FINAL EPREV REPORT

PEER APPRAISAL OF THE ARRANGEMENTS IN URUGUAY REGARDING THE PREPAREDNESS FOR RESPONDING TO A RADIATION EMERGENCY

05–14 November 2012
Montevideo, Uruguay

International Atomic Energy Agency

ACKNOWLEDGEMENT

The mission team gained access to the majority of the principal organizations, which provided excellent cooperation and valuable input at all levels. The time spent with the Uruguayan counterparts was extremely productive. The professional interest and involvement on the part of representatives from the critical response organizations with whom the mission team interacted was vital to the success of this mission.

Mr Walter Cabral, Director General of the Uruguayan National Regulatory Authority (ARNR) welcomed the mission and participated in several of the planned activities during the first week. The mission team also wishes to extend its special appreciation to Mrs Olga Gonzalez and Mrs Blanca Faller from the ARNR and their colleagues for taking care of all arrangements and for their active participation during all the sessions.

FOREWORD

Within the United Nations system, the International Atomic Energy Agency (IAEA) has the statutory functions of establishing standards of safety for the protection of health against exposure to ionizing radiation, and of providing for the application of these standards. In addition, under the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention) [1] the IAEA has a function, if requested, to assist Member States in preparing emergency arrangements for responding to nuclear accidents and radiological emergencies.

In response to a request from the National Authority on Radiation Protection (ARNR), the IAEA fielded an Emergency Preparedness Review (EPREV) mission to Uruguay to conduct, in accordance with Article III of the IAEA Statute, a peer review of Uruguay's radiation emergency preparedness and response arrangements vis-à-vis the relevant IAEA standards.

TABLE OF CONTENTS

Contents

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 [2]. 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 [3] (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 (the 'Assistance Convention') to provide a compendium of best practices for emergency planners aiming to comply with the IAEA Requirements [2].

With the intention to address the lessons learned from the nuclear emergency following the East-Japan earthquake and tsunami, the Board of Governors adopted the Action Plan on Nuclear Safety, which encourages Member States to review their emergency preparedness capabilities and to invite corresponding review services offered by the IAEA. On 10th April, 2012, the Uruguayan counterpart (ARNR) submitted a request for an Emergency Preparedness Review (EPREV) mission to assess the prevailing situation in the country.

As a result of the request from ARNR 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 Uruguayan counterpart with the request to update the information based on 14 main elements extracted from Ref [2]. This questionnaire contained information that had been obtained during the most recent Regional Coordination Meeting of the TC regional project RLA/9/061, held in Santo Domingo, Dominican Republic, in March 2011. Subsequently, and further to the upgrading of the self-assessment questionnaire to reflect the lessons learned from the Fukushima accident, a second version of this document was sent to the Uruguayan counterparts with the request to amend the original questionnaire. The updated sheets were returned to the IAEA prior to the conduct of the mission.
- The Terms of Reference (ToR) was drafted in March 2012 and finalized in October 2012.
- The mission was implemented from 05 to 14 November 2012.

The overall objectives of this mission were:

(a) To provide an *assessment of the State's capability* to respond to nuclear and radiological incidents and emergencies to include those involving terrorist attacks.

(b) To assist the State in the development of *interim arrangements* to promptly respond to a nuclear or radiological emergency. This will include suggested steps that can be taken immediately to better use existing capabilities.

(c) To assist the State in providing a basis upon which the State can develop a *longer-term programme* to enhance their ability to respond.

1.2. SCOPE

The review focused on Uruguay's ability to respond to a nuclear or radiological emergency and was based on an assessment of existing response provisions and capabilities. The mission did not make a detailed appraisal of the status of development of the national regulatory infrastructure. Instead, it focused on the national arrangements for radiation emergency preparedness.

The review consisted of:

- Reviewing and verifying the statements (Performance Indicators) made by the Uruguayan counterparts;
- Determining if the arrangements for preparedness and response for radiation emergencies in Uruguay were in conformity with the international requirements [2];
- Identifying methods and means of meeting the international requirements and other good practices. The safety guides indicated in references [12] and [13], and the expertise of the mission team members provided the basis for these suggestions;
- Discussing the proposed National Emergency Plan to Respond to Radiological Emergencies (PRENAR) structure, including mainly the given legal framework, and the national institutions that are assumed to be part of this plan.

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 and national emergency response and preparedness arrangements for all radiation emergencies that may affect Uruguay. 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 10 working days, which also included some time to be allocated for the visits to different agencies that are a part of the PRENAR). In order to focus the effort and to provide mission findings that would be generally applicable to the existing Uruguayan preparedness and response system, the arrangements for dealing with two different types of situations warranting emergency preparedness were examined:

- The capability to respond to a radiation emergency that might occur anywhere in the country (threat category IV[1]). These arrangements include local (departments or province) emergency services having the basic ability to recognize a radiation emergency and to take appropriate immediate action and the ability of national officials to support local response organizations.
- The capability to respond to a radiation emergency that 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

[1] The different threat categories (I through V) are defined in the IAEA requirements [2] and guidance [3]

category I or II; including such facilities in other States, to levels necessitating prompt restrictions on products in accordance with international standards (threat category V).

The reviews were used to benchmark emergency preparedness arrangements for these two different regulatory and operational environments, and generalized findings were subsequently developed.

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

- Emergency management;
- Emergency preparedness;
- Radiation protection;
- Law enforcement;
- Medical response;
- Public information; and
- 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 data and analysis collected and included in this report rely on documents, 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 considered as crucial to the establishment of an effective emergency response capability.

1.3 PROCESS

The general schedule for the mission established in agreement with the counterparts in Uruguay is shown in Appendix II. The mission team conducted interviews, reviewed the PRENAR structure and concentrated on reviewing, amending and validating the self-assessment sheets.

