FINAL EPREV REPORT

PEER APPRAISAL OF THE ARRANGEMENTS IN KAZAKHSTAN

ON PREPAREDNESS FOR RESPONDING TO A RADIATION EMERGENCY INVOLVING

THE IAEA LEU BANK (UST-KAMENOGORSK)

3–11 September 2012
Astana / Ust-Kamenogorsk, Kazakhstan

International Atomic Energy Agency

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The mission team for the emergency preparedness and response review gained access to all principal organizations, which provided excellent cooperation and valuable input at all levels, both in Astana and in Ust-Kamenogorsk. The time spent with the Kazakhstan organizational counterparts was extremely productive. The professional interest and involvement on the part of representatives from the Kazakhstan Atomic Energy Agency (KAEA), the Ulba Metallurgical Plant (Ulbinsky Metallurgichesky Zavod, UMZ) and the critical response organizations with whom the mission team interacted was vital to the success of this mission. Mr. Murat Tulegenov, Head of the Review and Inspection Division of KAEA, welcomed the mission team and provided support and information throughout the whole mission period.

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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 0[1] the IAEA has a function, if requested, to assist Member States in preparing emergency arrangements for responding to nuclear accidents and radiological emergencies.

The IAEA has initiated a project to establish a storage facility for nuclear material, called the IAEA Low Enriched Uranium (LEU) Bank, and Kazakhstan has offered to host this facility. In order to review the country's safety arrangements vis-à-vis the relevant IAEA safety standards, Kazakhstan invited the IAEA to implement its safety peer review missions. As part of this combined effort, an Emergency Preparedness Review (EPREV) was also invited.

In response to the request from the Kazakhstan Atomic Energy Agency (KAEA) the IAEA fielded an EPREV mission to Kazakhstan (specifically to Ust-Kamenogorsk, the site of the future IAEA LEU Bank) to conduct, in accordance with Article III of the IAEA Statute, a peer review of this facility's radiation emergency preparedness and response arrangements and their compliance with the relevant IAEA safety standards.

[1] The present report contains two reference lists. References in square brackets in the format [*n*] are used to refer to bibliographical sources (mainly official IAEA publications including standards and guidance documents); these are listed under REFERENCES. References using the @ symbol in the format [@*m*] refer to specific laws and regulations in Kazakhstan; these are listed in Appendix VII.

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1. INTRODUCTION

1.1. BACKGROUND

The obligations, responsibilities and requirements for preparedness for and response to radiation emergencies are set out in the IAEA Safety Standards, in particular in the Requirements publication Preparedness and Response for a Nuclear or Radiological Emergency 0. The IAEA General Conference, in resolution GC(46)/RES/9, encouraged Member States to "implement the Safety Requirements for Preparedness and Response to a Nuclear or Radiological Emergency".

In 2003, the IAEA published Method for Developing Arrangements for Response to a Nuclear or Radiological Emergency 0 (EPR-METHOD 2003) with the aim of fulfilling in part the IAEA's function under Article 5 of the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention) [1] to provide a compendium of best practices for emergency planners aiming to comply with the IAEA Requirements 0.

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In response to the request from the KAEA the IAEA fielded an EPREV mission to Kazakhstan (specifically to Ust-Kamenogorsk, the site of the future IAEA LEU Bank) to conduct, in accordance with Article III of the IAEA Statute, a peer review of the radiation emergency preparedness and response arrangements at the Ust-Kamenogorosk site and their compliance with the relevant IAEA safety standards.

As a result of the request by KAEA and following the relevant IAEA guidelines (EPREV Guidelines), a well-defined appraisal procedure was initiated. This included the following steps:

- The IAEA sent a set of specifically designed self-assessment sheets to the Kazakhstan counterpart with the request to update the information they contained and to revert them to the IAEA. The IAEA received the updated sheets prior to the conduct of the mission.
- The IAEA drew up the Terms of Reference (ToR) memorandum in June 2012 and sent it to the counterpart.
- The mission took place from 3 to 11 September 2012.

The overall objectives of this mission were to provide an assessment of the State's capability, as well as the arrangements and capabilities at the site, to respond to nuclear and radiological incidents and emergencies that can occur at the future IAEA LEU Bank site in and around the Ulba Metallurgical Plant (UMZ), Ust-Kamenogorsk. This included a review of the arrangements at the plant, outside the plant and the arrangements at the national level (legal, organizational and technical).

1.2. SCOPE

The review focused on Kazakhstan's ability to respond to a nuclear or radiological emergency associated with the IAEA LEU Bank facility in the UMZ and was based on an assessment of existing response provisions and capabilities. The mission did not conduct a detailed appraisal of the status of development of the national regulatory infrastructure – this is expected to be covered by the forthcoming IRRS mission. (However, the report of the IAEA Scoping Mission, implemented in preparation of the IRRS mission prior to the EPREV, was considered.) Instead, it focused on the national and local arrangements for radiation emergency preparedness, with special emphasis on the need to upgrade these capabilities in the near future to comply with the requirements expected for a facility hosting the IAEA LEU Bank.

The review consisted of:

- reviewing and verifying the statements made by the Kazakhstan counterparts in the self-assessment sheets;
- determining if the arrangements for preparedness and response for radiation emergencies in Kazakhstan were in conformity with the international requirements 0;
- proposing, in form of recommendations and suggestions, methods and means for achieving better compliance with the international requirements, when gaps were found, and identifying good practices, when possible. The EPR-METHOD publication 0 and the expertise of the mission team members provided the basis for these suggestions;

The review mission was designed to cover all aspects of the arrangements for emergency preparedness and response and included: on-site (facility), off-site, local (regional) and national emergency response and preparedness arrangements for all radiation emergencies that may affect the IAEA LEU Bank. When determining the scope of the mission, certain limitations had to be taken into consideration (the review part of the mission had to be completed within 5 workdays, which also included some time to be allocated for the visits to the regulatory body (KAEA) in Astana and the UMZ facility and different agencies in Ust-Kamenogorsk.

The reviews were used to benchmark emergency preparedness arrangements for responding to any radiation emergency occurring in and around the future IAEA LEU Bank.

The review considered the emergency arrangements at local and national levels in the following areas:

- Emergency management
- Emergency preparedness
- Radiation protection
- Medical response
- Public information
- National capability to support and provide training to local response teams.

The members of the mission team (see Appendix I) were selected on the basis of their relevant experience in the above areas.

The collected data and analysis contained in this report are based on presentations and discussions with representatives of key response organizations and on personal impressions obtained during these discussions. The mission concentrated on those areas that the team viewed as crucial to the establishment of a solid interim emergency response capability.

1.3 PROCESS

The general schedule for the mission established in agreement with the counterparts in Kazakhstan is shown in Appendix II. The mission team conducted interviews, reviewed the legal documents made available prior to the mission (including the draft Plan of the Republic of Kazakhstan for Response to Nuclear and Radiological Emergencies, PRNRE), visited the site of the future IAEA LEU Bank and its hosting industrial complex and reviewed the self-assessment sheets.

The mission team interacted with the following major organizations:

- Kazakhstan Atomic Energy Agency (KAEA)
- Ministry of Emergency Situations (MES)
    - State Control Committee for Emergency Situations and Industrial Safety
    - Department of Emergency Situations of the Eastern Kazakhstan Region (DES)
- Committee for State Sanitary and Epidemiology Supervision, Ministry of Health Care (CSSES):
    - Centre for Sanitary and Epidemiological Expertise in Astana
    - Committee for State Sanitary and Epidemiology Supervision – Eastern Kazakhstan Branch (CSSES-EKB)
    - Ust-Kamenogorsk Department of CSSES-EKB
- Ministry of Environmental Protection (MoE):
    - Committee of Ecological Regulation and Control
    - Republican State-Owned Enterprise "Kazhydromet"
- Ulba Metallurgical Plant Joint Stock Company (UMZ)
    - Division of Industrial Safety (UMZ-DIS)
    - Division of Uranium Production (UMZ-DUP)
- Ministry of Environmenal Protectiont (MoE) – Ust-Kamenogorsk Branch (MoE - UK)

1.4 INPUTS AND GUIDANCE FOR THE ASSESSMENT

The EPREV mission was conducted in accordance with the **Terms of Reference (ToR)**, developed and adopted between June and August 2012, which are provided in Appendix VI.

The **self-assessment sheets** provided an important contribution for the assessment of the country's radiological emergency preparedness and response capabilities.

A set of legislative and planning documents (e.g. laws, decrees, relevant decisions, ordinances and regulations, PRNRE), as well as presentations on the roles and functions of the agencies visited, were obtained during the mission.

According to the IAEA categorization of radiation related threats in GS-R-2, Ref. [2], Kazakhstan is currently a country with facilities and practices belonging to threat categories II, III, IV and V. The UMZ itself, on the basis of its past and current activities, is listed as a category II facility in the draft national radiation emergency plan (Chapter 2 of the PRNRE). This means that the emergency preparedness arrangements in Ust-Kamenogorsk have to meet the requirements requested for such a facility. It is to be noted that the storage of uranium hexafluoride in the IAEA LEU Bank, according to the categorization of the EPR-METHOD [3], would not fall into any of the five threat categories of GS-R-2, Ref. [2].

2. SUMMARY OF FINDINGS

2.1. INTRODUCTION

The mission team formulated recommendations and suggestions on the basis of the findings of the mission. The recommendations need to be addressed in order to comply with the IAEA Requirements 0; these are therefore stated as actions that *must* be implemented (with the specific corresponding paragraph in the IAEA Requirements 0 shown in a separate paragraph entitled 'BASIS'). To help implement the recommendations, the mission team put forward suggestions for better meeting the IAEA requirements. The team also highlighted good practices whenever these were deemed justified.

In order to maintain the momentum from recent activities (including this mission) and to facilitate the smooth preparation and implementation of the IAEA LEU Bank project, it is suggested that Kazakhstan make sufficient efforts to implement the actions arising from the findings in this report, that these actions be assigned high priority and that they be completed within the shortest reasonable time, with the support of the IAEA, if necessary.

The mission looked into the following questions:

- Is the legal and regulatory system in Kazakhstan sufficient to guarantee that the arrangements for responding to any radiation incident or emergency in the future IAEA LEU Bank site (UMZ, Ust-Kamenogorsk) are established and operated in compliance with the IAEA safety standards [2]?
- Are the practical arrangements in Ust-Kamenogorsk (within the site of UMZ and off the site) in place to facilitate appropriate emergency response in any credible radiation emergency scenario?
- What are the steps to be taken if some of the requirements of the IAEA are not fully complied with? What recommendations and suggestion can be given to achieve better compliance within the shortest possible time?

The major conclusion made by the EPREV team, after reviewing the materials presented and gaining insights into the national EPR legal framework in Kazakhstan as well as the local arrangements in Ust-Kamenogorsk, is that the country has established the legal framework for radiological and nuclear emergency preparedness and response (EPR). The concept is based on an integrated, all-hazard approach, part of the State System for Prevention and Liquidation of Emergencies (SSPLE), under the coordination of the Ministry of Emergency Situations, in which the country's nuclear regulatory body, the KAEA, has an important role. The EPREV team recognized the level of knowledge and dedication of the counterparts and very much appreciated their strong commitment to further improve their capabilities and harmonize them with the international standards.

This visit confirmed the notion that the IAEA LEU Bank will not be established in a vacuum and built up from scratch, but rather, will be housed by a licenced nuclear facility with decades of operational experience (and good safety records in respect of the occurrence of radiation emergencies), under the regulatory oversight of the KAEA (former KAEC), in cooperation with the Ministry of Emergency Situations (MES). Although this circumstance

does not provide guarantees for the future, it indicates that a well-functioning system is in place for operating and regulating the facility in which the IAEA LEU Bank will be located.

The mission team also found that the operator of the Ulba Metallurgical Plant (which is under regular IAEA Safeguards inspection) has a fully developed and maintained system to respond to radiation emergencies. The activities for which the UMZ has been licensed fall into a higher threat category (category II, according to Ref. [2]) than the handling and storage of the LEU containing cylinders. The plant observes all the requirements concerning radiation protection, industrial safety, emergency preparedness etc. in fulfilment of the provisions of the operating license.

Additionally, interviews with local and national off-site responding organizations (Ministry of Emergency Situations, Ministry of Health Care, Ministry of Environment and their corresponding local representatives) indicated that there is a good coordination and cooperation between the operator, as on-site responder, and the other authorities that are responsible for the off-site response in case of a radiation emergency.

In spite of the above positive general findings and with due consideration of the special status of the LEU Bank (especially the IAEA ownership), the team found reasons to recommend (or simply to suggest) a number of steps to improve the prevailing situation and to achieve better compliance with the IAEA standards (with special regard to Ref. [2]).

The EPREV mission team has formulated the following recommendations and suggestions. (A detailed description of the findings regarding the individual general, functional and infrastructural requirements is given in Chapter 3.)

2.2. RECOMMENDATIONS

- **R.2.1.** The draft **national radiation emergency plan** (PRNRE) should be finalized (taking into account the comments of the IAEA reviewers), approved and published as soon as possible.

- **R.3.1.** Regulations on preparedness and response to radiation emergencies should be reviewed and amended to enable the use of the **threat categorization** in accordance with international standards [2]. This categorization should then be applied to all nuclear installations and radiation sources in Kazakhstan, including UMZ.

- **R.3.2.** The threat associated with the establishment of the IAEA LEU Bank should be assessed through a thorough **safety assessment** process.

- **R.3.3.** The **non-radiological hazard** should also be considered during the threat assessment.

- **R.5.1.** A **direct notification and communication link with the IAEA IEC**, in parallel with the KAEA, must be established and maintained 24 hours a day/7 days a week.

- **R.7.1.** **Intervention levels** for taking urgent protective actions in the event of radiation accidents should be reviewed and revised, according to the relevant new international standards [4, 5].

- **R.8.1.** Procedures need to be established for **providing information** in the event of a nuclear accident to the personnel of the "KazZink" enterprise and other facilities in the sanitary protection zone of UMZ.

- **R.9.1.** Methods for the assessment of **internal contamination** should be made available for the investigation of the radionuclides incorporated internally in the body of emergency workers during and after responding to a radiation emergency (whole body counting, bioassay etc.)

- **R.9.2.** A method for **dose assessment in the event of a criticality accident** should be reviewed against international standards and guidelines and made available.

- **R.9.3.** Individual dosimeters used for accidental **dosimetry** at the site should be upgraded (readable and TLD for Hp(10)).

- **R.10.1. Operational intervention levels** (OILs) for urgent protective actions and for food restriction should be established and made part of the appropriate regulations, the PRNRE and the facility emergency plans.

- **R.11.1.** Procedures for **avoiding the spread of contamination** during evacuation of contaminated casualties should be clearly defined in the plans, in accordance with international standards and guidelines [7].

- **R.11.2.** A **referral medical institution** for specialized medical treatment of seriously overexposed persons has to be selected, provided with suitable equipment and its staff adequately trained.

- **R.15.1.** The existing UMZ **site emergency response plan** should be reviewed using the services of the IAEA.

- **R.15.2.** An analysis of additional needs for **radiation detection systems** and/or other monitoring equipment necessary for the response to emergency situations involving the IAEA LEU Bank and of necessary equipment for the first responders needs should be carried out.

- **R.15.3.** A clear policy for **public information** should be defined for the coordination of the information from a single point during a radiation emergency.

2.3. SUGGESTIONS

- **S.5.1.** Make efforts to **harmonize the classification system** used by the operator (in accordance with the IAEA standards) and the classification used by the main off-site response coordinator, MES.

- **S.5.2.** Establish a **continuous air monitoring system** (continuous air sampling and laboratory analysis of the samples) that can detect short releases of UF_6 from the containers.

- **S.9.1.** It is suggested that the **individual dosimetric and protection equipment** be thoroughly examined and replaced, when necessary.

- **S.9.2.** It is suggested that a **biodosimetry** service (laboratory) be organized in the Republic of Kazakhstan

- **S.12.1.** Emergency **information** and emergency instructions should be in plain language, developed in advance and suitable for a variety of situations (as described in Ref. [3]). The roles and responsibilities of the responsible organizations should be well defined and the person designated to act as spokesperson stipulated in the national plan. These arrangements have to be tested by conducting exercises with the **mass media**.

- **S.14.1.** Instructions and **information to the public** should be well prepared and defined in any level of emergency situation (e.g. at the facility, provincial and national levels). Local DES and the health authorities should address this issue.

- **S.15.1.** UMZ in cooperation with KAEA and MES should consider the organization of national/regional **training courses for first responders to radiation emergencies**, based on the IAEA training materials for first responders and with IAEA support. A component on radiation safety during severe accident conditions should also be included in the training programme.

- **S.15.2.** Guidance on the establishment and maintenance of a **quality assurance programme** for all stakeholders should be developed and integrated in the PRNRE. The programme will ensure a high degree of availability of all supplies and equipment necessary to perform an effective response. Maintenance of the existing resource catalogue could be an integral part of this programme.

3. DETAILED FINDINGS

3.1. INTRODUCTION

Kazakhstan has in place a comprehensive legislative framework that defines and allocates responsibilities for the management of all types of emergencies, including radiation emergencies.

The following types of legally binding documents are used to regulate the use of atomic energy in Kazakhstan:

- Decree by the President of the Republic of Kazakhstan
- Codes and laws of the Republic of Kazakhstan
- Decrees by the Government of the Republic of Kazakhstan
- Orders of the Ministries of the Republic of Kazakhstan
- Regulations of the regulatory body of the Republic of Kazakhstan – KazakhstanAtomic Energy Agency
- Technical standards of the Republic of Kazakhstan, which become legally binding when referred to in legal documents or in licenses.

