIL AVIATION ORGANIZATION, INTERNATIONAL LABOUR ORGANIZATION, INTERNATIONAL MARITIME ORGANIZATION, INTERPOL, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, PREPARATORY COMMISSION FOR THE COMPREHENSIVE NUCLEAR-TEST-BAN TREATY ORGANIZATION, UNITED NATIONS ENVIRONMENT PROGRAMME, UNITED NATIONS OFFICE FOR THE CO¬ORDINATION OF HUMANITARIAN AFFAIRS, WORLD HEALTH ORGANIZATION, WORLD METEOROLOGICAL ORGANIZATION, Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSR Part 7, IAEA, Vienna (2015).

[2] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR OFFICE, PAN AMERICAN HEALTH ORGANIZATION, WORLD HEALTH ORGANIZATION, Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSG-2, IAEA, Vienna (2011).

[3] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR OFFICE, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS, WORLD HEALTH ORGANIZATION, Arrangements for Preparedness for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GS-G-2.1, IAEA, Vienna (2007).

[4] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL CIVIL AVIATION ORGANIZATION, INTERNATIONAL LABOUR OFFICE, INTERNATIONAL MARITIME PORGANIZATION, INTERPOL, OECD NUCLEAR ENERGY AGENCY, UNITED NATIONS OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS, WORLD HEALTH ORGANIZATION, WORLD METEOROLOGICAL ORGANIZATION, Arrangements for the Termination of a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSG-11, IAEA, Vienna (2018).

[5] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL CIVIL AVIATION ORGANIZATION, INTERPOL, PREPARATORY COMMISSION FOR THE COMPREHENSIVE NUCLEAR-TEST-BAN TREATY ORGANIZATION AND UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, Arrangements for Public Communication in Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSG-14, IAEA, Vienna (2020)

[6] INTERNATIONAL ATOMIC ENERGY AGENCY, Preparedness and Response for a Nuclear or Radiological Emergency Involving the Transport of Radioactive Material, IAEA Safety Standards Series No. SSG-65, IAEA, Vienna (2022).

Acronyms

BUTE INT TR	Budapest University of Technology and Economics, Institute of Nuclear Techniques, Training Reactor
CDC	County Defence Committee
DMCC	Disaster Management Interministerial Coordination Committee
EOC	Emergency Operations Centre
EPR	Emergency Preparedness and Response
EPREV	Emergency Preparedness Review
ERP	Emergency Response Plan
HAEA	Hungarian Atomic Energy Authority
CER	Centre for Energy Research
HAZMAT	Hazardous Materials
HLWG	High Level Working Group
HNERS	Hungarian Nuclear Emergency Response System
IAEA	International Atomic Energy Agency
MHC	Ministry of Human Capacities
MoI	Ministry of Interior
NDGDM	National Directorate General for Disaster Management
NEM TSS	Nuclear Emergency Management Technical Scientific Section
NIO	National Institute of Oncology
NNERP	National Nuclear Emergency Response Plan
NPHC	National Public Health Centre
NPP	Nuclear Power Plant