The mission team interacted with the following main organizations (details of the personnel contacted are provided in Appendix III):

- National Authority on Radiation Protection (ARNR);
- Local Emergency Operations Centre (CECOED) – Montevideo;
- National Direction of Fire-fighters (DNB);
- National Emergency Direction (DNE);
- National Direction of Road Police (DNPC);
- Ministry of Industry, Energy and Mining (MIEM);
- National Emergency System (SINAE);
- National Direction of Technical Police (DNPT);
- Central Hospital of the Army (HCFF.AA.);
- Police Hospital (HP);
- Centre of Nuclear Research (CIN);
- Republican Guard. Unit 6 (GR-U6); and

- Regional Police Directorate of Montevideo

1.4 INPUTS AND GUIDANCE FOR THE ASSESSMENT

The EPREV mission was conducted in accordance with the Terms of Reference (ToR), which are provided in Appendix IV.

The self-assessment sheets, containing the evaluation prepared by the ARNR, provided an important input for the assessment of the country's radiological emergency preparedness and response capabilities.

A set of documents as well as presentations on the roles and functions of the agencies visited, were obtained during the mission.

From the point of view of emergency response at the national level, the authorities and organizations referred to in the PRENAR should be considered relevant.

According to the IAEA threat categories for the purpose of preparedness for response to a radiological emergency of radiation related threats in Ref. [2], in its self-assessment Uruguay considered that its facilities and practices belong to threat category IV. Nevertheless, the national authorities recognize the need to incorporate arrangements for threat category V into their emergency system.

2. SUMMARY OF FINDINGS

2.1. INTRODUCTION

The mission team formulated recommendations and suggestions on the basis of the findings obtained from the visits and interviews with the different relevant authorities, documents and the field exercise. The recommendations need to be addressed in order to comply with the IAEA Requirements [2]; which are therefore stated as actions that *must* be implemented and the specific corresponding paragraph from the IAEA Requirements [2] provided in a separate paragraph entitled 'Basis for recommendation'.

To help implement the recommendations, the mission team provides suggestions for improving Uruguay's ability to meet the IAEA requirements based on references [12] and [13].

The team also highlighted good practices, whenever these were deemed justified.

In general terms, it can be concluded that Uruguay has a substantial legal framework to support emergency preparedness and response activities. However, it was identified that there is some ambiguity on determining the allocation of responsibilities for coordination at the national level between the regulatory body and the SINAE.

The mission team reviewed the legal framework regarding the guidelines on national intervention levels for taking urgent protective actions, as well as the establishment of operational intervention levels (OILs), finding that specific guidelines should be issued.

The EPREV team recommends that the regulatory body strengthen its radiation emergency group, such as the number of staff and the development of detailed plans and procedures covering radiation emergency scenarios that are described in the PRENAR.

Improvements in a specialized medical response has been undertaken, such as two more hospitals being included to the PRENAR in addition to the existing Clinics Hospital (HC)

The PRENAR establishes that an operational objective of the SINAE is coordinating information in a radiation emergency. However, Law No 18.691, which establishes SINAE, does not clearly assign the responsibility for keeping the public informed in case of contingencies to a specific governmental agency or participating organization.

Regulation UY 100 establishes that generic action levels for foodstuff will be based on international standards, but there are no specific documents establishing intervention and action levels. Arrangements for taking agricultural countermeasures are not addressed, although a portion of the national territory is part of the food restriction planning zone of a Nuclear Power Plant (NPP) in a neighbouring country.

There are no specific procedures in place to respond to public concern in an actual or potential nuclear or radiological emergency. A mechanism to detect misinformation

circulating among the public, rumours and public reactions to a radiological emergency has not been established.

The PRENAR was approved by the President of Uruguay in June 2005. The plan sets out 14 participating institutions. The issue of threat category V is partially addressed in the plan, but is not sufficiently accomplished regarding the threat posed by the nearest nuclear power plant, which is located in Argentina approximately 80 km from the Uruguayan border.

The PRENAR establishes that each participating institution should develop its own plan and detailed procedures. However, emergency plans to respond to radiological emergencies of the participating organizations of the PRENAR were not shown to the EPREV team. The organizational structure, the relationships between major response organizations and the positions responsible within operating and response organizations are not clearly documented.

At present, most of the necessary supplies, equipment, communication systems, and facilities recognized for response to radiation emergencies are part of the existing capabilities for conventional emergencies. Specific resources in the response organizations are limited for a radiological response.

Exercises have been organized and conducted by first response organizations in cooperation with the ARNR. However, drill and exercise programmes for testing specified functions of response organizations were not shown to the EPREV team. National level exercise programmes for testing organizational interfaces among the response organizations were also not shown to the EPREV team.

In relation to the response to emergencies caused by terrorist attacks, specific arrangements between the relevant organizations are in place but do not include nuclear or radiological components.

In order to continue the momentum from recent activities that have been undertaken (including this mission), it is recommended that efforts are taken to implement the actions arising from the findings in this report and these actions assigned as a high priority to be completed within three years, with the support of the IAEA, if necessary.

The National Emergency Plan to Respond to Radiological Emergencies should be reviewed and revised. There are several reasons to support this recommendation:

(i) the role of coordination should take into account the current legislation – principally the legislation following the creation of SINAE;
(ii) a new basis for threat analysis should be used, (e.g. to take into account NPPs in neighbouring countries);
(iii) the capabilities of some key organizations have changed;
(iv) other organizations need to be included into the process;
(v) a concept of operations should be developed for all scenarios proposed in the PRENAR;
(vi) a complete set of standard operational procedures should be develop for these scenarios; and
(vii) elements related to radiation emergencies caused by terrorist attacks should be improved.

The national regulatory programme for the use of radiation sources should be strengthened for emergency preparedness and response. A formal set of clear instructions should be prepared for use by the licensees on how to formulate their facility's emergency plan and procedures.

ARNR should establish a 24 hours a day 7 days per week (24/7) notification point(s) responsible for receiving emergency notifications of an actual or potential nuclear or radiological emergency. To comply with its obligation as contract party to the Convention on Early Notification in Case of a Nuclear Accident, Uruguay should establish and operate a 24/7 contact point for international information exchange.

Intervention levels for taking urgent protective actions and for the implementation of long term protective actions to be used in the event of radiation emergencies according to international guidance need to be established and included in legally binding national documents. Similarly, guidance for the protection of emergency workers should be issued.

2.2. GOOD PRACTICES

The EPREV mission team has formulated the following summary of good practices as provided in more detail in Section 4.

Good practice 1. The PRENAR is fully integrated into the framework of the National Emergency System.