In the area of radiation emergency preparedness and response, at the highest level of the legislative framework are the Law on the Use of Atomic Energy No. 93 of 1997 [@075] and the Law on Radiation Safety of the Population No. 219 of 1998 [@078]. The Law on Civil Defence No. 100 of 1997 [@076] establishes the responsibilities of the central, regional and local public administrations for civil protection in emergency situations. The Law on Industrial Safety No. 314 of 2002 [@106] provides the requirements for industrial facilities using hazardous materials and technologies. Also important is the Law on Natural and Man-made Emergencies No. 96 of 1996 [@073], which defines the competence of public administration bodies at all levels and facilities for the prevention of and response to all kinds of emergencies.

The roles and responsibilities of the different government agencies, non-governmental organizations and licensees, regarding nuclear and radiological safety and radiation emergency preparedness and response, are defined in various legislative documents. The most important elements of this scheme of responsibilities are described in Chapter 3.2 below.

3.2 BASIC RESPONSIBILITIES

In connection with the requirements set out in Ref. [2] for basic responsibilities, the following appraisal criteria were investigated:

i. Establish or identify an existing governmental body or organization to act as a national coordinating authority (NCA).
ii. Clearly assign the functions and responsibilities of users and response organizations and ensure they are understood by all response organizations.

iii. Establish a regulatory and inspection system that provides reasonable assurance that emergency preparedness and response arrangements are in place for all facilities and practices.

3.2.1. Current situation

Ref. to (i): The Ministry of Emergency Situations (MES) is assign by Law [@073] and governmental decree [@018] as a National Coordinating Authority for any emergency of natural or man-made, including nuclear or radiological emergency.

At the national level, coordination of emergency preparedness and response is organized in the framework of the State System for Prevention and Liquidation of Emergencies (SSPLE) [@009]. The State Commission for Prevention and Liquidation of Emergencies (SCPLE) is the highest authority at the national level of SSPLE [@008, @016]. The minister of MES heads this commission. MES plays a leading role of organizing and operating the SSPLE.

At local level (administrative unit of "oblast") the Oblast Commission for Prevention and Liquidation of Emergencies (OCPLE) [@105] is the second highest authority of the SSPLE. In Eastern Kazakhstan Oblast the oblast OCPLE is headed by the akim (Governor) of the oblast. The Department of MES for the Eastern Kazakhstan Oblast (DES) plays the role of the coordinating authority at oblast level.

At the facility level of the SSPLE, the licensee plays the leading role in preparedness and response for any emergency, including radiation emergency. In accordance with Kazakhstan regulations, an operator of a dangerous facility has the primary responsibility for the protection of the workers and the public in the event of emergency [@106]. In accordance with Article 5 of the Emergency Law [@073] the operator of a radiological or nuclear facility is responsible for the radiation protection of the workers on-site and the public off-site within the territory of the emergency planning zone around the facility.The radiation emergency plan of UMZ [@104] contains special provisions for the implementation of protective measures off-site.

The Law On Industrial Safety [@106] (Chapter 4), Technical Requirement for Nuclear and Radiation Safety (Chapter 3) (12) and the Law On Use of Atomic Energy [@075] require the licensees of radiological and nuclear practices to have a "facility plan" for protection of the workers and the public in case of a radiation emergency. The responsibilities of UMZ in relation to protection of workers and the public in case of radiation emergencies as the operator of nuclear, chemical and radiation facilities are described in [@104] and in the draft national radiation emergency plan, PRNRE [@005].

The Kazakhstan Atomic Energy Committee (KAEC), under the Ministry of Industry and New Technologies (MINT) was the regulatory body covering all regulatory aspects related to nuclear energy and ionizing radiation. Recently KAEC became the Kazakhstan Atomic Energy Agency (KAEA) [@041, @043, @046, @047, @096], with more power and responsibilities, reporting directly to the Prime Minister.

Ref. to (ii): The functions of an operating organization are defined by its license. From the emergency preparedness point of view, an operator is responsible for the on-

site response. The functions of the other organizations are defined by the draft national radiation emergency plan, PRNRE (Chapter 3);

Ref. to (iii): The license is issued if an emergency plan is presented, so the submission of an emergency plan is a precondition for the issue of a license.

3.2.2 Recommendations

R.2.1. The draft national radiation emergency plan (PRNRE) should be finalized (taking into account the comments of the IAEA reviewers), approved and published as soon as possible.

BASIS:

Ref. [2], para. 5.13 states that *"Plans or other arrangements shall be made for co-ordinating the national response to the range of potential nuclear and radiological emergencies. These arrangements for a co-ordinated national response shall specify the organization responsible for the development and maintenance of the arrangements; shall describe the responsibilities of the operators and other response organizations; and shall describe the co-ordination effected between these arrangements and the arrangements for response to a conventional emergency. The arrangements should include provisions that can be used to formulate in detail a response to situations such as: a serious exposure or contamination resulting from contact with a source by a member of the public; the notification of a potential transboundary release of radioactive material; the discovery of a shipment containing a dangerous source that is not under control; the notification of the potential re-entry of a satellite; public concern or rumours about a threat; and other unanticipated situations warranting a response."*

3.3. ASSESSMENT OF THREATS

Regarding the requirements set out in Ref. 0 for threat assessment, the following appraisal criterion was investigated:

i. Perform threat assessments for the facilities and activities in the State; and categorize them in accordance with the five threat categories in Table I of Ref. [2].

3.3.1. Current situation

Paragraph 3 of the Technical Regulation on Nuclear and Radiation Safety [@032] and paragraph 15 of the Sanitary Rules for Sanitary and epidemiological requirements for radiation safety [@040] provide a categorization of radiation hazard of Nuclear and Radiation Facilities (NRF) as follows:
1) Category I includes facilities for which emergencies have been postulated that could result in a possible radiation impact on the population outside of the sanitary protection zone of NRF and may need implement actions to protect population;
2) Category II includes facilities for which emergencies have been postulated that could result in a possible radiation impact inside the sanitary protection zone of NRF;

3) Category III includes facilities for which emergencies have been postulated that could result in a possible radiation impact inside the site of NRF;
4) Category IV includes facilities for which emergencies have been postulated that could result in a possible radiation impact on the premises of NRF.

Regulations [@040, @036] define the sanitary protection zone of NRF as an area separating the area of special purpose, industrial organizations, and other industrial, utility and storage facilities in the settlement (on-site area) from the surrounding residential areas and buildings in order to reduce public exposure to adverse factors.

The radiation hazard categorization used in Kazakhstan is not fully consistent with the threat categorization provided in the relevant IAEA standards [2].

There are no category I facilities in the country. The facilities, which present higher risk, are classified as category II and are the following:

1) Reactor BN-350 (being decommissioned) (Aktau, Mangistaur Oblast);
2) Research reactor VVR-K, Institute of Nuclear Physics of the National Nuclear Center of the Republic of Kazakhstan (Almaty, Almaty Oblast);
3) Research reactors IVG-1M, IGR and RA of the Institute of Atomic Energy, National Nuclear Center of the Republic of Kazakhstan (Kurchatov, East Kazakhstan Oblast);
4) UMZ, producing fuel pellets of uranium dioxide for nuclear power reactors (Ust-Kamenogorsk, East Kazakhstan Oblast).

PRNRE lists medical applications using gamma sources (mainly oncology), industrial applications using radiation sources (particularly in radiography) or the production of sealed sources of ionizing radiation, scientific enterprises with powerful radioactive sources, etc. as category III and IV facilities. The nearest nuclear power plant (NPP Balakovo) is located 300 km from the border of Kazakhstan in the Russian Federation. The Production Association MAYAK is the other nuclear facility in the Russian Federation, which is located 200 km from the border of Kazakhstan. The research reactor of the Institute of Nuclear Physics (Ulugbek, Tashkent Oblast of Uzbekistan) lies at about 10 km from the border of Kazakhstan. Preparedness for a category V threat is mainly related to these nuclear facilities.

The threat classification of UMZ was discussed during the visit to the site and there was a common understanding regarding the threat classification (category II) according to Ref. [2]. There is, however, some confusion about this categorization: the UMZ plant itself was categorized as a category II and category III facility in different contexts.

The project of the new facility (the IAEA LEU Bank) on UMZ premises in connection with existing facilities should be evaluated from the point of view of safety in line with the Law [@106] and Regulation [@061] (in the framework of the Safety Assessment Report) [@067], which should be a basis for the future improvement of emergency arrangements and plans (for the facility and off-site) with special attention to criticality accidents or dispersion as a result of an explosion with consequences for both on-site and off-site areas. (NOTE: EPR-METHOD [3] does not

consider UF_6 under any threat category from a radiation hazard point of view, while it does emphasize the chemical toxicity hazard.) A criticality accident is considered by all parties (UMZ, KAEA and MES) as a credible scenario. Safety assessment studies for UMZ have been conducted in the past in relation to the licensing process (the safety analysis report was prepared by the Institute for Nuclear Power Engineering (IPPE) in Obninsk, Russian Federation, for the licensed nuclear fuel fabrication activities). Such a safety analysis would be necessary for the contemplated IAEA LEU project, but would require a full technical definition of the project. The use of foreign expert organizations and foreign regulations for licensing radiation and nuclear facilities in Kazakhstan is regulated by the provisions of paragraph 19, Chapter 4 of Ref. [@032].

In accordance with the Law on the Use of Atomic Energy [@075] and the Law on State Control and Supervision of the Republic of Kazakhstan [@088], a Ministerial Order "On approval of the criteria for assessing the risk of subjects in the field of private enterprises in the field of nuclear energy" was published in 2011 [@092]. The order introduces three categories of risks: high, medium or low risk. The group of high-risk subjects are in private business in nuclear energy, which operate nuclear facilities (reactor systems, enterprise production of uranium dioxide pellets to fuel nuclear reactors) providing transportation and long-term storage of spent nuclear fuel. There are no links between the risk categories (as defined above) and the hazard categories in regulations [@032, @040]. It is understood that this risk categorization was established only for the purpose of defining the periodicity of different inspections in the risk facilities.

In accordance with the conditions and requirements for obtaining a license, prior to the commissioning of a facility, the operator (licensee) is required to perform an assessment of the types of potential nuclear (radiation) accidents that may occur in the facility, with a prediction of their likely consequences. The emergency plan of the facility needs to be commensurate with the results of this assessment.

3.3.2. Recommendations

R.3.1. Regulations on preparedness and response to radiation emergencies should be reviewed and amended to enable the use of the threat categorization in accordance with international standards [2]. This categorization should then be applied to all nuclear installations and radiation sources in Kazakhstan, including UMZ.

BASIS:

Ref. [2], para. 3.6 states that "*3.6. For the purposes of the requirements nuclear and radiation related threats are grouped according to the threat categories shown in Table I. The five threat categories in Table I establish the basis for developing generically optimized arrangements for preparedness and response. Threat categories I, II and III represent decreasing levels of threat at facilities and in the corresponding stringency of requirements for preparedness and response arrangements. Threat category IV applies to activities that can lead to emergencies occurring virtually anywhere; it is also the minimum level of threat, which is assumed to apply for all States and jurisdictions. Threat category IV always applies to all*

jurisdictions, possibly together with threats in other categories. Threat category V applies to the off-site areas where arrangements for preparedness and response are warranted to deal with contamination resulting from a release of radioactive material from a facility in threat category I or II."

R.3.2. The threat associated with the establishment of the IAEA LEU Bank should be assessed through a thorough safety assessment process.

BASIS:

Ref. [2], para. 3.15 states that "*The nature and extent of emergency arrangements [for preparedness and response] shall be commensurate with the potential magnitude and nature of the [threat]… associated with the facility or activity." (Ref. [10], para. 6.4.) The full range of postulated events shall be considered in the threat assessment.*"

R.3.3. The non-radiological hazard should also be considered during the threat assessment.

BASIS:

Ref. [2], para. 3.18 states that "*Non-radiological threats (such as the release of uranium hexafluoride (UF_6) or other hazardous chemicals) to people on and off the site that are associated with the practice shall be identified in the threat assessment.*"

3.4. ESTABLISHING EMERGENCY MANAGEMENT AND OPERATIONS

Regarding the requirements set out in Ref. [2] for establishing emergency management and operations, the following appraisal criteria were investigated:

i. Make arrangements to coordinate the emergency response of all the off-site response organizations with the on-site response to include a command and control system for the local and national response to any nuclear or radiological emergency.
ii. Make arrangements for the appraisal of the information necessary for decision making on the allocation of resources throughout the emergency.

3.4.1. Current situation

Ref to (i): A system is in place for the coordination of the response in the event of a radiation emergency. The on-site (and partly the off-site) response is carried out by the operator, in accordance with its emergency plan, and implemented by the operator's own emergency personnel. Off the site, the Department of Emergency Situations of the East Kazakhstan Region (DES) is in charge of coordinating the implementation of the protective measures, based on their plan and on the decisions made by the Eastern Kazakhstan regional Commission on Emergency Situations.

There is a good cooperation between the UMZ operator and the regional DES. Emergency response capabilities are regularly tested by holding exercises (within the facility and at a joint level).

Ref to (ii): DES indicated that it was capable of establishing and maintaining the necessary information gathering functions in relation to an emergency and to the availability and allocation of the necessary resources.

3.5. IDENTIFYING, NOTIFYING AND ACTIVATING

Regarding the requirements set out in Ref. [2] for identifying, notifying and activating, the following appraisal criteria were investigated:

i. Establish 24 hours/day, 7 days/week contact point.
ii. Ensure first responders are aware of: the symptoms, the appropriate notification and other immediate actions warranted if an emergency is suspected.
iii. Establish a system for promptly initiating an off-site response in the event of an emergency.
iv. Ensure response organizations have sufficient personnel.
v. Make known to the IAEA and other States the State's single warning point of contact responsible for receiving emergency notifications and information from other States and information from the IAEA.
vi. Have arrangements in place to provide a response to an emergency for which detailed plans could not be formulated in advance.

3.5.1. Current situation

Ref. to (i): In the Republic of Kazakhstan the emergency telephone number 112 notification system is fully operational and the regional notification centres within this system take over the main burden of notifying and activating authorities at all levels.

KAEC was acting as the National Warning Point pursuant to the Convention on Early Notification of a Nuclear Accident (Early Notification Convention) and Assistance Conventions [1]. After reorganization of KAEC into the KAEA contact details were not upgraded until recently. KAEA has no possibility to operate a National Warning Point on a 24 hours/day, 7 days/week basis.

Ref. to (ii): On-site responder teams are organized at all departments of UMZ and are properly trained according to the existing radiological threats. Off-site responders are coordinated by DES, attend regular training and retraining that includes radiation basics and work under the supervision of the operator’s radiation protection service when involved in response activities within the facility. The UMZ radiation protection service has an emergency kit with about 40 individual dosimeters (of the ID-11 type) for off-site responders. The radiation protection service has medical responders who have the required knowledge (plant responders have more experience in radiation emergency response than off-site responders).

Ref. to (iii): There is a system in place for the initiation and activation of the responses in the event of an emergency in Kazakhstan [@004]. The on-site response is done by the operator, in accordance with its emergency plan, and carried out by the operator's own emergency personnel. The off-site response is organized by the regional departments of MES.

For the purpose of classifying emergencies, there is a four-step emergency classification system by the operator that provides for "Alert", "Facility emergency", "Site emergency" and a class for "General emergency" [@045]. This system is similar to the generic classification of nuclear and radiological emergencies provided in Ref. [2]. The classification of emergencies for UMZ has three classes, where site and facility emergencies are merged in one class of "Site (facility?) emergency" [@104].

A draft Regulation on the transport of nuclear material and radiation sources [@053] in paragraph 303 provides a specific categorization of radiation emergencies arising from the transport of radioactive and nuclear material, which is completely different from the classification in GS-R-2 0 and other Kazakhstan regulations [@045].

MES uses a classification of emergencies [@020] that has one category of "Site emergency" for any on-site emergency, when the off-site public is not affected, and three categories ("Local emergency", "Regional emergency" and "Global emergency") for events with off-site consequences, depending on the number of casualties, material loses and territory affected [@020]. This classification provides a graded approach in evaluation of off-site emergency conditions in analogy with the INES scale expanding the class of "General emergency" defined in Ref. [2] into the four levels (Levels 4 to 7) of INES. It is not clear how the deviating on-site and off-site emergency classifications match in Kazakhstan. A harmonization of these systems seems to be necessary.

The UMZ has an identifying, notifying and activating service which operates 24 hours/day and 7 days/week.

Radiation monitors for detection of criticality are positioned in areas where enriched uranium is present. Criticality monitoring consists of three gamma dose rate detectors. A criticality alarm is activated if any two of three detectors register a dose rate above the reference level. The number and position of monitors and the radiation reference level are displayed on a site diagram. Currently there is one criticality monitor in the storage area.

The level of ground-water is also monitored in the storage area for the prevention of a potential criticality emergency. An alarm is activated if the detector registers water exceeding the reference level. The number, position of water monitors and the water reference level are displayed in the same site diagram. Currently there are two water monitors in the storage area.

Air sampling is done with certain regularity to check the possible leakage of UF_6 from the containers but there is no continuously operating sampler and hence shorter episodes of leakages of UF_6 from the cylinders can remain undetected.