Good practice 2. The HAZMAT team from the Fire Department has enough personnel and technical capabilities to perform measurements of radiation at the scene and can provide initial advice on radiation issues in the early phase of the response to a radiological emergency.

Good practice 3. The biological laboratory through the Biological Research Institute establishes an agreement to provide support to the ARNR in case of an emergency. In particular, for assessing the biological dosimetry of those persons potentially exposed. This agreement states the specific role and activities of the biological dosimetry laboratory in case of activation by the ARNR.

2.3. RECOMMENDATIONS

The EPREV mission team has formulated the following recommendations in a summary, which are based on the findings identified during the mission and also based on specific paragraphs of international standards (Ref [2]), as provided in more detail in Section 4.

Recommendation 1. The Government should harmonize the current legislation in order to clearly assign the responsibilities of the National Coordinating Authority.

Recommendation 2. The ARNR should review and revise its authorization and inspection system in order to include detailed emergency preparedness elements for all practices in the country.

Recommendation 3. The Uruguayan Government should make arrangements for preparedness and response to a threat category V.

Recommendation 4. The ARNR should establish a mechanism to implement an effective operational 24/7 contact point for receiving national and international notifications of an actual or potential nuclear or radiological emergency; or should consider delegating this responsibility to another organization.

Recommendation 5. The ARNR should develop standard operational procedures in close cooperation with the relevant response organizations to respond to all scenarios foreseen in the PRENAR.

Recommendation 6. The ARNR should formally establish intervention levels for taking urgent protective actions in accordance with international standards.

Recommendation 7. The ARNR should establish clear requirements for the content of emergency plans and verify that the users' emergency plans contain arrangements to protect emergency workers. The ARNR should also establish guidance on the protection of emergency workers, with the response organizations ensuring arrangements are in place for its implementation.

Recommendation 8. The ARNR should issue guidelines for managing, controlling and recording the doses received by emergency workers.

Recommendation 9. The ARNR should establish OILs for urgent protective actions for agricultural countermeasures and integrate them into the appropriate regulations, the PRENAR and emergency plans of the facility.

Recommendation 10. Health Organizations should train medical personnel, both general practitioners and emergency staff, to ensure they are aware of the medical symptoms of radiation exposure.

Recommendation 11. The SINAE should formulate policies and establish procedures for keeping the public informed in case of a radiological emergency.

Recommendation 12. The ARNR, in close coordination with the Ministry of Livestock, Agriculture and Fishing, should define intervention and actions level for taking agricultural countermeasures.

Recommendation 13. The SINAE, the ARNR and the Ministry of Livestock, Agriculture and Fishing should assess the information related to the potential release of radioactive material in case of accidents in a neighbouring NPP, which may impact the Uruguayan territory and national agricultural and livestock practices, agricultural food distributions mechanisms and other activities related to foodstuff production.

Recommendation 14. The SINAE should identify, in close cooperation with the ARNR, issues that could concern the population in a radiological emergency and be prepared to respond to them promptly.

Recommendation 15. The SINAE should make arrangements to detect and respond to public concerns during a radiological emergency.

Recommendation 16. The SINAE, in close cooperation with the ARNR, should review and revise the National Emergency Plan to Respond to Radiological Emergencies (PRENAR), taking into account threat category V.

Recommendation 17. The SINAE should implement a mechanism to review and update emergency plans to respond to a radiological emergency.

Recommendation 18. The ARNR should assess the adequacy of existing resources and have in place plans and procedures to acquire and maintain the necessary resources for an effective radiological response.

Recommendation 19. The operator and response organizations should prepare procedures for personnel selection and training programmes for each position of their organizational structure.

Recommendation 20. Response organizations should prepare, conduct and evaluate drills and exercises according to established local and national programmes.

2.4. SUGGESTIONS

The EPREV mission team has formulated the following suggestions in a summary, which are based on findings identified during the mission and on specific paragraphs of international standards (Ref [12] and [13]), provided in more detail in Section 4.

Suggestion 1. SINAE and ARNR should consider the adoption of a unified command and control system approach at all levels (e.g. an ICS, as described in international guidance [3]), with oversight in all phases of a radiation emergency, which enables a high level of flexibility to respond to different kinds and scales of radiation emergencies. Guidance on the system should be provided in the PRENAR.

Suggestion 2. The government should consider including in existing bilateral agreements a procedure on notification and information exchange between Uruguay and Argentina based on the Convention on Early Notification of a Nuclear Accident.

Suggestion 3. The ARNR should consider facilitating the adoption and use of the IAEA training material for first responders to a radiological emergency.

Suggestion 4. The SINAE should consider preparing an action plan to implement an integrated approach for public information arrangements.

2.5. VERIFICATION OF THE SELF-ASSESSMENT SHEETS

As a part of the appraisal methodology, the responses in the self-assessment sheets were re-examined during the drafting of the present report. The EPREV team – based on the facts, interviews and documents obtained – made an independent judgement on the prevailing situation in Uruguay, for all appraisal criteria. Since the self-assessment sheets were designed so that the answers should give a comprehensive picture of the country's preparedness status, the comparison of the original sheets and the findings of the EPREV mission provides a good indication of any possible improvement, deterioration or bias in this regard.

The comparison of performance indicators (PI) between the self-assessment completed by the representatives of Uruguay and the values assigned by the EPREV mission teams are indicated in Appendix V. From the 34 investigated criteria, the majority received adjusted PI values from the EPREV team, as assigned by the representatives of the country.

3. DETAILED FINDINGS

3.1. INTRODUCTION

Uruguay has a broad legislative framework that defines and allocates responsibilities for the management of all types of emergencies, including radiation emergencies.