Any activation of the alarm system in the storage facility sends a signal to the on-duty operator of the storage facility, to the on-duty radiation protection officer and to the on-duty dispatcher ("night director") of the UMZ. Response actions on the alarm on the site and off the site are defined in the facility and working place emergency instructions and in the facility emergency plan, UMZEP [@104].

In case of any emergency, the on-duty despatcher activates the UMZ Operational Group (UMZOG) for evaluation of the accident, which assesses the event and takes a decision on the implementation of protective actions in accordance with the UMZEP. The Head of UMZOG is the Chief Physicist, a person responsible for radiation and nuclear safety at UMZ. In the event of a severe accident, when implementation of off-site protective measures is expected, the UMZOG activates the UMZ Headquarters for liquidation of emergency (UMZEH). The Head of UMZEH is the Director for Industrial Safety. UMZEH takes a decision about the activation of the oblast level response, if needed.

In the event of a general emergency, the UMZ is responsible for the implementation of protective actions regarding the protection of the public off the site [@104].

Ref. to (iv): Based on the interviews in UMZ and with the local authorities in Ust-Kamenogorsk, this requirement is complied with.

Ref. to (v): For the purpose of early notification of an incident or emergency to the IAEA, as the LEU Bank owner, and to the national regulatory authority, a direct contact in parallel with the IAEA IEC and the KAEA needs to be established and maintained 24 hours a day/7 days a week. This communication link does not exist yet.

Ref. to (vi): Resources can be mobilized through MES. Radiological expertise can be brought in from Kurchatov and Semipalatinsk (both in the East Kazakhstan Oblast). Additional assistance can be organized through the IAEA (Kazakhstan is party to the Assistance and Early Notification Conventions).

3.5.2. Recommendations

R.5.1. A direct notification and communication link with the IAEA IEC, in parallel with the KAEA, must be established and maintained 24 hours a day/7 days a week.

BASIS:

Ref. [2], para. 4.16 states that *"Notification points shall be established that are responsible for receiving emergency notifications of an actual or potential nuclear or radiological emergency. The notification points shall be continuously available to receive any notification or request for assistance and to respond promptly or to initiate an off-site response."*

3.5.3. Suggestions

S.5.1. Make efforts to harmonize the classification system used by the operator (in accordance with the IAEA standards) and the classification used by the main off-site response coordinator, MES.

S.5.2. Establish a continuous air monitoring system (continuous air sampling and laboratory analysis of the samples) that can detect short releases of UF_6 from the containers.

3.6. TAKING MITIGATORY ACTIONS

Regarding the requirements set out in Ref. 0 for taking mitigatory actions, the following appraisal criteria were investigated:

i. Make arrangements to provide expertise and services in radiation protection promptly to local officials and first responders responding to actual or potential emergencies involving practices in threat category IV.
ii. The operator of a practice in threat category IV shall be given basic instruction.
iii. Make arrangements for mitigatory action to prevent an escalation of the threat; to return the facility to a safe and stable state; to reduce the potential for releases of radioactive material or exposures; and to mitigate the consequences of any actual releases or exposures.

3.6.1. Current situation

Ref to (i): Licensing for the transport of nuclear and radioactive material in the Republic of Kazakhstan is carried out by the Transport Control Committee of the Ministry of Transport and Communication. The existence of an emergency plan is a precondition for issuing a transport license.

Only the transport of nuclear material and radiation sources by the Kazakhstan National Railway Company (Kazakhstan Temir Zholy) to/from UMZ was considered by the IAEA team while evaluating this functional requirement for practices in threat category IV.

There are no regulations on safe transport of nuclear material and radation sources in force in Kazakhstan. The former Regulation on safe transport of radioactive material of 2004 and Regulations on mitigation of an emergency situation arising from the transport of nuclear material by road transport of 2000 were abolished by KAEC in 2009. The regulation on mitigation of an emergency situation arising from the transport of radioactive material by rail transport from 1999 was abolished by governmental decision in 2005. In 2011, KAEC prepared a draft regulation on the transport of nuclear material and radiation sources [@053], which has not been approved until now.

Ref. to (ii): The Kazakhstan National Railway Company, which is considered as the only licensed operator for the transport of nuclear material and radiation sources

throughout the territory of Kazakhstan, has drawn up instructions on how to proceed in the event of a transport accident. UMZ professional teams are planned to be involved in carrying out works on location in the event of a transport accident involving nuclear material on the railways.

UMZ has arrangements and plans on how to respond to an accident involving nuclear material during transport by rail. These plans are tested during dedicated periodical training sessions and exercises. Accidents in practices in threat category IV are simulated in periodic training exercises and drills. Emergency response teams composed of UMZ experts are trained to perform in search and recovery actions that result from transport accidents involving nuclear material.

Ref to (iii): All responders, including railway staff and physical protection guards, are instructed in how to prevent escalation of the threat, how to reduce the potential of overexposure and how to mitigate the consequences of accidents involving nuclear material.

3.6.2. Good practice

GP.6.1. Top management of UMZ, in coordination with the regional DES, includes training and exercises on response to accidents of threat category IV in the annual exercise plans; off-site response organizations are invited as participants or observers.

3.7. TAKING URGENT PROTECTIVE ACTION

Regarding the requirements set out in Ref. 0 for taking urgent protective actions, the following appraisal criteria were investigated:

i. Adopt national intervention levels for taking urgent protective actions in accordance with international standards.
ii. Make arrangements for effectively making and implementing decisions on urgent protective actions to be taken off the site.
iii. Make arrangements to ensure the safety of all persons on the site in the event of a nuclear or radiological emergency.

3.7.1. Current situation

Ref. to (i): The national intervention levels have been adopted in accordance with international standards that are just phasing out (old BSS) [@040]. There is a need to update the intervention levels to comply with the new safety standards [4, 5].

Ref. to (ii): There are a few installations in Kazakhstan in which arrangements for urgent protective action off the site should be planned; these are limited to category II facilities.

Urgent protective action may be triggered on Kazakhstan territory in the event of severe accidents at category II facilities or of a significant release of radioactive material due to a serious accident at a nuclear power plant or other nuclear facilities in

neighbouring countries (the closest nuclear power plant lies at a distance of 300 km, for further details, see Section 3.3.1). Although the risk for such trans-boundary radiological impact is of very low probability, in the light of Chernobyl experience and recent lessons learned from Fukushima, the mission team supports the understanding that attention has to be also paid to planning appropriate urgent action upon the notification of a severe accident at a nearby nuclear power plant.

In case of emergencies affecting the public, the decision on implementation of urgent protection actions is taken by the local and/or regional Emergency Commissions/officials in coordination with the competent territorial department of the Ministry of Emergency Situations, in accordance with the local/regional off-site emergency plan. Radiation emergencies are considered as one of several kinds of emergencies covered by the off-site plans. There is a close coordination between the on-site and off-site response actions.

Based on the discussions during the visit to UMZ, the decisions on the implementation of urgent protective actions are taken by the UMZ emergency management organization, in accordance with the facility emergency plan, on the site and off the site and in the emergency planning zone in the vicinity of the plant (except for the workers of other plants in the planning zone). The term 'emergency planning zone' (EPZ) is introduced in regulation [@032]. In paras 6 and 7 of Chapter 1, the Civil Protection Regulation [@002] defines the suggested sizes for these zones for nuclear power plants and for chemical hazardous facilities. Paragraph 51 of the Regulation on the Siting of Radiation and Nuclear Facilities, Ref. [@072], provides for the suggested maximal sizes of the EPZ for radiation hazardous facilities, depending on their hazard category, as follows:

- EPZ for a hazard category I facility – 25 km;
- EPZ for a hazard category II facility – 10 km;
- EPZ for a hazard category III facility –5 km.

For hazard category IV facilities, an EPZ does not need to be established.

Zoning is based on the safety assessment [@067]. A map of the emergency planning zone is not included in the UMZ radiation emergency plan [@104]. The emergency planning zone should be bigger than the sanitary protection zone of UMZ, a map of which was presented to the EPREV team. In accordance with the categorization of UMZ as a facility in threat category II, UMZ's emergency planning zone radius should not exceed 10 km.

Further off the site, decisions on the implementation of urgent protective actions are made by local and/or regional officials, in coordination with the competent territorial department of the Ministry of Emergency Situations, in accordance with the local/regional off-site emergency plan.

MES provides detailed guidance for implementation of urgent protective actions [@001, @014, @021].

Ref. to (iii): The arrangements to ensure the safety of all persons on-site (threat categories II and III) are addressed in the facility emergency plans. The appropriate

on-site emergency management is a part of the operating procedures (safety requirements and emergency handling), which are a prerequisite for issuing a license for commissioning the facility.

3.7.2. Recommendations

R.7.1. Intervention levels for taking urgent protective actions in the event of radiation accidents should be reviewed and revised, according to the relevant new international standards [4, 5].

BASIS:

GS-R-2, para. 4.45 states that *"Optimized [national] intervention levels [for taking urgent protective actions] shall be [established that are in accordance with international standards], modified to take account of local and national conditions, such as: (a) the individual and collective [doses] to be averted by the intervention; and (b) the radiological and non-radiological health risks and the financial and social costs and benefits associated with the intervention."*

3.8. PROVIDING INFORMATION AND ISSUING INSTRUCTIONS AND WARNINGS TO THE PUBLIC

Regarding the requirements set out in Ref. [2] for providing information and issuing instructions and warnings to the public, the following appraisal criterion was investigated:

i. Make arrangements to promptly provide warning and instruction to the permanent, transient and special population groups or those responsible for them, and to special facilities in the emergency zones upon declaration of an emergency class.

3.8.1. Current situation

Alarm and communication systems are established at the UMZ site. Sirens are installed in the facility and in the town. Plans contain procedures for providing warnings and instructions through the mass media (local radio, TV) and local mobile telephone networks. DES and the UMZ are responsible for this. There are regulations on communications in an emergency. On-site and off-site warning systems (sirens) are connected into one common network and can be activated separately by the site for on-site announcements or for the entire Ust-Kamenogorsk city by DES.

Independent radio communication with outside response organizations is also available.

There are no procedures established for providing information and issuing instructions to the neighbouring "KazZink" enterprise and other facilities in the sanitary protection zone of UMZ.

3.8.2. Recommendations

R.8.1. Procedures need to be established for providing information in the event of a nuclear accident to the personnel of the "KazZink" enterprise and other facilities in the sanitary protection zone of UMZ.

BASIS

GS-R-2, paras. 4.55, states that *"Arrangements shall be made for facilities in threat category I or II to provide promptly a warning and instruction to permanent, transient and special population groups or those responsible for them and to special facilities in the precautionary action zone and the urgent protective action planning zone upon declaration of an emergency class. This shall include instructions in the Kazakh, Russian and English languages on the immediate actions to be taken."*

3.9. PROTECTING EMERGENCY WORKERS

Regarding the requirements set out in Ref. 0 for providing protection for emergency workers, the following appraisal criterion was investigated:

i. Make arrangements for taking all practicable measures to provide protection for emergency workers and response personnel.

3.9.1. Current situation

In Kazakhstan, the requirements on protection for emergency workers and all other specialists involved in response to an emergency are stipulated by the Law on Rescue Services and Status of Rescuer No. 87 of 1997 [@074], Law on Radiation Protection of the Public No. 219 of 1998 [@078], Sanitary Rules Sanitary Epidemiological Reguirements to Radiation Safety Assurance [@040], Hygienic Norms Sanitary Epidemiological Reguirements to Radiation Safety Assurance, [@039] and other subordinated regulations.

The term 'emergency worker' is not used in the Kazakhstan regulation but rather, the term 'persons recruited for response to radiation emergency'. However, a solid definition of this term is not provided. The Kazakhstan regulation treats exposure of emergency workers as a planned elevated occupation exposure for the conduct of special work with ionizing radiation. Therefore, the assignment of any task in an emergency which could lead to an exposure above 50 mSv needs to be approved by the Chef Sanitary Doctor at regional (oblast) or national level, depending on the expected level of individual dose [@039]. Such requirement leads to a delay in implementing urgent protective actions, e.g. lifesaving or mitigatory actions to prevent the development of catastrophic conditions. Requirements on volunteering for emergency tasks involving doses above prescribed dose limits and on the awareness of emergency workers of their individual risk are in place. Paragraphs 331–334 of the Sanitary Rules for Radiation Safety [@040] stipulate that emergency workers should be male volunteers over 30 years of age, who have consented to do the job in writing after being informed of the possible exposure doses and associated health risks. Only

in exceptional cases can female workers be assigned to carry out emergency response actions.

Paragraph 223 of the Sanitary Rules Sanitary Epidemiological Reguirements to Radiation Safety Assurance [@040] obliges nuclear facilities to provide workers with emergency dosimeters in the event of criticality emergencies whenever criticality is concerned as a design basis accident. The UMZ is one of such facilities in Kazakhstan. UMZ uses ID-11 dosimeters for individual monitoring of external exposure in normal conditions and emergency situations. The ID-11 device measures absorbed dose of photons (0.08–11 MeV) and neutrons at the body surface in the range of 0.1–15 Gy (10–1500 rad). The dose measured by ID-11 is recorded as an individual effective dose of external exposure.

The ID-11 dosimeter is used in the Kazakhstan army for the evaluation of individual dose at the battlefield. Articles 10, 14 and 18 of the Law on Radiation Protection of the Public [@078] establish the requirements for monitoring, registering and reporting individual doses in normal conditions and in radiation emergencies. Regulation [@015], the Sanitary Norms [@039] and Hygienic Norms [@040] together provide more detailed guidelines for monitoring, registering and reporting individual doses. The dosimetric quantity of personal dose equivalent Hp(10) is not introduced in the Kazakhstan regulation and this regulation does not provide requirements analogous to those of Schedule III of Ref. [#13] for the verification of compliance of individual monitoring results with dose criteria (dose limits or reference levels).

The UMZ has in place an instruction for the express evaluation of an individual neutron dose to a worker in the event of a criticality emergency, which is based on the measurement of the dose rate from the torso of an affected person, in analogy with Procedure F4 described in EPR-MEDICAL [#05].

There is no certified biodosimetry service (laboratory) in Kazakhstan which could be used for individual dose assessment in case of radiation emergency.

Individual monitoring of internal exposure is not provided in UMZ. The radiation protection service of UMZ regularly (once per week or once per month) measures a total alpha-activity in ambient air. The individual dose of internal exposure is evaluated from workplace monitoring under the assumption that the total alpha-activity is an activity of U-234.

Facilities of categories II, III and IV must be provided with devices of radiation control, individual dosimeter sets and an emergency stock of individual protection equipment and medicines. The UMZ is one of the licensees that provide individual dosimetry services to evaluate external exposure in Kazakhstan.

The practical arrangements found by the EPREV team indicate that the laws and regulations regarding the protection of the workers are implemented. Emergency plans are available (at least on the site of UMZ). Monitoring (personal, workplace) is provided, even if the dosimeters are rather outdated and serve only for emergency dose monitoring. (The team was provided with personal dosimeters ID-11 during the

visit and the area of the future IAEA LEU Bank is equipped with dose rate meters with sound and light alarm functions.) Protective clothing and equipment are available, but some are rather old and used, requiring replacement or refreshment. Training and exercises are conducted regularly.

In the facility there are no means for internal contamination/dose assessment. No whole body counter, partial body counter, nor bioassay assessments are available.

It is not known how many dosimeters would be needed and available in case of a severe accident condition until a thorough threat assessment is done.

3.9.2. Recommendations

R.9.1. Methods for the assessment of internal contamination should be made available for the investigation of the radionuclides incorporated internally in the body of emergency workers during and after responding to a radiation emergency (whole body counting, bioassay etc.)

R.9.2. A method for dose assessment in the event of a criticality accident should be reviewed against international guidelines and made available.

BASIS

Ref. [2], para. 5.28 states that "*Laboratories shall be designated to make the necessary arrangements to be able to perform appropriate and reliable analyses of environmental and biological samples and measurements of internal contamination for the purposes of an emergency response. It shall be ensured that these facilities would be operational under postulated emergency conditions.*"

R.9.3. Individual dosimeters used for accidental dosimetry at the site should be upgraded (readable and TLD for Hp(10)).

BASIS

Ref. [2], para. 4.62 states that "*Arrangements shall be made for taking all practicable measures to provide protection for emergency workers for the range of anticipated hazardous conditions in which they may have to perform response functions on or off the site. This shall include: arrangements to assess continually and to record the doses received by emergency workers; procedures to ensure that doses received and contamination are controlled in accordance with established guidance and international standards; and arrangements for the provision of appropriate specialized protective equipment, procedures and training for emergency response in the anticipated hazardous conditions.*"

3.9.3. Suggestions

S.9.1. It is suggested that the individual dosimetric and protection equipment be thoroughly examined and replaced, when necessary.

S.9.2. It is suggested that a biodosimetry service (laboratory) be organized in the Republic of Kazakhstan.

3.10. ASESSING THE INITIAL PHASE

Regarding the requirements set out in Ref. [2] for assessing the initial phase, the following appraisal criterion was investigated:

i. Establish default operational intervention levels (OILs) for radiation emergencies.

3.10.1. Current situation

Kazakhstan uses OILs for first responders (criteria for cordoning contaminated/radiation area) but there are no other OILs for urgent protective action as proposed by Ref. [6].

3.10.2. Recommendations

R.10.1. Operational intervention levels (OILs) for urgent protective actions and for food restriction should be established and made part of the appropriate regulations, the PRNRE and the facility emergency plans.

BASIS

Ref. [2], para. 4.71 states that "*....In addition, arrangements shall be made for promptly assessing the results of environmental monitoring and monitoring for contamination on people in order to decide on or to adapt urgent protective actions to protect workers and the public, including the application of operational intervention levels (OILs) with arrangements to revise the OILs as appropriate to take into account the conditions prevailing during the emergency.*"

3.11. MANAGING THE MEDICAL RESPONSE

Regarding the requirements set out in Ref. 0 for managing the medical response, the following appraisal criteria were investigated:

i. Make arrangements for general practitioners and emergency staff to be made aware of the medical symptoms of radiation exposure and of the appropriate notification procedures if a nuclear or radiological emergency is suspected.

ii. Make arrangements, at the national level, to provide initial treatment for people who have been exposed or contaminated.

3.11.1. Current situation

Ref to (i): Radiological problems requiring medical attention are fortunately rare and a centralized capacity for the medical response is normally enough.

According to the Article 10 of Code On Public Health and Health Care System [@086], local health care authorities at all levels are responsible for providing free medical assistance, medicines and other medical facilities in emergency situations. Special rules are established at the national level for investigation of syndromes which could be caused by radiation exposure [@017].

Located close to the UMZ site, Medical Sanitary Unit No. 2 carries out routine health controls on workers, provides first medical response at the scene and treatment of injuries at the pre-hospital level, including for contaminated and/or overexposed persons that are registered for long term follow-up.

It is planned that the off-site emergency medical service (first aid) of the City of Ust-Kamenogorsk will be involved in medical response to an emergency and is aware of the fact that contaminated casualties could need medical attention in the event of an emergency at the UMZ site. Nonetheless, procedures for avoiding the spread of contamination during the evacuation of contaminated casualties were not clearly defined in the plans.

Ref to (ii): There is no referral medical institution in the vicinity of the plant which could provide specialized medical treatment to overexposed persons.

3.11.2. Recommendations

R.11.1. Procedures for avoiding the spread of contamination during evacuation of contaminated casualties should be clearly defined in the plans, in accordance with international standards and guidelines [7].

BASIS

Ref. [2], para. 4.78 states that "*Facilities in threat category I, II or III shall make arrangements to treat a limited number of contaminated or overexposed workers, including arrangements for first aid, the estimation of doses, medical transport and the initial medical treatment of contaminated or highly exposed individuals in local medical facilities.*"

R.11.2. A referral medical institution for specialized medical treatment of seriously overexposed persons has to be selected, provided with suitable equipment and its staff adequately trained.

BASIS

Ref. [2], para. 4.80 states that "*Arrangements shall be made at the national level to treat people who have been exposed or contaminated. These shall include: guidelines for treatment; the designation of medical practitioners trained in the early diagnosis and treatment of radiation injuries; and the selection of approved institutions to be used for the extended medical treatment or follow-up of persons subjected to radiation exposure or contamination. This shall also include arrangements for consultation on treatment following any exposure that could result in severe tissue damage or other severe deterministic health effects with medical practitioners experienced in dealing with such injuries*."

3.12. KEEPING THE PUBLIC INFORMED

Regarding the requirements set out in Ref. [2] for keeping the public informed, the following appraisal criterion was investigated:

i. Make arrangements for providing useful, timely, truthful and consistent information to the public, responding to incorrect information and rumours, responding to requests for information from the public and from news and information media.

3.12.1. Current situation

Arrangements are in place at the national and regional levels to provide the public with useful, timely, truthful, consistent and appropriate information throughout a radiological emergency. The current arrangements for providing information to the public are defined in several documents and rules and are the basis for a common use during the response to emergencies (e.g. [@003, @013, @019]). The Rules for Information Distribution, Popularization of Knowledge, Population and Specialist Training in the Field of Emergency Situations ensures that the public is aware of the threat or occurrence of a radiation accident. The notification system is used for transferring the information approved by the appropriate bodies.

During the visit to UMZ, the readiness of UMZ to inform the public about the risks, actual situation and conditions under emergency conditions was demonstrated. Much information about the company is available on UMZ's web page (http://www.ulba.kz) in Kazakh, Russian and English.

Sirens and local media can be used for a full notification of the population in case of an emergency. The local and regional level Emergency Commission and the regional structure of the MES should facilitate the coordination of public communications, including the response to rumours and heightened request for information during emergency conditions.

3.12.2. Suggestions

S.12.1. Emergency information and emergency instructions should be in plain language, developed in advance and suitable for a variety of situations (as described in Ref. [3]). The roles and responsibilities of the responsible organizations should be well defined and the person designated to act as spokesperson stipulated in the

national plan. These arrangements have to be tested by conducting exercises with the mass media.

3.13. TAKING AGRICULTURAL COUNTERMEASURES, COUNTERMEASURES AGAINST INGESTION AND LONGER TERM PROTECTIVE ACTIONS

Regarding the requirements set out in Ref. 0 for taking agricultural countermeasures against ingestion and longer term protective actions, the following appraisal criteria were investigated:

i. Adopt national intervention and action levels for agricultural countermeasures.
ii. Make arrangements, concentrating on the use of existing capabilities, for taking effective agricultural countermeasures.

3.13.1. Current situation

Ref. to (i): The action levels for agricultural countermeasures are in place for ^{131}I, ^{134}Cs, ^{137}Cs, ^{90}Sr, ^{238}Pu, ^{239}Pu, ^{241}Am [@040] in line with international standards. Additionally, some intervention levels were adopted for the predicted exposure level, when urgent intervention is required. Criteria for taking decisions on contaminated agricultural areas and on limiting temporarily the consumption of certain products were also established.

Ref. to (ii): State and local bodies are able to arrange the monitoring and control of food in the defined emergency zone and of imported food products. Measuring capabilities are available at the regional level (Laboratory Centres) of the Ministry of Health Care.

3.14. MITIGATING THE NON-RADIOLOGICAL CONSEQUENCES OF AN EMERGENCY AND ITS RESPONSE

Regarding the requirements set out in Ref. 0 for mitigating the non-radiological consequences of an emergency and its response, the following appraisal criterion was investigated:

i. Make arrangements for responding to public concern in an actual or potential nuclear or radiological emergency.

3.14.1. Current situation

No written arrangements or procedures on how to respond to public concern in the event of a nuclear or radiological emergency were made available to the mission. Nevertheless, the UMZ web site, as well as some ecological organizations in the City of Ust-Kamenogorsk, are conducting a large promoting campaign of public information in local mass media and on internet sites (i.e. http://www.ulba.kz/ru/ecology4.htm). A certain number of conferences and meetings with the public have been held.

Public hearings are held in case of contentious issues (public hearings dedicated to the LEU Bank with the participation of the Deputy Minister of Environment Protection and other relevant officials had been not yet held in Ust-Kamenogorsk on 14 September 2012). These are important means of preparing the public and raising awareness about a potential nuclear or radiological emergency among the population.

3.14.2. Suggestions

S.14.1. Instructions and information to the public should be well prepared and defined in any level of emergency situation (e.g. at the facility, provincial and national levels). Local DES and the health authorities should address this issue.

3.15. REQUIREMENTS FOR INFRASTRUCTURE

Regarding the requirements set out in Ref. 0 for infrastructure, the following appraisal criteria were investigated:

i. Develop emergency plans that are consistent with the threats and coordinated with all response organizations.
ii. Operating and response organizations shall develop the procedures needed to perform their response functions.
iii. Provide, concentrating on the use of existing capabilities, adequate tools, instruments, supplies, equipment, communication systems, facilities and documentation.
iv. Identify facilities at which the following will be performed: (a) coordination of on-site response actions; (b) coordination of local off-site response actions (radiological and conventional); (c) coordination of national response actions; (d) coordination of public information; (e) coordination of off-site monitoring and assessment.
v. Make arrangements, concentrating on the use of existing capabilities, for the selection of personnel and training.
vi. Conduct exercises and drills to ensure that all specified functions required to be performed for emergency response and all organizational interfaces for the facilities in threat categories I, II and III and the national level programmes for threat categories IV and V are tested at suitable intervals.
vii. Make arrangements to ensure the availability and reliability of all supplies, equipment, communication systems and facilities needed during an emergency.
viii. Provide an on-site emergency control centre for threat category I facilities, designed to remain operational for the range of postulated severe accident conditions.
ix. The on-site emergency control centre has enough information available about essential safety related parameters and radiological conditions in the facility and its immediate surroundings.
x. Make arrangements to conduct internal monitoring of emergency response workers and to ensure the availability of these services under postulated emergency conditions.

3.15.1 Current situation

Ref. to (i): The draft national radiation emergency response plan (PRNRE) was developed by KAEA with the help of the United States Nuclear Regulatory Commission and in cooperation with the MoH and MES. The plan principally follows the IAEA standards and guidance (Refs [2, 3]) and has (recently) been reviewed by the IAEA. The draft national plan identifies the category II facilities as the highest category risk in the country. The proposed actions are formulated according to the risk. Regional plans are developed according to the integrated planning response concept following national requirements, in which radiation emergencies are considered as one kind of emergency. The emergency response plans of operators are developed and approved in accordance with the licensing procedure. Some requirements are provided for these plans, but there is no dedicated regulation on emergency preparedness for nuclear and radiation facilities. Emergency plans for transport of nuclear materials should be prepared according to the transport rules (regulation). The current legislation (regulation) and requirements on emergency planning does not fully comply with the international requirements.

Plans of other response organizations (other than those of operators) should be approved by authorized national bodies. The availability of emergency plans at the MES and MoH were discussed. MES has an important role in approving and supervising emergency preparedness activities.

The UMZ plan is in place and was presented during the visit to the site. This plan is coordinated with the local/regional off-site plans and should enable to respond to all possible (DBA) accidents. During the visit to UMZ, a video on a transport accident exercise was presented, where the activation and coordinated response with different response organizations were exercised in field conditions.

Ref. to (ii): Procedures are developed and are included in the relevant emergency response plans at the facility level. These procedures are tested during regularly held, planned exercises.

There is a need for further review/amendment of the procedures at other levels. Common rules for the development and structure of procedures should be provided by the PRNRE.

Ref. to (iii): Most of the necessary supplies, equipment, communication systems, and facilities used for the response to radiation emergencies are part of the equipment for conventional emergencies. The availability and reliability of this equipment is regularly tested and some of this equipment (for fire response and rescue at transport accidents) is used every day in different response activities. The equipment for measuring radiation of UMZ is used or regularly tested, but some of it is outdated, may have limited capabilities and cannot guarantee the necessary preventive actions.

Radiation monitoring at the regional and national levels is the responsibility of the Ministry of Environmental Protection. Laboratory capabilities are available at the regional laboratory centres of the Ministry of Health Care. The Ministry of Health Care may perform independent measurements at the site of radiation or nuclear facilities.

An assessment needs be performed to determine what areas are the most sensitive and for which the lack of instruments, supplies or equipment may affect the response; this assessment will allow to establish priorities and initiate actions aimed at improving the situation.

Ref. to (iv): The emergency management system has been established at three levels and ensures appropriate coordination, except in respect of public information.

Available facilities:
(a) The coordination of on-site response actions is done on the operator's premises by the operator, according to the on-site emergency plans/UMZ emergency management system at UMZ;
(b) The coordination of local off-site response actions is performed by the local/regional authority crisis management commission (together with the management of UMZ, in the vicinity);
(c) The coordination of national response actions is performed by the National Commission on Emergency Situations/MES;
(d) The coordination of public information is not clear. The requirement as to designating one single point for public communication is not implemented;
(e) The coordination of off-site monitoring and assessment is performed by the Ministry of Environmental Protection and the Ministry of Health Care.

Ref. to (v): In accordance with the established requirements, only qualified and trained personnel can take part in the remediation of the consequences of a radiation accident. The regulations establish the three levels in which the emergency workers are required to intervene (at the State level – the emergency workers of the Republican services of radiation protection; at the territorial level – the emergency workers of the territorial services of radiation protection; and at the operator level – the emergency workers of facilities of category II, III and IV).

The emergency response organization at the UMZ has been established and the emergency response teams are trained. Most arrangements for availability of protective tools and dose control are in place. The organizations (responders) providing support based on the contract with the UMZ (fire and rescue units, medical services) work under the control of the emergency response organization of the facility.

The staff of the envisaged new facility (the IAEA LEU Bank) should be trained and integrated into the emergency response organization of UMZ. For additional training on radiation protection and nuclear safety issues, the Ust-Kamenogorsk University can provide education and training courses. IAEA training materials on emergency preparedness can also be used in training programmes.

There is limited training and availability of equipment to detect radiation at fire/rescue and medical units.

Ref. to (vi): Training and exercises are conducted at the State and local levels and in response organizations for facilities and activities in threat categories II, III and IV. The annual exercise plans are approved by the top managers of emergency response

organizations at the State and local levels. Complex exercises and table top exercises are planned and periodically conducted on and off the sites. The periodicity of exercises/training depends on the threat category of the facility. At facilities like UMZ, exercise should be conducted at least twice per year.

There are plans for regular exercises for the UMZ facility and for transport. Taking into account that the new nuclear facility will be on company premises, the training and exercise programme of UMZ should be extended to include emergency situations involving the IAEA LEU Bank.

Ref. to (vii): Arrangements (a Quality Assurance Programme) to ensure the availability and reliability of all systems and facilities have been under development. Requirements are in place that: the emergency response plans and procedures as well as the training programmes for testing these shall be reviewed on the regular basis. Lessons and experience learned during the exercises should be discussed and used to make necessary modifications or improvements.

Ref. to (viii): Not relevant.

Ref. to (ix): Some information is available at the UMZ on-site centre, but with the aid of an upgrade programme, the volume of on-line technical information could be up-rated, including the data from the monitoring system from all site facilities (including the IAEA LEU Bank) and from the vicinity.

Ref. to (x): There is no available capability for internal monitoring of emergency workers.

3.15.2. Recommendations

R.15.1. The existing UMZ site emergency response plan should be reviewed using the services of the IAEA.

BASIS

Ref. [2], para. 5.10, states that "*Arrangements for the co-ordination of emergency response and protocols for operational interfaces between operators and local, regional and national governments shall be developed, as applicable. These arrangements shall include the organizations responsible for emergency services and for response to conventional emergencies. The arrangements shall be clearly documented and this documentation shall be made available to all relevant parties*."

R.15.2. An analysis of additional needs for radiation and detection systems and/or other monitoring equipment necessary for the response to emergency situations involving the IAEA LEU Bank and of necessary equipment for the first responders needs should be carried out.

BASIS

Ref. [2], paras 5.21 and 5.25, state that: "*The operating and response organizations shall develop the necessary procedures, analytical tools and computer programs in order to be able to perform the functions specified to meet the requirements for emergency response established in Section 4.*";

"*Adequate tools, instruments, supplies, equipment, communication systems, facilities and documentation (such as procedures, checklists, telephone numbers and manuals) shall be provided for performing the functions specified in Section 4.*"

R.15.3. A clear policy for public information should be defined for the coordination of the information from a single point during a radiation emergency.

BASIS

Ref. [2], para 5.18(f), states that: "*Emergency plans shall include, as appropriate:…(f) a description of the public information arrangements in the event of [a nuclear or radiological emergency]; …*"

3.15.3. Suggestions

S.15.1. UMZ, in cooperation with KAEA and MES, should consider the organization of national/regional training courses for first responders to radiation emergencies, based on the IAEA training materials for first responders and with IAEA support. A component on radiation safety during severe accident conditions should also be included in the training programme.

S.15.2. Guidance on the establishment and maintenance of a quality assurance programme for all stakeholders should be developed and integrated in the PRNRE. The programme will ensure a high degree of availability of all supplies and equipment necessary to perform an effective response. Maintenance of the existing resource catalogue could be an integral part of this programme.

GLOSSARY

arrangements (for emergency response): The integrated set of infrastructure elements necessary to provide the capability for performing a specified function or task required in response to a nuclear or radiological emergency. These elements may include authorities and responsibilities, organization, coordination, personnel, plans, procedures, facilities, equipment or training.

dangerous source: A source that could, if not under control, give rise to exposure sufficient to cause severe deterministic health effects. This categorization is used for determining the need for emergency response arrangements and is not to be confused with categorizations of sources for other purposes.

deterministic effect: A health effect of radiation effect for which generally a threshold level of dose exists above which the severity of the effect is greater for a higher dose. Such an effect is described as a 'severe deterministic effect' if it is fatal or life threatening or results in a permanent injury that reduces quality of life.

emergency: A non-routine situation or event that necessitates prompt action primarily to mitigate a hazard or adverse consequences for human health and safety, quality of life, property or the environment. This includes nuclear or radiological emergencies and conventional emergencies such as fires, release of hazardous chemicals, storms or earthquakes. It includes situations for which prompt action is warranted to mitigate the effects of a perceived hazard.

emergency action level (EAL): A specific, predetermined, observable criterion used to detect, recognize and determine the emergency class.

emergency class: A set of conditions that warrant a similar immediate emergency response. The term used for communicating to the response organizations and the public the level of response needed. The events that belong to a given emergency class are defined by criteria specific to the installation, source or practice, which if, exceeded indicate classification at the prescribed level. For each emergency class, the initial actions of the response organizations are predefined.

emergency classification: The process whereby an authorized official classifies an emergency in order to declare the applicable level of emergency class. Upon declaration of the emergency class, the response organizations initiate the predefined response actions for that emergency class.

emergency plan: A description of the objectives, policy and concept of operations for the response to an emergency and of the structure, authorities and responsibilities for a systematic, coordinated and effective response. The emergency plan serves as the basis for the development of other plans, procedures and checklists**.**

(emergency) preparedness: The capability to take action that will effectively mitigate the consequences of an emergency for human health, safety, quality of life, property and the environment.

emergency procedures: A set of instructions describing in detail actions to be taken by response personnel in an emergency.