In relation to preparedness and response to radiation emergencies, the legal infrastructure includes several levels of regulations that are summarized as follows:

- Laws:
    - 16.736 (January 12th, 1996). Creating the Department for the Attention of Radiological Emergencies on the regulatory body.
    - 18.621 (November 17th, 2009). Related to the National System for Emergencies creating the National Emergency System (SINAE) with the responsibilities for operational coordination during situations of alert and disaster and for coordination of activities on prevention, mitigation, preparedness, response and rehabilitation for all member of the SINAE.
    - 17.930 (December 23rd, 2005): Creating on the Ministry of Industry, Energy and Mining (MIEM) the executing unit National Regulatory Authority on Radiation Protection (ARNR).
- Presidential decrees:
    - 151/004 (May 5th, 2004): Related to the fusion of organizations relevant to the regulation of radioactive material in the country.
    - 371/995 (October 2nd, 1995): Approving the Regulation on the Organization and Operation of the National System for Emergencies.
    - 242/005 (August 01st, 2005): Approving the National Emergency Plan to Respond to Radiological Accidents (PRENAR).
- Bilateral agreements:
    - Between ARNR and National Direction of Customs.
    - Between ARNR and Biological Research Institute “Clemente Estable”.
    - Between ARNR and Argentinean authorities. This agreement allows Uruguayan authorities to participate in national exercises for NPPs in Argentina.

The above legislation assigns the National Coordinating Authority (NCA) to SINAE. However, SINAE’s functions are not clearly defined in relation to radiation emergencies.

It is important to emphasize that all relevant organizations contacted during the mission recognize the leadership of the ARNR in case of radiation emergencies and as part of the national structure dealing with conventional emergencies.

The following sections address the main requirements of the relevant IAEA safety publication GS-R-2 [2] concerning basic responsibilities, assessment of threats, response functions and infrastructural elements.

3.2 BASIC RESPONSIBILITIES

Regarding 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.
iv. Establish an appropriate management system and all organizations that may be involved in the response to a nuclear or radiological emergency have adopted appropriate management arrangements to meet the timescales and to ensure an effective and coordinated response throughout the emergency.

3.2.1. Current situation

Ref. to (i): The Law 18.621, from November 19, 2009, established SINAE with the following responsibilities: (a) operational coordination during situations of alert and disaster; (b) coordination of activities on prevention, mitigation, preparedness, response and rehabilitation for all members of the System.

The Decree that approved the PRENAR, from August 1st 2005, establishes that the National Regulatory Authority for Radiation Protection is a member of SINAE and that it is the coordinating body for the PRENAR.

In addition, according to the PRENAR, the Regulatory Body is responsible for specialized technical assessments of any radiation incident, accident or emergency.

The Decree No. 151/004 from 28 July 2004, establishes the Regulatory Authority (ARNR).

Based on the above paragraphs, the NCA is SINAE. However, SINAE's functions are not clearly defined in relation to radiation emergencies.

Relevant organizations recognize the leadership of the ARNR in the national structure dealing with radiation emergencies.

It is expected that the legislation addresses the ambiguity of the roles and responsibilities of the main organizations and ensures that they are more clearly defined.

SINAE was created to coordinate all national efforts on preparedness and response for any national emergency. At present there is a homepage (www.sinae.gub.uy) where any citizen can find information on relevant documents, such as emergency plans at the national and state levels. Among these plans, the National Radiation Emergency Response Plan is included.

GOOD PRACTICE
Basis for Good Practice 1. GS-R-2 Paragraph 3.11 states that *"The national co-ordinating authority and the response organizations shall ensure that the arrangements for response to a nuclear or radiological emergency are coordinated with the arrangements for response to conventional emergencies."*
Good practice 1. The PRENAR is fully integrated into the framework of the National Emergency System.

Ref. to (ii): The regulation UY 100 (art. 154 and 162), and the PRENAR establishes that the user is responsible for on-site response arrangements (point 1.12) and clearly assigns the missions of the response organizations (point 3) during an emergency situation.

RECOMMENDATION
Basis for Recommendation 1. GS-R-2 Paragraph 3.4. states that *"...Legislation shall be adopted to allocate clearly the responsibilities for preparedness and response for a nuclear or radiological emergency and for meeting the requirements established in this Safety Requirements..."*
Recommendation 1. The Government should harmonize the current legislation in order to clearly assign the responsibilities of the National Coordinating Authority.

Ref. to (iii): During the visit to the ARNR, documents from the licensees were reviewed that cover emergency plans and the verification process during inspections. It was found that some elements related to emergency preparedness, such as equipment and tools are considered in the inspection, if the licensee has an emergency plan and if exercises are conducted. Items not covered in the inspection included the type of radiation detectors and their calibrations, personal protecting equipment, notification and activation list, among others. It is expected that a more complete authorization and inspection process on emergency response should be in place for all practices.

The team could not find evidence of the use of written procedures on emergency preparedness inspections for other practices.

It is expected that the regulatory body can demonstrate the capability to reasonable ensure that emergency preparedness and response arrangements are in place for all facilities and practices.

RECOMMENDATION
Basis for Recommendation 2. GS-R-2 Paragraph 3.9. states that *"...In fulfilling its statutory obligations, the regulatory body… shall establish, promote or adopt regulations and guides, upon which its regulatory actions are based; …shall provide for issuing, amending, suspending or revoking authorizations, subject to any necessary conditions, that are clear and unambiguous and which shall specify (unless elsewhere specified):…the requirements for incident reporting;….and emergency preparedness arrangements."* GS-R-2 Paragraph 3.11. states that *"The national co-ordinating authority and the response organizations shall ensure that arrangements for response to a nuclear or radiological emergency are co-ordinated with the arrangements for response to conventional emergencies. The regulatory body shall ensure that the co-ordinated arrangements are implemented adequately by the operators."*
Recommendation 2. The ARNR should review and revise its authorization and inspection system in order to include detailed emergency preparedness elements for all practices in the country.

3.3. ASSESSMENT OF THREATS

Regarding the requirements set out in Ref. [2] for threat assessment, the following appraisal criterion was investigated:

i. Perform threat assessments for the facilities and activities in the State; categorizing them in accordance with the five threat categories in Table I of Ref. [1].

3.3.1. Current situation

Ref. to (i): ARNR conducted a detailed threat analysis in 2003 and used it as the technical data basis for the development of the concept of operations for the PRENAR, which was issued in 2005. At present, taking into account all practices and the inventory of radiation sources in Uruguay, ARNR identified that the threat category applied to the country should be Category IV.

Uruguay has two neighbouring countries with NPPs: Argentina and Brazil. For planning purposes, it was identified that only the NPP located in Argentina needs to be addressed in emergency preparedness and response arrangements. This NPP is approximately 80 km far from the Uruguayan border. Despite this, no arrangements have been established to address this issue.