(emergency) response: The performance of actions to mitigate the consequences of an emergency on human health and safety, quality of life, property and the environment. It may also provide a basis for the resumption of normal social and economic activity.

emergency services: The local off-site response organizations that are generally available and that perform emergency response functions. These may include police, fire and rescue brigades, ambulance services, and control teams for hazardous materials.

emergency worker: A worker who may be exposed in excess of occupational dose limits while performing actions to mitigate the consequences of an emergency for human health and safety, quality of life, property and the environment.

emergency zones: The precautionary action zone and/or the urgent protective action planning zone.

exposure: The act or condition of being subject to irradiation. Exposure can be either external exposure (irradiation by sources outside the body) or internal exposure (due to a source within the body).

first responders: The first members of an emergency service to respond at the scene of an emergency.

generic intervention level: The level of avertable dose at which a specific protective action is taken in an emergency or situation of chronic exposure.

generic action level: The concentration (Bq/g) of specific isotopes in food or water at which consumption should be restricted if replacement food or water is available.

initial phase: The period of time from the detection of conditions warranting the implementation of response actions that must be taken promptly in order to be effective until those actions have been completed. These actions included taking mitigatory actions by the operator and urgent protective actions on and off the site.

intervention: Any action intended to reduce or avert exposure or the likelihood of exposure to sources which are not part of a controlled practice or which are out of control as a consequence of an accident.

intervention level: The level of avertable dose at which a specific protective action is taken in an emergency or situation of chronic exposure.

longer term protective action: A protective action, which is not an urgent protective action. Such protective actions are likely to be prolonged over weeks, months or years. These include measures such as relocation, agricultural countermeasures and remedial actions.

non-radiological consequences: Effects on humans or the environment that are not deterministic or stochastic effects. These include effects on health or the quality of life resulting from psychological, social or economic consequences of the emergency or the response to the emergency.

notification:

1. A report submitted to a national or international authority providing details of an emergency or potential emergency, for example as required by the Convention on Early Notification of a Nuclear Accident;
2. A set of actions taken upon detection of emergency conditions with the purpose of alerting all organizations with responsibility for taking emergency response actions in the event of such conditions.

notification point: A designated organization with which arrangements have been made to receive notification (meaning 2 in this glossary) and promptly to initiate predetermined actions to activate a part of the emergency response.

nuclear or radiological emergency: An emergency in which there is, or is perceived to be a hazard due to:

the energy resulting from a nuclear chain reaction or from the decay of the products of a chain reaction; or

radiation exposure.

off-site: Outside the site area.

on-site: Within the site area.

operational intervention level (OIL): A calculated level, measured by instruments or determined by laboratory analysis that corresponds to an intervention level or action level. OILs are typically expressed in terms of dose rates or of activity of radioactive material released, time integrated air concentrations, ground or surface concentrations, or activity concentrations of radionuclides in environmental, food or water samples. An OIL is a type of action level that is used immediately and directly (without further assessment) to determine the appropriate protective actions on the basis of an environmental measurement.

operator (or operating organization): Any organization or person applying for authorization or authorized and/or responsible for nuclear, radiation, radioactive waste or transport safety when undertaking activities or in relation to any nuclear facilities or sources of ionizing radiation. This includes private individuals, governmental bodies, consignors or carriers, licensees, hospitals, and self-employed persons. This includes those who are either directly in control of a facility or an activity during use (such as radiographers or carriers) or, in the case of a source not under control (such as a lost or illicitly removed source or a re-entering satellite), those who were responsible for the source before control over it was lost.

practice: Any human activity that introduces additional sources of exposure or exposure pathways or extends exposure to additional people or modifies the network of exposure pathways from existing sources, so as to increase the exposure or the likelihood of exposure of people or the number of people exposed.

precautionary action zone: An area around a facility for which arrangements have been made to take urgent protective actions in the event of a nuclear or radiological emergency to reduce the risk of server deterministic health effects off the site. Protective actions within this area are to be taken before or shortly after a release of radioactive material or exposure on the basis of the prevailing conditions at the facility (EALs).

protective action: An intervention intended to avoid or reduce doses to members of the public in emergencies or situations of chronic exposure.

radiation emergency: A nuclear or radiological emergency.

radiological emergency: An emergency involving an actual or perceived risk from activities that could give rise to a nuclear or radiological emergency at an unforeseeable location. These include non-authorized activities such as activities relating to dangerous sources obtained illicitly. They also include transport and authorized activities involving dangerous mobile sources such as industrial radiography sources, radio thermal generators or nuclear powered satellites.

radiological dispersal device (RDD): A device constructed by terrorists to spread radioactive materials using conventional explosives or other means.

regulatory body: An authority or a system of authorities designated by the government of a State as having legal authority for conducting the regulatory process, including issuing

authorizations, and thereby regulating nuclear, radiation, radioactive waste and transport safety.

response organization: An organization designated or otherwise recognized by a State as being responsible for managing or implementing any aspect of a response.

significant transboundary release: A release of radioactive material to the environment that may result in doses or levels of contamination beyond national borders from the release which exceed international intervention levels or action levels for protective actions, including food restrictions and restrictions on commerce.

site area: A geographical area that contains an authorized facility, activity or source, within which the management of the authorized facility or activity may directly initiate emergency actions. This is typically the area within the security perimeter fence or other designated property marker. It may also be the controlled area around a radiography source or a cordoned off area established by first responders around a suspected hazard.

source: Anything that may cause radiation exposure — such as by emitting ionizing radiation or by releasing radioactive substances or materials — and can be treated as a single entity for protection and safety purposes. For example, materials emitting radon are sources in the environment, a sterilization gamma irradiation unit is a source for the practice of radiation preservation of food, an X ray unit may be a source for the practice of radio diagnosis; a nuclear power plant is part of the practice of generating electricity by nuclear fission, and may be regarded as a source (e.g. with respect to discharges to the environment) or as a collection of sources (e.g. for occupational radiation protection purposes). A complex or multiple installations situated at one location or site may, as appropriate, be considered a single source for the purposes of application of international safety standards.

stochastic effect (of radiation): A radiation induced health effect, the probability of occurrence of which is greater for a higher radiation dose and the severity of which (if it occurs) is independent of dose. Stochastic effects may be somatic effects or hereditary effects, and generally occur without a threshold level of dose. Examples include thyroid cancer and leukaemia.

threat assessment: The process of analysing systematically the hazards associated with facilities, activities or sources within or beyond the borders of a State in order to identify:

1. Those events and the associated areas for which protective actions and emergency countermeasures may be required within the State; and
2. The actions that would be effective in mitigating the consequences of such events.

transnational emergency: A nuclear or radiological emergency of actual, potential or perceived radiological significance for more than one State. This includes:

1. A significant transboundary release of radioactive material (however a transnational emergency dose not necessarily imply a significant transboundary release or radioactive material);
2. A general emergency at a facility or other event that could result in a significant transboundary release (atmospheric or aquatic) of radioactive material;
3. A discovery of the loss or illicit removal of a dangerous source that has been transported across or is suspected of having been transported across a national border;
4. An emergency resulting in significant disruption to international trade or travel;

5. An emergency warranting the taking of protective actions for foreign nationals or embassies in the State in which it occurs;
6. An emergency resulting in or potentially resulting in severe deterministic health effects and involving a fault and/or problem (such as in equipment or software) that could have implications for safety internationally;
7. An emergency resulting in or potentially resulting in great concern among the population of more than one State owing to the actual or perceived radiological hazard.

urgent protective action: A protective action that, in the event of an emergency, must be taken promptly (normally within hours) in order to be effective, and the effectiveness of which will be markedly reduced if it is delayed. The most commonly considered urgent protective actions in a nuclear or radiological emergency are evacuation, decontamination of individuals, sheltering, respiratory protection, iodine prophylaxis, and restriction of the consumption of potentially contaminated foodstuffs.

urgent protective action planning zone: An area around a facility for which arrangements have been made to take urgent protective actions in the event of a nuclear or radiological emergency to avert doses off the site in accordance with international standards. Protective actions within this area are to be taken on the basis of environmental monitoring — or, as appropriate, prevailing conditions at the facility.

ABBREVIATIONS

EAL	emergency action level
EOC	emergency operations centre
EOF	emergency operations facility
EP	emergency planning
EPR	emergency preparedness and response
EPREV	emergency preparedness review
EPZ	emergency planning zone
ERC	emergency response centre
GAL	generic action level
GIL	generic intervention level
IAEA	International Atomic Energy Agency
ICP	incident command post
ICS	incident command system
INES	International Nuclear Event Scale
LEU	low enriched uranium
NPP	nuclear power plant
OIL	operational intervention level
PAZ	precautionary action zone
PIO	public information officer
PRNRE	Plan of the Republic of Kazakhstan for Response to Nuclear and Radiological Emergencies
RDD	radiological dispersal device
SAR	Safety Analysis Report
TLD	thermoluminescent dosimeter/dosimetry
UMZ	"Ulbinsky Metallurgichesky Zavod" (Ulba Metallurgical Plant)
UN	United Nations
UPZ	urgent protective action planning zone
WHO	World Health Organization

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[2] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS OFFICE FOR THE CO-ORDINATION OF HUMANITARIAN AFFAIRS, WORLD HEALTH ORGANIZATION, Preparedness and Response for a Nuclear or Radiological Emergency, Safety Standards Series No. GS-R-2, IAEA, Vienna (2002).

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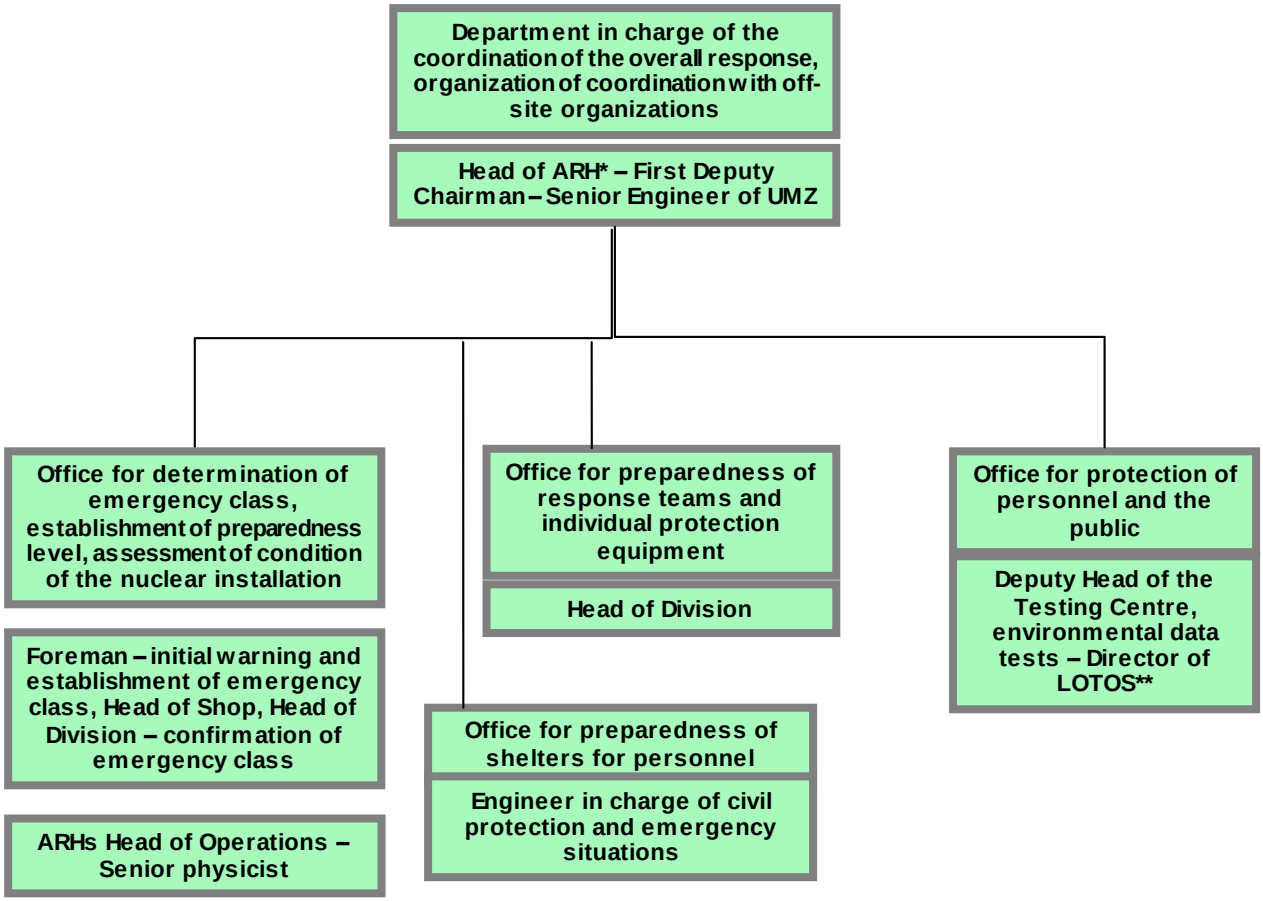
Appendix I: MISSION TEAM

JANKO, Karol	Nuclear Regulatory Authority of the Slovak Republic (ÚJD SR)
APOSTOL, Ion	National Centre of Public Health, Ministry of Health, Republic of Moldova
KUTKOV, Vladimir	NS-Incident and Emergency Centre, IAEA
ZOMBORI, Peter (IAEA Coordinator)	NS-Incident and Emergency Centre, IAEA

Appendix II: MISSION SCHEDULE

Date	Activity
Sunday, 2 September	**Arrival** in Astana Initial team meeting
Monday, 3 September	**Introductory** plenary meeting with KAEA representatives, discussion on the roles and responsibilities of the regulatory body in the event of radiation emergencies
Tuesday, 4 September	**Travel** to Ust-Kamenogorsk (morning) Visit to the site of the future IAEA LEU Bank, meeting with the UMZ safety management
Wednesday, 5 September	**Visits** to the future IAEA LEU Bank site and related facilities on the site; **Discussions** with UMZ safety management and with local authorities and responding organizations
Thursday, 6 September	**Travel to Astana** (morning) **Visits** at/**discussions** with national authorities and responding organizations
Friday, 7 September	**Discussions** with the KAEA counterparts and representatives of national organizations involved in management of radiation emergencies
Saturday, 8 September	**Drafting** the EPREV Mission Report
Sunday, 9 September	**Drafting** the EPREV Mission Report (morning)
Monday, 10 September	**Discussions** on the first draft report with the counterpart, clarifications to and updating of the draft report
Tuesday, 11 September	**Final** plenary meeting with representatives of all organizations involved in the national EPR system
Wednesday 12 September	**Departure** of the EPREV team from Astana

Appendix III: ORGANIZATION OF THE FACILITY LEVEL (UMZ) RESPONSE TO A RADIATION EMERGENCY



* ARH – Accident Recovery Headquarters
** LOTOS – Labour Protection and Environmental Protection Laboratory

Appendix IV: ORGANIZATIONS CONTACTED

- Atomic Energy Agency of the Republic of Kazakhstan (KAEA)
- Ministry of Emergency Situations (MES)
    - State Control Committee for Emergency Situations and Industrial Safety
    - Department of Civil Defence
    - Department of Emergency Situations of the Eastern Kazakhstan Region (DES)
- Committee for State Sanitary and Epidemiology Supervision, Ministry of Health Care (CSSES):
    - Centre for Sanitary and Epidemiological Expertise in Astana
    - Committee for State Sanitary and Epidemiology Supervision – Eastern Kazakhstan Branch (CSSES-EKB)
    - Ust-Kamenogorsk Department of CSSES-EKB
- Ministry of Environmental Protection (MoE):
    - Committee of Ecological Regulation and Control
    - Republican State Owned Enterprise "Kazhydromet"
- Ulba Metallurgical Plant Joint Stock Company (UMZ)
    - Division of Industrial Safety (UMZ-DIS)
    - Division of Uranium Production (UMZ-DUP)
- Ministry of Environmental Protection (MoE) – Ust-Kamenogorsk Branch (MoE - UK)

Appendix V: LIST OF ATTENDEES OF VARIOUS EPREV MISSION MEETINGS

ENTRY MEETING WITH KAEA REPRESENTATIVES

3 September 2012

No.	Name	Position	Organization
1.	Mr. Peter Zombori	IAEA Coordinator	IAEA
2.	Mr. Vladimir Kutkov	Expert	IAEA
3.	Mr. Ion Apostol	Expert	IAEA
4.	Mr. Karol Janko	Expert	IAEA
5.	Mr. Murat Tulegenov	Head of Review and Inspection Division	KAEA
6.	Mr. Abdumalik Yermatov	Chief Expert of Review and Inspection Division	KAEA
7.	Ms. Albina Chunkibayeva	Chief Expert of Review and Inspection Division	KAEA

MEETING WITH REPRESENTATIVES OF ULBA METALLURGICAL PLANT (UMZ)

4-5 September 2012

No.	Name	Position	Organization
1.	Mr. Peter Zombori	IAEA Coordinator	IAEA
2.	Mr. Vladimir Kutkov	Expert	IAEA
3.	Mr. Ion Apostol	Expert	IAEA
4.	Mr. Karol Janko	Expert	IAEA
5.	Mr. Sergey V. Sidorov	Director for Industrial Safety, Division of Industrial Safety	UMZ-DIS
6.	Mr. Anatoliy P. Karandashev	Chief Physicist, DIS	UMZ-DIS
7.	Ms. Lyudmila A. Supronenko	Civil Defense and Environment Protection Engineer, DIS	UMZ-DIS
8.	Ms. Svetlana Ye. Bogacheva	Occupational Protection and Environment Protection Engineer, DIS	UMZ-DIS
9.	Mr. Andrey A. Gofman	Head – Shop "V" of DUP	UMZ-DUP
10.	Mr. Dmitriy B. Slobodin	Head – Environment Protection Department, DIS	UMZ-DIS
11.	Mr. Evgeniy Pissarevskiy	Engineer-dosimetrist, Laboratory of Occupational Protection and Environment Protection (LOTOS), DIS	UMZ-DIS

MEETING WITH REPRESENTATIVES OF THE MINISTRY OF EMERGENCY SITUATION – EASTERN KAZAKHSTAN BRANCH

5 September 2012

No.	Name	Position	Organization
1.	Mr. Peter Zombori	IAEA Coordinator	IAEA
2.	Mr. Vladimir Kutkov	Expert	IAEA
3.	Mr. Ion Apostol	Expert	IAEA
4.	Mr. Karol Janko	Expert	IAEA
5.	Mr. Stanislav F. Lebedev	Head, Department of Control over Industrial Safety in Nuclear Industry, State Service of Control over Emergency Situations and Industrial Safety, Eastern Kazakhstan Branch of MES	MES-EKB
6.	Mr. Murat Kasenov	Head, State Service on Civil Defence, MES-EKB	MES-EKB
7.	Mr. Alibek Dlimov	Deputy Head, Department of Emergency Situations, State Service of Control over Emergency Situations and Industrial Safety, MES-EKB	MES-EKB

MEETING WITH REPRESENTATIVES OF THE COMMITTEE FOR STATE SANITARY AND EPIDEMIOLOGY SUPERVISION – EASTERN KAZAKHSTAN BRANCH

5 September 2012

No.	Name	Position	Organization
1.	Mr. Peter Zombori	IAEA Coordinator	IAEA
2.	Mr. Vladimir Kutkov	Expert	IAEA
3.	Mr. Ion Apostol	Expert	IAEA
4.	Mr. Karol Janko	Expert	IAEA
5.	Mr. Vitaly Tsoy	Head, Division of Radiation Safety, Eastern Kazakhstan Branch of CSSES	CSSES-EKB
6.	Mr. Mikhail L. Deriabin	Head, Ust-Kamenogorsk Department of CSSES-EKB, Chief Sanitary Doctor of Ust-Kamenogorsk	Ust-Kamenogorsk Department of CSSES-EKB,
7.	Ms. Olga Ushakova	Vice Head of Division of Radiation Safety, Ust-Kamenogorsk Department of CSSES-EKB	Ust-Kamenogorsk Department of CSSES-EKB
8.	Mr. Rafail B. Shin	Vice Head of Division of Industrial Safety, Ust-Kamenogorsk Department of CSSES-EKB	Ust-Kamenogorsk Department of CSSES-EKB

MEETING WITH REPRESENTATIVES OF STAKEHOLDERS IN NATIONAL RADIATION EMERGENCY PREAREDNESS

7 September 2012

No.	Name	Position	Organization
1.	Mr. Peter Zombori	IAEA Coordinator	IAEA
2.	Mr. Vladimir Kutkov	Expert	IAEA
3.	Mr. Ion Apostol	Expert	IAEA
4.	Mr. Karol Janko	Expert	IAEA
5.	Ms. Alisa B. Abisheva	Chief Expert of the Committee of Ecological Regulation and Control, MoE	MoE
6.	Mr. Marat Z. Tyulyubayev	Head, Department of Industrial Safety, State Control Committee for Emergency Situations and Industrial Safety, MES	MES
7.	Mr. Dimash M. Baysanbayev	Senior Officer, Department of Civil Defence, MES	MES
8.	Ms. Kamila T. Kabdulayeva	Head, Laboratory of Toxicology, Centre for Sanitary and Epidemiological Expertise in Astana, CSSES	CSSES
9.	Mr. Hamid M. Kudratullaev	Expert, CSSES	CSSES
10.	Mr. Tulebay A. Adilov	Director, Department of Environmental Monitoring, "Kazhydromet"	"Kazhydromet"

Appendix VI: TERMS OF REFERENCE

TERMS OF REFERENCE

of an IAEA Emergency Preparedness and Response Review (EPREV) mission to

KAZAKHSTAN

BACKGROUND:

In connection with the establishment of the IAEA LEU Bank the authorities of Kazakhstan and the IAEA have agreed to undertake an IAEA Emergency Preparedness Review (EPREV) mission, which will be performed during the period of 3–11 September 2012.

MISSION OBJECTIVES:

The mission is conducted to provide an *assessment of the State's capability, as well as the arrangements and capabilities at the site,* to respond to nuclear and radiological incidents and emergencies that can occur at the future IAEA LEU Bank site in and around the Ulba Metallurgical Plant (UMZ), Ust-Kamenogorsk. This includes the reviewing of the arrangements in the plant, outside the plant and the arrangements (legal, organizational and technical) on the national level.

SCOPE:

The mission will be carried out in accordance with the Guidelines developed for the EPREV services. As part of the methodology a questionnaire will be filled out, addressing the main issues and requirements of GS-R-2 [2]. (The most recent self-assessment for Kazakhstan is available from 2011; it should be updated before the actual implementation of the mission.)

The mission will address arrangements at local and national level, but only those functional and infrastructural requirements will be dealt with that are related with the establishment and operation of the IAEA LEU Bank in Ust-Kamenogorsk.

The following emergency arrangements will be assessed (both local and national level:

- Emergency management
- Emergency preparedness
- Radiation protection
- Medical response
- Public information
- National capability to support and provide training to local response teams

DATES: 3-11 September 2012

EPREV MISSION TEAM:

Peter ZOMBORI, Co-ordinator (IEC/NS, IAEA)
Vladimir KUTKOV (IEC/NS, IAEA)
Karol JANKO (Slovakia)
Ion APOSTOL (Moldavia)

HOST:

- Atomic Energy Agency of the Republic of Kazakhstan

COUNTERPARTS:

- Atomic Energy Agency of the Republic of Kazakhstan (KAEA)
- Ministry of Emergency Situations (MES)
- Ministry of Health Care (MoH)
- Ministry of Environment Protection (MoE)
- The State Control Committee for Emergency Situations
- State Enterprise "Centre for Epidemiological Inspection"
- Ministry of Emergency Situations – Ust-Kamenogorsk Branch (MES - UK)
- Ministry of Health Care (MoH) – Ust-Kamenogorsk Branch (MoH – UK)
- Ministry of Environmental Protection (MoE) – Ust-Kamenogorsk Branch (MoE - UK)
- Ulba Metallurgical Plant (UMZ)

CONDUCT OF MISSION

This mission is intended to follow the basic concepts set out in the EPREV Guidelines, which is to review all aspects of the State's arrangements, as well as the local arrangements at the LEU Bank facility and its surroundings, to respond to a nuclear or radiological emergency. The review is to be based principally on the international requirements in GS-R-2 [2] and supporting IAEA guidance contained in the "EPR-Method, 2003" [3]. The team members are also to provide suggestions based on their experience and good international practices. In order to focus the effort and to provide insights that will be of immediate practical value the mission will concentrate on the ability to respond to a radiological emergency that can occur in the future fuel bank facility.

The mission team will be composed of 4 members, covering the following areas during the 1 week EPREV mission:

Review of the national emergency preparedness and response capabilities: This activity will review the response of national level organizations that initiate or support local response and the ability of the facility in UMZ to respond to an emergency. The review will be conducted against the IAEA requirements [2] and guidance contained in the EPR-METHOD (2003) [3] document. This will focus on the off-site arrangements and national level preparedness for handling specific aspects of the emergency: notification, communication, activation of national off-site responding organizations etc. One of the

goals will be to establish clearly the roles and responsibilities of the national organizations and their means for coordination, command and control. In the area of preparedness the review of training, conduct of drills and exercises, public information, quality assurance will be performed, as well as notification system and command (decision-making) .system. Review of national policy will also cover assessment of conditions ensuring fulfilment of State obligations resulting from relevant international agreements and Conventions [1].

Local and facility response review: This part of the mission will review the ability of first responders to promptly and effectively identify and respond to nuclear and radiological emergencies, including availability of facility and on-site plans in relevant cases, medical preparedness and response. The review will be conducted against the IAEA requirements [2]; guidance contained in the EPR-METHOD (2003) [3]. This will include reviews of the capabilities of local first responders (operator, police, fire, medical) in the vicinity of the IAEA LEU Bank facility (Ust-Kamenogorsk city).

OUTPUT

A formal report that provides the followings for each of the "functional" and "infrastructure" requirements in GS-R-2 [2]:

- A general description of and comments on the existing situation;
- Recommendation/suggestions of actions that should be taken to establish and/or improve the ability to respond. Suggestions would be based on good international practice and IAEA guidance;
- Good practices.

LOGISTICS

The country will provide or arrange for during the mission:

- Local transportation for the team.
- An English speaking counterpart, if available, for each visit.
- A workroom during the mission for team members' discussions and preparation of technical notes.
- Access to international telephone lines, e-mail, a PC, projector, printer and copier, and Internet.

The country will also assist in making hotel arrangements.

IAEA will assume costs of travel and accommodations for the experts participating in the mission. The Agency will provide the State with the credentials (document details) of the team members (passport copies etc.) in advance, if required.

BRIEFING

The State will provide an overview briefing of the current situation (to include responsibilities, criteria etc.) concerning response to a nuclear or radiological emergency.

INTERVIEW/FACILITY ACCESS

The State will make arrangements and provide a schedule for the expert teams to interview officials of the following authorities and/or have access to the following facilities.

Review of the national emergency preparedness and response capabilities:

- National level ministries/facilities that would support the local response to a radiological emergency and address national issue to include those responsible for (this could be accomplished at combined meetings):
  - National decision making (coordinated response)
  - National emergency notification and contact points
  - Disaster management and relief
  - Law enforcement/criminal investigation
  - Military response
  - Medical treatment of exposed/contaminated people
  - Control of contaminated goods and products
  - Public information
  - Requesting international assistance
  - Training of local first responders
  - Exercises
  - Equipment and maintenance
  - Mitigating non-radiological consequences

Review of the local and facility emergency preparedness and response capabilities (whichever are available at the time of the mission):

- Emergency Services/Management
- Local police (first responders)
- Civil defense (fire fighters)
- Medical (first responders)
- Local hospital (treatment of radiation injuries)
- Hazardous materials response (local radiological, biological and chemical (NBC) defense unit) or Fire (first response)
- Local decision makers
- National emergency notification and contact points
- On site response on industrial sites, hospitals and educational institutions.
- Radiation monitoring capabilities (fixed, mobile, sampling)
- Off-site local authorities

SCHEDULE and TEAM ASSIGNMENTS

See attachment 1.

DOCUMENTS

The country will make available to the mission laws or decrees and International Instruments adhered to by the country (if possible in English) relative to:

- Emergency Preparedness and Response
- Radiation Safety/Nuclear Energy, as applicable to Emergency Preparedness and Response

The IAEA will provide the country with relevant safety standards and guidelines (also available on the IAEA homepage):

- Requirements; GS-R-2 (Ref. [2]).

- Method for developing arrangements for response to a nuclear or radiological emergency (Ref. [3]).

Briefing Pack for the EPREV Team

Document	**Responsibility**
List and description of individual organizations taking part in the emergency preparedness and response specifying their responsibilities and capabilities to perform critical tasks (p. 26, EPR-Method, Ref [3])	Host
List of legislation in the area of EP together with the available English translation	Host
Non-legal policy documents covering response to emergencies including or relevant to nuclear or radiological emergencies	Host
Mission reports (RaSSIA,…)	Host
Past emergency reports	Host
Nuclear Country Profile	IAEA
General Country Profile	IAEA
Customs, holidays, working hours	Host

Documents to be handed over to IAEA co-ordinator before the EPREV mission.

REPORT CONFIDENTIALITY:

The report's initial distribution is restricted to the authorities concerned, the contributors to the report and responsible IAEA staff. In the interest of openness, however, countries are encouraged to make their report public. Therefore, the final report of the EPREV mission will be derestricted after 90 days unless the host country specifically requests that the report remains restricted.

Any technical notes or other information that identify vulnerabilities will be treated as confidential information according to the Agency confidentiality regime.

ATTACHMENT 1: TENTATIVE SCHEDULE

Date	Subject
Sunday, 2 September	**Arrival** in Astana
Monday, 3 September	**Introductory** plenary meeting with national authorities and the representatives of all organizations involved in the national EPR
Tuesday, 4 September	**Travel** to Ust-Kamenogorsk (morning) **Visiting** the site of the future LEU Bank facility
Wednesday, 5 September	**Visits** at/**discussions** with local authorities and responding organizations
Thursday, 6 September	**Travel to Astana** (morning) **Visits** at/**discussions** with national authorities and responding organizations
Friday, 7 September	**Visits** at/**discussions** with national disaster management organization
Saturday, 8 September	**Drafting** the EPREV Mission Report
Sunday, 9 September	**Drafting** the EPREV Mission Report (morning)
Monday, 10 September	**Presentation** of the first draft report to the counterpart, discussions and updating of the draft report
Tuesday, 11 September	**Final** plenary meeting with representatives of all organizations involved in the National EPR **Departure** of the EPREV team from Astana

ATTACHMENT 2: LIST OF ORGANIZATION INVITED TO PARTICIPATE

No.	Institution	No. of Persons
	LOCAL RESPONDERS	
	• Ministry of Emergency Situations – Ust-Kamenogorsk Branch	
	• Ministry of Health Care – Ust-Kamenogorsk Branch	
	NATIONAL AUTHORITIES	
	• Kazakh Atomic Energy Agency (KAEA)	
	• Ministry of Emergency Situations (MES)	
	• Ministry of Health Care (MoH)	
	• Ministry of Environment Protection (MoE)	
	• The State Control Committee for Emergency Situations	
	• State Enterprise "Centre for Epidemiological Inspection"	
	FACILITY	
	• Ulba Metallurgical Plant (UMZ)	

Appendix VII: LIST OF RELEVANT REGULATORY DOCUMENTS

[@001] Kaz=EMER-2000_140 Instruction on evacuation-Rus
[@002] Kaz=EMER-2007_022 Instruction on civil defense protective measures-Rus
[@003] Kaz=EMER-2009_137 Instruction on communication in emergency-Rus
[@004] Kaz=EMER-2009_226 Rules of declaration of emergency-Rus
[@005] Kaz=GDec-(2012 Draft) Plan for response to nuclear and radiation emergencies-Rus&Eng
[@006] Kaz=GDec-1993_0183 Licensing of export and import-Rus
[@007] Kaz=GDec-1995_2344 IAEA Safeguard Agreement-Rus
[@008] Kaz=GDec-1996_0553(2005) Constitution of State Commission for EPR-Rus
[@009] Kaz=GDec-1997_1298(2008) Constitution of state EPR system-Rus
[@010] Kaz=GDec-1999_1917(2008) Constitution of Commission for export control-Rus
[@011] Kaz=GDec-2002_1351 Rules for investigation of causes of emergency-Rus
[@012] Kaz=GDec-2002_1351(2008) Rules for investigation of causes of emergency-Rus
[@013] Kaz=GDec-2003_0050(2008) Rules for informing and educating in EPR-Rus
[@014] Kaz=GDec-2003_0363 Requirements for level of protection from emergency-Rus
[@015] Kaz=GDec-2003_1277(2008) Rules for registering individual doses-Rus
[@016] Kaz=GDec-2003_1383 Programme of development of the SSPLE for 2004-2010-Rus
[@017] Kaz=GDec-2004_0034 Rules of causation of radiation-induced syndromes-Rus
[@018] Kaz=GDec-2004_1112(2012) Constitution of MES-Rus
[@019] Kaz=GDec-2004_1176 Exchange of information on emergency situations-Rus
[@020] Kaz=GDec-2004_1310 Classification of conventional emergencies-Rus
[@021] Kaz=GDec-2005_0012 Rules for use of motor transport in emergency-Rus
[@022] Kaz=GDec-2005_0115 Rules for reimbursement of communication costs in emergency-Rus
[@023] Kaz=GDec-2005_0607(2011) Constitution of MoI-Rus
[@024] Kaz=GDec-2005_0769 Rules for inventory of NM&RS-Rus
[@025] Kaz=GDec-2006_1043 Rules for attestation of staff of operator-Rus
[@026] Kaz=GDec-2006_1306 State EPR programme for 2007-2015-Rus
[@027] Kaz=GDec-2007_0653 Criteria for evaluation of environmental conditions-Rus
[@028] Kaz=GDec-2008_0270(2012) Provisions for licensing activities related to the life cycle of nuclear facilities-Rus
[@029] Kaz=GDec-2008_0578(2009) Licensing of export and import of goods-Rus
[@030] Kaz=GDec-2010_0683 TRYaRB-NPP-2010 TR for N&R safety of NPP-Rus
[@031] Kaz=GDec-2010_0684 TRYaRB-NRF-2010 TR for N&R safety of nuclear research facilities-Rus
[@032] Kaz=GDec-2010_0768 TRYaRB-2010 Technical regulation for N&R safety-Rus
[@033] Kaz=GDec-2011_0347 Rules of disposal of RW into the subsoil-Rus
[@034] Kaz=GDec-2011_0728 Programme of development of nuclear power by 2020-Rus
[@035] Kaz=GDec-2012_0093_1 Sanitary requirements for buildings and industrial facilities-Rus
[@036] Kaz=GDec-2012_0093_2 Sanitary requirements for sanitary protective zone-Rus
[@037] Kaz=GDec-2012_0104 Sanitary requirements for water supplies-Rus
[@038] Kaz=GDec-2012_0168 Sanitary requirements for atmospheric air-Rus
[@039] Kaz=GDec-2012_0201 NRB-2012 Sanitary Norms for radiation protection-Rus
[@040] Kaz=GDec-2012_0202 OSPRB-2012 Sanitary rules for radiation safety-Rus
[@041] Kaz=GDec-2012_0273 Register of public services -Rus
[@042] Kaz=GDec-2012_0308 OSPRO-2012 Sanitary rules for radiation objects-Rus
[@043] Kaz=GDec-2012_0321 Constitution of KAEA-Rus