The accident at the Fukushima Daiichi NPP provided further support of the need to conduct a threat analysis that includes consideration of a transnational release.

It can be concluded that there is an established management system for emergency response regarding radiation practices in threat categories IV. However, there is no arrangement to ensure the effectiveness of emergency preparedness and response for a threat category V.

3.3.2. Recommendations

RECOMMENDATION
Basis for Recommendation 3. **GS-R-2 Paragraph 3.6 states that** *"...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."* **GS-R-2 Paragraph 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."*
Recommendation 3. The Uruguayan Government should make arrangements for preparedness and response to a threat category V.

3.4. ESTABLISHING EMERGENCY MANAGEMENT AND OPERATIONS

Regarding the requirements set out in Ref. [1] for establishing emergency management and operations, the following appraisal criteria were investigated:

i. Make arrangements to coordinate the emergency response of all 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.

3.4.1. Current situation

Ref. to (i): During the EPREV mission, the team visited SINAE and CECOED. According to the PRENAR, emergency management and operations in case of a radiation emergency should be established at the following levels:

- Facility;
- local (department); and
- national.

According to the concept of operations, the emergency management and response operations should be performed on the basis of an all-hazard concept, when the available infrastructure is used for any type of emergency.

At the national level, SINAE is responsible for the overall coordination.

According to Article 11 of the Law 18.621, CECOED is responsible for the decentralized and primary coordination and execution of all activities concerned with prevention, mitigation, response, rehabilitation and recovery of any emergency at the local level (department). There is no specific radiation emergency plan or document in place describing emergency management and operations at the local level.

In relation to the regulatory body, there is no specific plan or procedures describing its activities during the response to a radiation emergency. More details on plans and procedures are provided in Section 3.15.

During the visit to the CECOED in the city of Montevideo, the application of the PRENAR was discussed. The centre is responsible for the coordination of first responders (police, medical response, fire brigades, and other response organizations as required) at the local level. It was demonstrated that the concept of operations is fully integrated within the existing system that covers response to conventional emergencies. Dependent on the nature of the emergency, other expertise are requested to the centre.

The EPREV team had the opportunity to observe a field exercise for a radiation emergency during the transport of radioactive materials. It should be noted that the HAZMAT team from the fire brigade has personnel and technical capabilities to perform initial emergency management and operations. They are able to conduct initial environmental monitoring at the scene and can provide advice on radiation issues in the early phase of a response. It was recognised and commended by the EPREV team that these personnel are professionals in responding to all-hazards emergencies.

There is a consensus among all organizations that professional technical advice is always expected from the radiation protection specialists of the ARNR.

There is an informal procedure for providing initial information to the public through the CECOED.

As indicated before, there is no procedure for emergency management and operations concerned with a transnational release (category V).

GOOD PRACTICE
Basis for Good Practice 2. GS-R-2 Paragraph 3.12 states that *"In the event of a nuclear or radiological emergency the time available for decision making and for implementing an effective strategy for response may be short. It is therefore important that an appropriate management system be used..."*
Good practice 2. The HAZMAT team from fire department has enough personnel and technical capabilities to perform measurements of radiation at the scene and can provide initial advice on radiation issues in the early phase of the response to a radiological emergency.

SUGGESTION
Basis for Suggestion 1. GS-G-2.1 Paragraph 3.20 states that *"All organizations that may be involved in the response to a nuclear or radiological emergency shall ensure that appropriate management arrangements are adopted to meet the timescales for response throughout the emergency. Where appropriate, the management system shall be consistent with that used by other response organizations in order to ensure a timely, effective and coordinated response."*
Suggestion 1. SINAE and ARNR should consider the adoption of a unified command and control system approach at all levels (e.g. ICS, described in international guidance [3]), with oversight in all phases of a radiation emergency and that enables a high level of flexibility to respond to different types and scales of radiation emergencies. Generic guidance on the system should be given in the PRENAR.

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 24/7 contact point.
ii. Make aware of the radiological hazards for on-site managers of facilities (e.g. scrap metal processing facilities) and national border control authorities.
iii. Ensure first responders are aware of: the symptoms, the appropriate notification and other immediate actions warranted if an emergency is suspected.
iv. Establish a system for promptly initiating an off-site response in the event of an emergency.
v. Ensure response organizations have sufficient personnel.
vi. 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.

3.5.1. Current situation

Ref. to (i): According to Article 169 of the Regulation UY 100, the licensee should report any incident to the regulatory body.

Currently, ARNR is the contact point but does not have 24/7 capabilities for effective notification and activation in case of a radiation emergency. It is not properly equipped and staffed for information exchange and activation of response organizations (including as the contact point that is required under the Convention on Early Notification in Case of a Nuclear Accident, Ref. [1]).

It was observed during visits performed by the EPREV team, that the CECOED and Centre of Unified Command (CCU) have the capability in terms of staff and equipment to provide a contact point under a 24/7 regime, which could be used as notification point.

RECOMMENDATION
Basis for Recommendation 4. GS-R-2 Paragraph 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."*
Recommendation 4. The ARNR should establish a mechanism to implement an effective operational 24/7 contact point for receiving national and international notifications of an actual or potential nuclear or radiological emergency, or should consider delegating this responsibility to another organization.

Ref. to (ii): A formal agreement was signed between ARNR and the custom authorities on the importation of radioactive materials. In addition, there is good coordination with neighbouring countries under mechanisms established by MERCOSUR.

Ref. to (iii): The EPREV team observed that, due to a series of training courses held at both the national and regional level, key first responders such as the HAZMAT team from the fire brigades are aware of indicators of a radiation emergency. It is recommended that other first responders, such as police and medical responders, should also attain this level of capability.

Ref. to (iv): The fire brigade has personnel and technical capabilities to perform initial emergency management and operations. The organization is able to conduct the first measurements of radiation at the scene and can initially provide advice on radiation issues in the early phase of a response.

As stated above, there is consensus among all organizations that professional technical advice is always expected from the radiation protection specialists of the ARNR. This fact can be considered an extra challenge for the ARNR, which has to be continuously updated in manpower and equipment for ensuring this capability.

SUGGESTION
Basis for Suggestion 2. GS-G-2.1, paragraph 3.13 states that: *The national coordinating authority should coordinate the development of the national all-hazards response plan or the national radiation emergency plan and should foster the implementation by other States of measures designed to fulfil the relevant international obligations in accordance with the Requirements (para. 3.5)."*
Suggestion 2. The government should consider including in the existing bilateral agreement a procedure on notification and information exchange between Uruguay and Argentina based on the Convention on Early Notification of a Nuclear Accident.

Ref. to (v): It was demonstrated that the majority of the response organizations have enough personnel to perform activities for identifying, notifying and activating. However, the EPREV team found that the ARNR has an insufficient number of

professionals for these tasks. The same personnel are also responsible for all the other tasks related to radiological assessments.

SUGGESTION
Basis for Suggestion 3. GS-G-2.1, paragraph 4.6 states that: "Standardized national guidance on the response at the local (first responders) and national level that encompasses the types of radiological emergency listed in Table 2 should be developed and made available, with training, to the appropriate response organizations."
Suggestion 3. The ARNR should consider facilitating the adoption and use of the IAEA training material for first responders to a radiological emergency.

Ref. to (vi): With respect to the conditions specified by the Convention on Early Notification of a Nuclear Accident, parties to the Convention should have assigned a Contact Point and a Competent Authority for implementing the duties of the party state. Currently, ARNR is the contact point. But it is not operational under a 24/7 basis.

Due to the Argentinean's NPP being located approximately 80 km from the Uruguay border, the country should make arrangements for the exchange of information with its neighbouring country.

3.6. TAKING MITIGATORY ACTIONS

Regarding the requirements set out in Ref. [2] 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 to initiate a prompt search and issue a warning to the public in the event of the loss of a dangerous source.
iv. 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): According to the PRENAR, licensees shall mitigate the consequences of emergencies within the facility. It is expected that this capability would be assessed in the licensing process, as well as verified during inspections conducted by the ARNR. It is also expected that the regulatory body would provide clear written instructions on this process. The ARNR did not demonstrate a complete set of standard operational procedures for providing these instructions.

The ARNR is responsible for providing expert advice in radiation protection to first responders and local and national officials during emergencies. The regulatory body has only three staff members responsible for this task. During the response to an emergency, the same personnel are also responsible for several other tasks, such as identification, notification, activation, radiological assessment and field actions.

This element is covered in more detail in Section 14, which covers plans and procedure requirements.

Ref. to (ii): Emergency plans of all practices in threat category IV should contain instructions regarding the mitigation of the consequences of emergency situations. The ARNR should provide additional advice, if required. The regulatory body should provide clear written instructions on how these instructions should be carried out in the emergency plans for any facility. The ARNR did not demonstrate standard operational procedures for providing these instructions.

This element is also covered in more detail in Section 14, which covers plans and procedure requirements.

Ref. to (iii): The PRENAR provides mechanisms to initiate a search and issue warnings to the public in case of an event involving a dangerous source that has been lost or illicitly removed. However, the relevant organizations did not demonstrate that they have specific radiation emergency plans or procedures for responding to this scenario.

RECOMMENDATION
Basis for Recommendation 5. GS-R-2 Paragraph 4.38 states that *"Arrangements shall be made to initiate a prompt search and issue a warning to the public in the event of a dangerous source being lost or illicitly removed and possibly being in the public domain."*
Recommendation 5. The ARNR should develop standard operational procedures in close cooperation with the relevant response organizations to respond to all scenarios foreseen in the PRENAR.

Ref. to (iv): Accordingly to the PRENAR, licensees shall mitigate the consequences of accidents within the facility. It is expected that this capability is assessed in the licensing process, as well as verified during inspections conducted by the ARNR. It is also expected that the regulatory body should provide clear written instructions on this process. The ARNR did not demonstrate having a complete set of standard operational procedures for providing these instructions.

The EPREV team did not confirm any emergency plan for installations that demonstrates there is a process in place.

There is no evidence that exercises are conducted regularly in order to verify the capability of the facilities for responding to an emergency.

3.7. TAKING URGENT PROTECTIVE ACTION

Regarding the requirements set out in Ref. [2] 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): UY 100 states in chapter XIV (Emergency Exposure Intervention Situations), article 173, that in emergency exposure situations, the intervention shall be done based on intervention and action levels. There is no other document in the legislation that states the specific values to be used as intervention levels for taking urgent protective actions.

RECOMMENDATION
Basis for Recommendation 6. GS-R-2 Paragraph 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.*"
Recommendation 6. The ARNR should formally establish intervention levels for taking urgent protective actions in accordance with international standards.

Ref. to (ii): This requirement is applicable only for threat categories I or II, which is not applicable to Uruguay.

Ref. to (iii): There are no clear arrangements to ensure the safety of all persons on the site in the event of a nuclear or radiological emergency. These arrangements are not included in the regulation UY 100, which is the document used for licensing radiological facilities. In article 162, the document specifies that the licensee shall be prepared to take any necessary action to respond to any emergency related to the operation of a radioactive source. However, this is not included in the emergency plans of the licensed practices. There are also some practices without an emergency plan that has been authorized by the regulatory body, as required in article 167 of the regulation UY 100.

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 warning 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

According to the PRENAR, the SINAE is the organization responsible for promptly providing warnings and instructions to all population groups. In particular, the CECOEDs coordinate the information that should be given to the different population groups and the information is given to these population groups by the police, which is part of the SINAE.

3.9. PROTECTING EMERGENCY WORKERS

Regarding the requirements set out in Ref. [2] 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

The PRENAR and in particular its Annex 2, states the main measures to be taken in case of a radiological emergency. However it does not assign this responsibility to a specific organization. Emergency plans authorized by the ARNR do not specify the measures required for providing protection for emergency workers. These measures are also not issued in the specific guidelines of any legal document. Fire fighters have the equipment necessary to prevent internal contamination and if radioactive material is suspected or detected, may request advice via the CECOED to the regulatory authority. According to Montevideo's CECOED, in case of a radiological emergency, the ARNR will be notified to ensure information is provided to the responders, if required. A HAZMAT fire brigade unit is trained and equipped with radiation detectors in case of a radiation emergency. This does not include personal dosimeters, nor default operational levels.