[@044] Kaz=GDec-2012_0609 Qualification requirements for the personnel-Rus
[@045] Kaz=GDec-(2012 Draft) Plan for response to nuclear and radiation emergencies-Rus&Eng
[@046] Kaz=GDec-2012_0654 Chairman of KAEA
[@047] Kaz=GDec-2012_0753 On Some issues of licensing
[@048] Kaz=KAEC-(2007 Draft) Concept of management of nuclear knowledge-Rus
[@049] Kaz=KAEC-(2009 Draft) QA programme of physical protection of NF-Rus
[@050] Kaz=KAEC-(2009 Draft) QA programmes of accounting and control of N&RM-Rus
[@051] Kaz=KAEC-(2010 Draft) Provisions for accounting and control of NM and RS-Rus
[@052] Kaz=KAEC-(2010 Draft) Provisions for physical protection of NM&F-Rus
[@053] Kaz=KAEC-(2011 Draft) Provisions for transportation of NM and RS-Rus
[@054] Kaz=KAEC-2003_### TBSPH-2003 Safety requirements for handling RW-Rus
[@055] Kaz=KAEC-2004_043 TBPRN-2004 Safety requirements for processing of K-Rus
[@056] Kaz=KAEC-2005_003 Guidelines on audit of safety of BN-350 SNF-Rus
[@057] Kaz=KAEC-2005_003 RD-02-01-30-05 Inspection of replacement of BN-350 SNF-Rus
[@058] Kaz=KAEC-2005_003 RD-05-02-29-05 Documentation of operation of dry storage of SNF-Rus
[@059] Kaz=KAEC-2005_011 Glossary. Accounting, control and physical protection of NM&F-Rus
[@060] Kaz=KAEC-2008_064 RD-P-005-08 Guide on approval of design of transport packages-Rus
[@061] Kaz=KAEC-2008_065 RD-TS-006-08 Contents of safety analysis report of SNF storage-Rus
[@062] Kaz=KAEC-2008_066 RD-RU-007-08 Safety guide for surface disposal of RW-Rus
[@063] Kaz=KAEC-2008_089 Contents of safety analysis report of nuclear research facilities-Rus
[@064] Kaz=KAEC-2008_088 Reporting violations in operation with RM and RW-Rus
[@065] Kaz=KAEC-2008_088 Reporting violations in operation of NF-Rus
[@066] Kaz=KAEC-2008_089 QA programme for nuclear research facilities-Rus
[@067] Kaz=KAEC-2008_089 Contents of safety analysis report-Rus
[@068] Kaz=KAEC-2010_086 RD-P-023-10 Rules for attestation of personnel-Rus
[@069] Kaz=KAEC-2011_011 RD-MR-024-11 GDL on Report on safety analysis of NPP with VVER-Rus
[@070] Kaz=KAEC-2011_011 RD-MR-025-11 GDL on QA programme for safety of N&RF-Rus
[@071] Kaz=KAEC-2011_016 RD-MR-026-11 GDL on categorization of radiation hazards-Rus
[@072] Kaz=KAEC-2012_010 GDL on siting nuclear and radiation facilities-Rus
[@073] Kaz=Law-1996_019(2012) On emergency of natural and man-made-Rus
[@074] Kaz=Law-1997_087-1(2011) On rescue service and rescuer status-Rus
[@075] Kaz=Law-1997_093(2011) Use of Atomic Energy-Rus
[@076] Kaz=Law-1997_100-1(2012) On Civil Defence-Rus
[@077] Kaz=Law-1998_213 On Normative Legal Acts
[@078] Kaz=Law-1998_219(2011) On Radiation Protection of the Public-Rus
[@079] Kaz=Law-2000_011 Convention of Legalization of Official Docs-Rus
[@080] Kaz=Law-2003_378(2011) On State of Emergency-Rus -Rus
[@081] Kaz=Law-2004_017 Convention on Physical Protection-Rus
[@082] Kaz=Law-2007_212(2012) Ecology Codex-Rus
[@083] Kaz=Law-2007_214(2011) On Licensing
[@084] Kaz=Law-2007_229 Additional Protocol to IAEA Safeguard Agreement-Rus

[@085] Kaz=Law-2008_033-IV Convention on Nuclear Terrorism-Rus
[@086] Kaz=Law-2009_193-IV Health codex-Rus
[@087] Kaz=Law-2010_246-IV Joint Convention-Rus
[@088] Kaz=Law-2011_377-IV(2012) On state control and inspection
[@089] Kaz=Law-2011_405-IV Vena convention on nuclear liability-Rus
[@090] Kaz=Law-2011_416-IV Amendment to Convention on Physical Protection-Rus
[@091] Kaz=MINT-2011_### Check list for practices using nuclear energy-Rus
[@092] Kaz=MINT-2011_322 Criteria for risk assessment of nuclear activities-Rus
[@093] Kaz=MoEn-2007_204 Instruction on assessment of environmental impact-Rus
[@094] Kaz=MoEn-2012_110 Method on development of authorized release-Rus
[@095] Kaz=MoPh-2011_360 Rules of radiation control at border crossing-Rus
[@096] Kaz=PDec-2012_0321 About KAEA-Rus
[@097] Kaz=UKmn-2004_3051 Constitution of Ust-Kamenogorsk EPR commission-Rus
[@098] Kaz=GDec-2010_1219 TR on Safety of toxic material-Rus
[@099] Kaz=GDec-2012_0166 Medical followup of those working in hazardous conditions-Rus
[@100] Kaz=EMER-2007_0088 Declaration of industrial safety
[@101] Kaz=MoEn-2007_207 State ecological expertize-Rus
[@102] Kaz=Law-2002_314-On Industrial safety-Rus
[@103] Kaz=Law-2002_580-On mandatory insurance of civil liability-Rus
[@104] Kaz=UMZ-2011_14_2686-RadEmerPlan-Rus
[@105] Kaz=UKmn-2004_3051 Constitution of Ust-Kamenogorsk EPR commission-Rus
[@106] Kaz=Law-2002_314(2012) On industrial safety-Rus

Appendix VIII: REGULATORY DOCUMENTS (WITH ORIGINAL RUSSIAN TITLES)

File name	Russian title
Kaz=EMER-2000_140 Instruction on evacuation-Rus	Об утверждении "Инструкции по организации и проведению эвакуационных мероприятий" Приказ Председателя Агентства Республики Казахстан по чрезвычайным ситуациям от 23 июня 2000 No 140. Зарегистрирован в Министерстве юстиции Республики Казахстан 22.08.2000 г. за No 1229
Kaz=EMER-2007_022 Instruction on civil defense protective measures-Rus	Об утверждении Инструкции по содержанию и объемам инженерно-технических мероприятий гражданской обороны в зависимости от степени категорирования городов и объектов хозяйствования Приказ Министра по чрезвычайным ситуациям Республики Казахстан от 11 декабря 2007 года No 22. Зарегистрирован в Министерстве юстиции Республики Казахстан 25 декабря 2007 года No 5059
Kaz=EMER-2009_137 Instruction on communication in emergency-Rus	Об утверждении Инструкции по передаче информации при угрозах, возникновении или ликвидации чрезвычайных ситуаций Приказ Министра по чрезвычайным ситуациям Республики Казахстан от 22 июня 2009 года No 137. Зарегистрирован в Министерстве юстиции Республики Казахстан 27 июля 2009 года No 5728
Kaz=EMER-2009_226 Rules of declaration of emergency-Rus	Об утверждении Правил представления материалов, обосновывающих наличие чрезвычайной ситуации природного и техногенного характера, мероприятий по ее локализации и ликвидации, расчетов материально-технических, финансовых и людских ресурсов Приказ Министра по чрезвычайным ситуациям Республики Казахстан от 30 сентября 2009 года No 226. Зарегистрирован в Министерстве юстиции Республики Казахстан 28 октября 2009 года No 5833
Kaz=GDec-(2012 Draft) Plan for response to nuclear and radiation emergencies-Rus&Eng	План реагирования на ядерные и радиационные аварии Проект 2012

File name	Russian title
Kaz=GDec-1993_0183 Licensing of export and import-Rus	Об утверждении Положения об экспорте и импорте ядерных материалов, технологий, оборудования, установок, специальных неядерных материалов, оборудования, материалов и технологий двойного назначения, источников радиоактивного излучения и изотопной продукции Постановление Кабинета Министров Республики Казахстан от 9 марта 1993 года No 183
Kaz=GDec-1995_2344 IAEA Safeguard Agreement-Rus	О ратификации Соглашения между Республикой Казахстан и Международным агентством по атомной энергии о применении гарантий в связи с Договором о нераспространении ядерного оружия Указ Президента Республики Казахстан от 19 июня 1995 г. No 2344
Kaz=GDec-1996_0553(2005) Constitution of State Commission for EPR-Rus	О Межведомственной государственной комиссии по предупреждению и ликвидации чрезвычайных ситуаций Постановление Правительства Республики Казахстан от 3 мая 1996 г. No 553
Kaz=GDec-1997_1298(2008) Constitution of state EPR system-Rus	О государственной системе предупреждения и ликвидации чрезвычайных ситуаций Постановление Правительства Республики Казахстан от 28 августа 1997 г. No 1298
Kaz=GDec-1999_1917(2008) Constitution of Commission for export control-Rus	О совершенствовании системы экспортного контроля в Республике Казахстан Постановление Правительства Республики Казахстан от 14 декабря 1999 года No 1917
Kaz=GDec-2002_1351 Rules for investigation of causes of emergency-Rus	Об утверждении Правил расследования причин аварий, бедствий и катастроф, приведших к возникновению чрезвычайных ситуаций природного и техногенного характера Постановление Правительства Республики Казахстан от 24 декабря 2002 года No 1351
Kaz=GDec-2002_1351(2008) Rules for investigation of causes of emergency-Rus	Об утверждении Правил расследования причин аварий, бедствий и катастроф, приведших к возникновению чрезвычайных ситуаций природного и техногенного характера Постановление Правительства Республики Казахстан от 24 декабря 2002 года No 1351
Kaz=GDec-2003_0050(2008) Rules for informing and educating in EPR-Rus	Правила информирования, пропаганды знаний, обучения населения и специалистов в области чрезвычайных ситуаций Постановление Правительства Республики Казахстан от 17 января 2003 года No 50
Kaz=GDec-2003_0363 Requirements for level of protection from emergency-Rus	Об утверждении уровня защищенности объектов и территорий от чрезвычайных ситуаций Постановление Правительства Республики Казахстан от 16 апреля 2003 года No 363

File name	Russian title
Kaz=GDec-2003_1277(2008) Rules for registering individual doses-Rus	Об утверждении Правил контроля и учета индивидуальных доз облучения, полученных гражданами при работе с источниками ионизирующего излучения, проведении медицинских рентгенорадиологических процедур, а также обусловленных радиационным фоном Постановление Правительства Республики Казахстан от 19 декабря 2003 года No 1277
Kaz=GDec-2003_1383 Programme of development of the SSPLE for 2004-2010-Rus	Об утверждении Программы развития государственной системы предупреждения и ликвидации чрезвычайных ситуаций на 2004-2010 годы Постановление Правительства Республики Казахстан от 31 декабря 2003 года No 1383
Kaz=GDec-2004_0034 Rules of causation of radiation-induced syndromes-Rus	Об утверждении перечня заболеваний, связанных с воздействием ионизирующих излучений, и Правил установления причинной связи заболеваний с воздействием ионизирующих излучений Постановление Правительства Республики Казахстан от 13 января 2004 года No 34
Kaz=GDec-2004_1112(2012) Constitution of EMERCOM-Rus	Вопросы Министерства по чрезвычайным ситуациям Республики Казахстан Постановление Правительства Республики Казахстан от 28 октября 2004 года No 1112
Kaz=GDec-2004_1176 Exchange of information on emergency situations-Rus	Об утверждении Соглашения об обмене информацией о чрезвычайных ситуациях природного и техногенного характера, об информационном взаимодействии при ликвидации их последствий и оказании помощи пострадавшему населению Постановление Правительства Республики Казахстан от 10 ноября 2004 года No 1176
Kaz=GDec-2004_1310 Classification of conventional emergencies-Rus	Об утверждении классификации чрезвычайных ситуаций природного и техногенного характера Постановление Правительства Республики Казахстан от 13 декабря 2004 года No 1310
Kaz=GDec-2005_0012 Rules for use of motor transport in emergency-Rus	Об утверждении Правил привлечения автомобильных перевозчиков к ликвидации чрезвычайных ситуаций Постановление Правительства Республики Казахстан от 13 января 2005 года No 12
Kaz=GDec-2005_0115 Rules for reimbursement of communication costs in emergency-Rus	Об утверждении Правил возмещения затрат, понесенных операторами связи при использовании их сетей и средств во время чрезвычайных ситуаций природного и техногенного характера Постановление Правительства Республики Казахстан от 7 февраля 2005 года No 115

File name	Russian title
Kaz=GDec-2005_0607(2011) Constitution of MoI-Rus	Вопросы Министерства внутренних дел Республики Казахстан Постановление Правительства Республики Казахстан от 22 июня 2005 года No 607
Kaz=GDec-2005_0769 Rules for inventory of NM&RS-Rus	Об утверждении Правил организации государственных систем учета и контроля ядерных материалов и источников ионизирующего излучения в Республике Казахстан Постановление Правительства Республики Казахстан от 22 июля 2005 года No 769
Kaz=GDec-2006_1043 Rules for attestation of staff of operator-Rus	Об утверждении Правил прохождения аттестации персонала эксплуатирующей организации Постановление Правительства Республики Казахстан от 2 ноября 2006 года No 1043
Kaz=GDec-2006_1306 State EPR programme for 2007-2015-Rus	О проекте Указа Президента Республики Казахстан "О Государственной программе предупреждения и ликвидации чрезвычайных ситуаций на 2007-2015 годы" Постановление Правительства Республики Казахстан от 29 декабря 2006 года No 1306
Kaz=GDec-2007_0653 Criteria for evaluation of environmental conditions-Rus	Об утверждении критериев оценки экологической обстановки территорий Постановление Правительства Республики Казахстан от 31 июля 2007 года No 653
Kaz=GDec-2008_0270(2012) Provisions for licensing activities related to the life cycle of nuclear facilities-Rus	Об утверждении квалификационных требований, предъявляемых к лицензируемым видам деятельности в сфере использования атомной энергии Постановление Правительства Республики Казахстан от 19 марта 2008 года No 270
Kaz=GDec-2008_0578(2009) Licensing of export and import of goods-Rus	Об утверждении Правил лицензирования экспорта и импорта товаров, в том числе продукции, подлежащей экспортному контролю, а также деятельности при автоматическом лицензировании импорта отдельных товаров, квалификационных требований, предъявляемых к деятельности по лицензированию и перечня товаров, экспорт и импорт которых подлежат лицензированию Постановление Правительства Республики Казахстан от 12 июня 2008 года No 578
Kaz=GDec-2010_0683 TRYaRB-NPP-2010 TR for N&R safety of NPP-Rus	Об утверждении технического регламента "Ядерная и радиационная безопасность атомных станций" Постановление Правительства Республики Казахстан от 1 июля 2010 года No 683
Kaz=GDec-2010_0684 TRYaRB-NRF-2010 TR for N&R safety of nuclear research facilities-Rus	Об утверждении технического регламента "Ядерная и радиационная безопасность исследовательских ядерных установок" Постановление Правительства Республики Казахстан от 1 июля 2010 года No 684

File name	Russian title
Kaz=GDec-2010_0768 TRYaRB-2010 Technical regulation for N&R safety-Rus	Об утверждении технического регламента "Ядерная и радиационная безопасность" Постановление Правительства Республики Казахстан от 30 июля 2010 года No 768
Kaz=GDec-2011_0347 Rules of disposal of RW into the subsoil-Rus	Об утверждении Правил захоронения вредных веществ, радиоактивных отходов и сброса сточных вод в недра Постановление Правительства Республики Казахстан от 2 апреля 2011 года No 347
Kaz=GDec-2011_0728 Programme of development of nuclear power by 2020-Rus	Об утверждении Программы развития атомной отрасли в Республике Казахстан на 2011-2014 годы с перспективой развития до 2020 года Постановление Правительства Республики Казахстан от 29 июня 2011 года No 728
Kaz=GDec-2012_0093_1 Sanitary requirements for buildings and industrial facilities-Rus	Об утверждении Санитарных правил "Санитарно-эпидемиологические требования к зданиям и сооружениям производственного назначения" Постановление Правительства Республики Казахстан от 17 января 2012 года No 93
Kaz=GDec-2012_0093_2 Sanitary requirements for sanitary protective zone-Rus	Об утверждении Санитарных правил "Санитарно-эпидемиологические требования по установлению санитарно-защитной зоны производственных объектов" Постановление Правительства Республики Казахстан от 17 января 2012 года No 93
Kaz=GDec-2012_0104 Sanitary requirements for water supplies-Rus	Об утверждении Санитарных правил "Санитарно-эпидемиологические требования к водоисточникам, местам водозабора для хозяйственно-питьевых целей, хозяйственно-питьевому водоснабжению и местам культурно-бытового водопользования и безопасности водных объектов" Постановление Правительства Республики Казахстан от 18 января 2012 года No 104
Kaz=GDec-2012_0168 Sanitary requirements for atmospheric air-Rus	Об утверждении Санитарных правил "Санитарно-эпидемиологические требования к атмосферному воздуху в городских и сельских населенных пунктах, почвам и их безопасности, содержанию территорий городских и сельских населенных пунктов, условиям работы с источниками физических факторов, оказывающих воздействие на человека" Постановление Правительства Республики Казахстан от 25 января 2012 года No 168
Kaz=GDec-2012_0201 NRB-2012 Sanitary Norms for radiation protection-Rus	Гигиенические нормативы «Санитарно-эпидемиологические требования к обеспечению радиационной безопасности» Утверждены постановлением Правительства Республики Казахстан от 3 февраля 2012 года No 201

File name	Russian title
Kaz=GDec-2012_0202 OSPRB-2012 Sanitary rules for radiation safety-Rus	Санитарные правила «Санитарно-эпидемиологические требования к обеспечению радиационной безопасности» Утверждены постановлением Правительства Республики Казахстан от 3 февраля 2012 года No 202
Kaz=GDec-2012_0273 Register of public services -Rus	О внесении изменений в постановление Правительства Республики Казахстан от 20 июля 2010 года No 745 "Об утверждении реестра государственных услуг, оказываемых физическим и юридическим лицам" Постановление Правительства Республики Казахстан от 29 февраля 2012 года No 273
Kaz=GDec-2012_0308 OSPRO-2012 Sanitary rules for radiation objects-Rus	Об утверждении Санитарных правил "Санитарно-эпидемиологические требования к радиационно-опасным объектам" Постановление Правительства Республики Казахстан от 11 марта 2012 года No 308
Kaz=GDec-2012_0321 Constitution of KAEA-Rus	Вопросы Агентства Республики Казахстан по атомной энергии Постановление Правительства Республики Казахстан от 9 июля 2012 года No 926
Kaz=GDec-2012_0609 Qualification requirements for the personnel-Rus	Об утверждении квалификационных требований к персоналу, занятому на объектах использования атомной энергии Постановление Правительства Республики Казахстан от 14 мая 2012 года No 609
Kaz=GDec-(2012 Draft) Plan for response to nuclear and radiation emergencies-Rus&Eng	План реагирования на ядерные и радиационные аварии Проект 2012
Kaz=GDec-2012_0654 Chairman of KAEA	О Жантикиие Т.М. Постановление Правительства Республики Казахстан от 22 мая 2012 года No 654
Kaz=GDec-2012_0753 On Some issues of licensing	О некоторых вопросах лицензирования Постановление Правительства Республики Казахстан от 7 июня 2012 года No 753
#Part 2	
Kaz=KAEC-(2007 Draft) Concept of management of nuclear knowledge-Rus	Концепция управления ядерно-технологическими знаниями в Республике Казахстан Проект 2007
Kaz=KAEC-(2009 Draft) QA programme of physical protection of NF-Rus	Методические указания по разработке программ обеспечения качества физической защиты объектов использования атомной энергии Проект 2009

File name	Russian title
Kaz=KAEC-(2009 Draft) QA programmes of accounting and control of N&RM-Rus	Методические указания по разработке программ обеспечения качества учета и контроля ядерных материалов, источников ионизирующих излучений, радиоактивных веществ. Проект 2009
Kaz=KAEC-(2010 Draft) Provisions for accounting and control of NM and RS-Rus	Правила организации государственной системы учета и контроля ядерных материалов и источников ионизирующего излучения в Республике Казахстан Проект 2010
Kaz=KAEC-(2010 Draft) Provisions for physical protection of NM&F-Rus	Правила физической защиты ядерных материалов и ядерных установок Проект 2010
Kaz=KAEC-(2011 Draft) Provisions for transportation of NM and RS-Rus	Правила транспортировки ядерных материалов и источников ионизирующего излучения Проект 2011
Kaz=KAEC-2003_### TBSPH-2003 Safety requirements for handling RW-Rus	Требования безопасности при сборе, переработке и хранении радиоактивных отходов. ТБСПХ-2003 Утверждено приказом Председателя КАЭ МЭМР РК No ### 2003г.
Kaz=KAEC-2004_043 TBPRN-2004 Safety requirements for processing of K-Rus	Требования по безопасности при переработке радиоактивного натрия. ТБПРН-2004 Утверждено приказом Председателя КАЭ МЭМР РК No 43 от «21» июня 2004г.
Kaz=KAEC-2005_003 Guidelines on audit of safety of BN-350 SNF-Rus	Методические указания по проверке безопасности деятельности по перемещению отработавшего топлива реактора БН- 350 на площадке МАЭК. РД-02-01-31-05 Утверждено приказом Председателя КАЭ МЭМР РК No_3_от_7 февраля_2005г.
Kaz=KAEC-2005_003 RD-02-01-30-05 Inspection of replacement of BN-350 SNF-Rus	Проект размещения отработавшего ядерного топлива БН- 350. Руководство по инспекции. РД- 02-01-30-05 Утверждено приказом Председателя КАЭ МЭМР РК No_3_от_7 февраля_2005г.
Kaz=KAEC-2005_003 RD-05-02-29-05 Documentation of operation of dry storage of SNF-Rus	Требования к составу и содержанию документов в обоснование эксплуатации сухого хранилища отработавшего топлива. РД-05-02-29-05 Утверждено приказом Председателя КАЭ МЭМР РК No 3 от 7 февраля_2005г.

File name	Russian title
Kaz=KAEC-2005_011 Glossary. Accounting, control and physical protection of NM&F-Rus	Учет, контроль и физическая защита ядерных материалов и ядерных установок. Терминологический словарь. Утвержден Приказом Председателя Комитета по атомной энергетике Министерства энергетики и минеральных ресурсов Республики Казахстан от 6 мая 2005 г. No 11
Kaz=KAEC-2008_064 RD-P-005-08 Guide on approval of design of transport packages-Rus	Руководство по утверждению конструкций радиоактивных материалов, транспортных упаковок и условий перевозок. РД-Р-005-08 Утверждено приказом Председателя КАЭ МЭМР РК No 64пр от 17 июля 2008 г.
Kaz=KAEC-2008_065 RD-TS-006-08 Contents of safety analysis report of SNF storage-Rus	Типовое содержание отчета по анализу безопасности хранилища отработавшего топлива. РД-ТС-006-08 Утверждено приказом Председателя КАЭ МЭМР РК No 65пр от 17 июля 2008 г.
Kaz=KAEC-2008_066 RD-RU-007-08 Safety guide for surface disposal of RW-Rus	Руководство по безопасности приповерхностного захоронения радиоактивных отходов. РД-РУ-007-08 Утверждено приказом Председателя КАЭ МЭМР РК No 66 от 17 июля 2008 г.
Kaz=KAEC-2008_089 Contents of safety analysis report of nuclear research facilities-Rus	Типовое содержание отчета по анализу безопасности исследовательских ядерных установок Утверждены Приказом Председателя Комитета по атомной энергетике Министерства энергетики и минеральных ресурсов Республики Казахстан No 89-пр. от 05 ноября 2008
Kaz=KAEC-2008_088 Reporting violations in operation with RM and RW-Rus	Методические указания по информированию, расследованию и учету нарушений при работе с радиоактивными веществами и радиоактивными отходами Утверждены Приказом Председателя Комитета по атомной энергетике Министерства энергетики и минеральных ресурсов Республики Казахстан No 88-пр. от 05 ноября 2008 г
Kaz=KAEC-2008_088 Reporting violations in operation of NF-Rus	Методические указания по информированию, расследованию и учету нарушений в работе объектов ядерного топливного цикла Утверждены Приказом Председателя Комитета по атомной энергетике Министерства энергетики и минеральных ресурсов Республики Казахстан No 88-пр. от 05 ноября 2008 г.

File name	Russian title
Kaz=KAEC-2008_089 QA programme for nuclear research facilities-Rus	Типовое содержание программы обеспечения качества для исследовательских ядерных установок Утверждены Приказом Председателя Комитета по атомной энергетике Министерства энергетики и минеральных ресурсов Республики Казахстан No 89-пр. от 05 ноября 2008
Kaz=KAEC-2008_089 Contents of safety analysis report-Rus	Типовое содержание отчета по анализу безопасности исследовательских ядерных установок Утверждены Приказом Председателя Комитета по атомной энергетике Министерства энергетики и минеральных ресурсов Республики Казахстан № 89-пр. от 05 ноября 2008
Kaz=KAEC-2010_086 RD-P-023-10 Rules for attestation of personnel-Rus	Общие правила выдачи разрешений персоналу на право ведения работ в области использования атомной энергии. РД-П-023-10 Утверждено Приказом КАЭ No 86-пр от 10.12.2010 г
Kaz=KAEC-2011_011 RD-MR-024-11 GDL on Report on safety analysis of NPP with VVER-Rus	Методические рекомендации по составлению отчета по анализу безопасности атомных станций с водоохлаждаемым реактором типа ВВЭР. РД-МР-024-11 Утверждены приказом Председателя КАЭ МИНТ РК от 30 марта 2011 г. No 11-пр
Kaz=KAEC-2011_011 RD-MR-025-11 GDL on QA programme for safety of N&RF-Rus	Методические рекомендации по разработке программы обеспечения качества для безопасности ядерных, радиационных и электрофизических установок. РД-МР-025-11 Утверждены приказом Председателя КАЭ МИНТ РК от 30 марта 2011 г. No 11-пр
Kaz=KAEC-2011_016 RD-MR-026-11 GDL on categorization of radiation hazards-Rus	Методические рекомендации по определению категории потенциальной радиационной опасности ядерных, радиационных и электрофизических установок. РД-МР-026-11 Утверждены приказом Председателя КАЭ МИНТ РК от 25 мая 2011 года No 16-пр
Kaz=KAEC-2012_010 GDL on siting nuclear and radiation facilities-Rus	Руководство по выбору площадки размещения ядерных, радиационных и электрофизических установок Утверждены приказом Председателя КАЭ МИНТ РК от 30 января 2012 года No 10-пр
Kaz=Law-1996_019(2012) On emergency of natural and man-made-Rus	О чрезвычайных ситуациях природного и техногенного характера Закон Республики Казахстан от 5 июля 1996 года No 19
Kaz=Law-1997_087-1(2011) On rescue service and rescuer status-Rus	Об аварийно-спасательных службах и статусе спасателей Закон Республики Казахстан от 27 марта 1997 г. No 87-1
Kaz=Law-1997_093(2011) Use of Atomic Energy-Rus	Об использовании атомной энергии Закон Республики Казахстан от 14 апреля 1997 года No 93

File name	Russian title
Kaz=Law-1997_100-1(2012) On Civil Defence-Rus	О Гражданской обороне Закон Республики Казахстан от 7 мая 1997 года No 100-1
Kaz=Law-1998_213 On Normative Legal Acts	О нормативных правовых актах Закон Республики Казахстан от 24 марта 1998 года No 213
Kaz=Law-1998_219(2011) On Radiation Protection of the Public-Rus	О радиационной безопасности населения Закон Республики Казахстан от 23 апреля 1998 года No 219
Kaz=Law-2000_011 Convention of Legalization of Official Docs-Rus	О присоединении Республики Казахстан к Конвенции, отменяющей требование легализации иностранных официальных документов Закон Республики Казахстан от 30 декабря 1999 года No 11
Kaz=Law-2003_378(2011) On State of Emergency-Rus -Rus	О чрезвычайном положении Закон Республики Казахстан от 8 февраля 2003 года No 387
Kaz=Law-2004_017 Convention on Physical Protection-Rus	О присоединении Республики Казахстан к Конвенции о физической защите ядерного материала Закон Республики Казахстан от 22 декабря 2004 года No 17
Kaz=Law-2007_212(2012) Ecology Codex-Rus	Экологический кодекс Республики Казахстан Кодекс Республики Казахстан от 9 января 2007 года No 212
Kaz=Law-2007_214(2011) On Licensing	О лицензировании Закон Республики Казахстан от 11 января 2007 года No 214
Kaz=Law-2007_229 Additional Protocol to IAEA Safeguard Agreement-Rus	О ратификации Дополнительного протокола к Соглашению между Республикой Казахстан и Международным агентством по атомной энергии о применении гарантий в связи с Договором о нераспространении ядерного оружия Закон Республики Казахстан от 19 февраля 2007 года No 229
Kaz=Law-2008_033-IV Convention on Nuclear Terrorism-Rus	О ратификации Международной конвенции о борьбе с актами ядерного терроризма Закон Республики Казахстан от 14 мая 2008 года No 33-IV
Kaz=Law-2009_193-IV Health codex-Rus	О здоровье народа и системе здравоохранения Кодекс Республики Казахстан от 18 сентября 2009 года No 193-IV
Kaz=Law-2010_246-IV Joint Convention-Rus	О ратификации Объединенной конвенции о безопасности обращения с отработавшим топливом и о безопасности обращении с радиоактивными отходами Закон Республики Казахстан от 3 февраля 2010 года No 246-IV

File name	Russian title
Kaz=Law-2011_377-IV(2012) On state control and inspection	О государственном контроле и надзоре в Республике Казахстан Закон Республики Казахстан от 6 января 2011 года No 377-IV
Kaz=Law-2011_405-IV Vena convention on nuclear liability-Rus	О ратификации Венской конвенции о гражданской ответственности за ядерный ущерб 1997 года (Сводный текст Венской конвенции о гражданской ответственности за ядерный ущерб от 21 мая 1963 года с поправками, внесенными Протоколом от 12 сентября 1997 года) Закон Республики Казахстан от 10 февраля 2011 года No 405-IV
Kaz=Law-2011_416-IV Amendment to Convention on Physical Protection-Rus	О ратификации Поправки к Конвенции о физической защите ядерного материала Закон Республики Казахстан от 19 марта 2011 года No 416-IV
Kaz=MINT-2011_### Check list for practices using nuclear energy-Rus	Проверочный лист субъектов в сфере частного предпринимательства в области атомной энергии Утвержден совместным приказом И.о. Министра индустрии и новых технологий Республики Казахстан от ### 2011 года и И. о. Министра экономического развития и торговли Республики Казахстан от ### 2011 года
Kaz=MINT-2011_322 Criteria for risk assessment of nuclear activities-Rus	Об утверждении критериев оценки степени риска субъектов в сфере частного предпринимательства в области атомной энергии Совместный приказ и.о. Министра индустрии и новых технологий Республики Казахстан от 15 сентября 2011 года No 322 и и.о. Министра экономического развития и торговли Республики Казахстан от 16 сентября 2011 года No 303. Зарегистрирован в Министерстве юстиции Республики Казахстан 10 октября 2011 года No 7247
Kaz=MoEn-2007_204p Instruction on assessment of environmental impact-Rus	Об утверждении Инструкции по проведению оценки воздействия намечаемой хозяйственной и иной деятельности на окружающую среду при разработке предплановой, плановой, предпроектной и проектной документации Приказ Министра охраны окружающей среды Республики Казахстан от 28 июня 2007 года No 204-п. Зарегистрирован в Министерстве юстиции Республики Казахстан 23 июля 2007 года No 4825
Kaz=MoEn-2012_110e Method on development of authorized release-Rus	Об утвеждении Методики определения нормативов эмиссий в окружающую среду Приказ Министра охраны окружающей среды Республики Казахстан от 16 апреля 2012 года No 110-ө. Зарегистрирован в Министерстве юстиции Республики Казахстан 16 мая 2012 года No 7664

File name	Russian title
Kaz=MoPh-2011_360 Rules of radiation control at border crossing-Rus	Об утверждении Правил проведения радиационного контроля Приказ Министра финансов Республики Казахстан от 11 июля 2011 года No 360. Зарегистрирован в Министерстве юстиции Республики Казахстан 15 августа 2011 года No 7125
Kaz=PDec-2012_0321 About KAEA-Rus	Об Агентстве Республики Казахстан по атомной энергии Указ президента Республики Казахстан от 7 мая 2012 No 321
Kaz=UKmn-2004_3051 Constitution of Ust-Kamenogorsk EPR commission-Rus	О межведомственной Усть-Каменогорской городской комиссии по предупреждению и ликвидации чрезвычайных ситуаций Постановление акимата города Усть-Каменогорск от 14 января 2004 года No 3051. Зарегистрировано Департаментом юстиции Восточно-Казахстанской области 26 января 2004 года за No 1608.