RECOMMENDATIONS
Basis for Recommendation 7. GS-R-2 Paragraph 4.56 states that *"Arrangements shall be made to protect emergency workers, in accordance with international standards"*.

RECOMMENDATIONS
Recommendation 7. The ARNR should establish clear requirements for the content of emergency plans and verify that the users' emergency plans contain arrangements to protect emergency workers. The ARNR should also establish guidance on the protection of emergency workers, with the response organizations ensuring arrangements are in place for its implementation.
Basis for Recommendation 8. GS-R-2 Paragraph 4.60 states that "*National guidance that is in accordance with international standards shall be adopted for managing, controlling and recording the doses received by emergency workers. This guidance shall include default operational levels of dose for emergency workers for different types of response activities, which are set in quantities that can be directly monitored during the performance of these activities (such as the integrated dose from external penetrating radiation). In setting the default operational levels of dose for emergency workers the contribution to doses via all exposure pathways shall be taken into account*"
Recommendation 8. The ARNR should issue guidelines for managing, controlling and recording the doses received by emergency workers.

3.10. ASSESSING 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

In accordance with the regulation UY 100, the operator is responsible for the assessment of the initial phase of an emergency and these assessments are addressed in the operator's' emergency plans, which are evaluated and inspected by the ARNR.

In the event of a radiological emergency not under the control of a licensee, ARNR should be prepared to provide expert advice if required.

Default triggers such as conditions on the scene (e.g. Emergency Action Levels (EALs) and default OILs) have not yet been established.

RECOMMENDATION
Basis for Recommendation 9. GS-R-2 Paragraph 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."* GS-R-2 Paragraph 4.89 states that**:** *''For areas with activities in threat category V arrangements shall be made for taking effective agricultural countermeasures ... These arrangements shall include: default OILs for environmental measurements (such as dose rates due to deposition and deposition densities) and food concentrations"*
Recommendation 9. The ARNR should establish OILs for urgent protective actions for agriculture countermeasures and integrate them into the appropriate regulations, the PRENAR and emergency plans of the facility.

3.11. MANAGING THE MEDICAL RESPONSE

Regarding the requirements set out in Ref. [2] 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

According to the PNRER, the Ministry for Public Health is the institution responsible for providing appropriate medical treatment to contaminated or over-exposed persons, as well for long term health monitoring.

The PNRER also states that the Clinics Hospital (HC) is where individuals with radiation injuries are to be treated. The hospital has two centres where patients are to be treated: the Nuclear Medicine Centre and the Emergency Department.

The Nuclear Medicine Centre of Clinics Hospital is responsible for diagnosis and treatment of radiation injuries. The resources of the Nuclear Medicine Centre include an isolation area for patients (overexposed or internally contaminated), decontamination showers and radiation measurement instruments.

The Emergency Department is responsible for the supply of medical and nursing personnel, as well as to provide all necessary equipment for medical treatment until it is no longer required.

The Biological Research Institute 'Clemente Estable' is responsible for biological dosimetry. The laboratory for biological dosimetry is part of the Latin-American network. There are enough resources for assistance in the event often irradiated individuals per two weeks. The laboratory has the capability to electronically capture the images.

The Biological Research Institute has signed an agreement with the ARNR to provide biological dosimetry services. This agreement was signed in November 2011 and is still valid.

The ARNR and medical staff will strengthen medical capabilities by including two additional hospitals: The Police Hospital and the Central Defence Hospital. The mission found great interest from both hospitals to participate in strengthening specialized medical attention.

Regarding training of medical staff, the majority have participated in training courses given by the IAEA through regional projects. It was explained during the EPREV mission that some lessons regarding radiological emergencies are now being given to medical staff at university.

Medical staff, according to the PNRE, would be assisted by the ARNR in case of a radiological emergency.

Ref to (i): Regarding the operation and training of medical staff, it was stated that there is no expertise to identify the medical symptoms of radiation exposure.

Ref to (ii): The current procedure to provide initial treatment to people exposed or contaminated by radioactive material is to activate the Clinics Hospital (HC) and provide the required treatment. However, no written procedures were presented during the EPREV mission, so the related recommendations have been included in Section 3.14.

GOOD PRACTICE
Basis for Good Practice 3. GS-R-2 Paragraph 5.4 states that *"The emergency arrangements shall include the clear allocation of responsibilities, authorities and arrangements for co-ordination in all phases of the response*…"
Good practice 3. The biological laboratory through the Biological Research Institute has an agreement to provide support to the ARNR in case of an emergency for assessing the biological dosimetry of those persons potentially exposed. This agreement states the specific role and activities of the biological dosimetry laboratory in case of activation by the ARNR.

RECOMMENDATION
Basis for Recommendation 10. GS-R-2 Paragraph 4.77 states that "Arrangements shall be made for medical personnel, both general practitioners and emergency staff, to be made aware of the medical symptoms of radiation exposure..."
Recommendation 10. Health Organizations should train medical personnel, both general practitioners and emergency staff, to ensure they are aware of the medical symptoms of radiation exposure.

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

Ref. to (i): The PRENAR establishes that an operational objective of the SINAE is coordinating information in a radiation emergency. In connection with this, the SINAE's objectives are to: "collect the information on the emergency situation, respond with actions and instructions to the affected population; coordinate all the information coming from different sources with other response organizations; disseminate timely, uniform and precise information to the public; establish arrangements to manage questions of citizens and establish a telephone line (0800) to inform the public".

The Law No 18.691 does not clear assign the responsibility for keeping the public informed in case of contingencies to a specific governmental agency or participating organization. However, the EPREV team was informed that the National Emergency Direction (DNE) has arrangements in place to provide information to the public in case of disasters or contingencies. Protocols and regulations under the Law 18.691 are under development for specific arrangements on public information.

The DNE has not implemented arrangements or developed procedures for receipt of significant inquiries from the media concerning a possible radiological emergency, immediately coordinating all official sources of publicly available information and establishing a single official source as soon as possible.

Arrangements to monitor the media and to promptly respond to misleading, inaccurate or confusing information are not in place. There are also no arrangements to identify inappropriate responses by the public during a radiological emergency. Templates of press releases have not been prepared in advance.

It is expected that public information centres and appropriate agreements for providing support to representatives of response organizations responsible for public information may be arranged in advance.

RECOMMENDATION
Basis for Recommendation 11. GS-R-2 Paragraph 4.83 states that "*Arrangements shall be made for: providing useful, timely, truthful, consistent and appropriate information to the public in the event of a nuclear or radiological emergency; responding to incorrect information and rumours; and responding to requests for information from the public and from the news and information media.*"
Recommendation 11. The SINAE should formulate policies and establish procedures for keeping the public informed in case of a radiological emergency.

SUGGESTION
Basis for Suggestion 4. GS-G-2.1 Paragraph 4.36 states that "*These arrangements (for public information) should include provision:* • *To designate an individual within each organization with the role, during the response, of coordinating the provision of information to the news media.* • *To arrange to coordinate the provision of information to the public by national officials, local officials and the operator. This could include the establishment, as soon as possible, of a public information centre, as described in Appendix VIII (of this reference), to serve as the single source of information.* • *To give plain language answers to typical questions, descriptions of the risks involved and appropriate actions that the public can take to reduce the risks.* • *To identify and correct misleading and harmful information*."
Suggestion 4. The SINAE should consider preparing an action plan to implement an integrated approach for public information arrangements.

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

Regarding the requirements set out in Ref.[2] 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 Regulation UY 100 establishes that "generic action levels for foodstuff will be based on the guidance provided in Schedule V of reference [14], as well as the guidance levels of the Codex Alimentarius for foodstuff for international trade after an accidental contamination". However, the PRENAR does not contain national intervention and action levels for agricultural countermeasures and no other documents establishing specific intervention and action levels were presented to the EPREV team.

RECOMMENDATION
Basis for Recommendation 12. GS-R-2 Paragraph 4.88 states that "*Optimized [national] intervention levels and action levels [for agricultural countermeasures, countermeasures against ingestion and longer term 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."*

RECOMMENDATION
Recommendation 12. The ARNR, in close coordination with the Ministry of Livestock, Agriculture and Fishing, should define intervention and action levels for taking agricultural countermeasures.

Ref. to (ii): The PRENAR establishes that "the mission of the Ministry of Livestock, Agriculture and Fishing is giving advice on agricultural methods and protective actions in any area that could be contaminated by an accident and sampling agricultural products and foodstuff for radiological analysis by specialized organizations". According to the information provided by the counterpart, there are no arrangements in place for implementing this mission. The EPREV team did not have the opportunity to interview an official from this ministry.

RECOMMENDATION
Basis for Recommendation 13. GS-R-2 Paragraph 4.89 states that: *"For areas with activities in threat category V arrangements shall be made for taking effective agricultural countermeasures, including restriction of the consumption, distribution and sale of locally produced foods and agricultural produce following a release of radioactive material."*
Recommendation 13. The SINAE, the ARNR and the Ministry of Livestock, Agriculture and Fishing should assess the information related to the potential release of radioactive material in case of accidents in a neighbouring NPP, which may impact the Uruguayan territory and national agricultural and livestock practices, agricultural food distributions mechanisms and other activities related to foodstuff production.

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

Regarding the requirements set out in Ref. [2] 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

Ref. to (i): The arrangements on information and communication as described in Sections 3.8 and 3.12 of this report will have an important impact on the non-radiological consequences of a radiation emergency. The potential adverse psychological effects to the public may be mitigated with the provision of timely, appropriate and truthful information, in plain language that is understandable for the target audience. As stated above, there are no specific arrangements in place to respond to public concern in an actual or potential nuclear or radiological emergency.

Press conferences were conducted by SINAE with relevant support from ARNR due to public concern of the possibility of design flaws in the Doel-3 type reactor pressure vessel (Belgium) and the fact that a similar reactor pressure vessel is installed in Argentina.

There are organizations that conduct monitoring activities of the media. These organizations may serve the SINAE as a mechanism to detect misinformation to the public, rumours and public response during a radiological emergency.

It is expected that appropriate authorities be prepared to respond to issues that concern the population such as:

a. What can I do to ensure that my family and I are safe now?
b. Is my family safe now? What could be the consequences for my health?
c. What is contamination and is it dangerous? Are the food, water, milk and other products safe?
d. I am pregnant, what are the dangers for my baby?
e. How can I find out what dose I may have received and what it means to my health?

All these issues are particularly important in those areas where food restrictions may be implemented in case of an accident at an NPP located in a neighbouring country.

RECOMMENDATIONS
Basis for Recommendation 14. GS-R-2 Paragraph 4.96 states that *"Arrangements shall be made for responding to public concern in an actual or potential nuclear or radiological emergency. Preparations shall include arrangements for promptly explaining any health risks and what are appropriate and inappropriate personal actions for reducing risks"*
Recommendation 14. The SINAE should identify, in close cooperation with the ARNR, issues that could concern the population in a radiological emergency and be prepared to respond to them promptly.
Basis for Recommendation 15. GS-R-2 Paragraph 4.96 states that *"Arrangements shall be made for responding to public concern in an actual or potential nuclear or radiological emergency...This shall include the designation of the organization(s) with the responsibility for identifying the reasons for such actions (such as misinformation from the media or rumours) and for making recommendations on countering them. How these recommendations are to be included in the national emergency response shall be specified".*
Recommendation 15. The SINAE should make arrangements to detect and respond to public concerns during a radiological emergency.

3.15. REQUIREMENTS FOR INFRASTRUCTURE

Regarding the requirements set out in Ref.[2] 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 PRENAR was approved by the President of Uruguay in June 2005. The plan specifies the following participating institutions:

- National Emergency System: Permanent Technical and Operational Direction (DTOP), Departments Emergency Committees (CDE)
- Ministry of Industry, Energy and Mining (MIEM): National Regulatory Authority in Radiation Protection (ARNR).
- Ministry of Health (MSP): State Sanitary Service Administration (ASSE)
- Ministry of Housing, Territorial Code and Environment (MVOTMA): National Direction of Environment (DINAMA).
- Ministry of National Defence (MDN): Armed Forces (FFAA), National Direction of Meteorology (DNM), National Direction of Health of the Armed Forces (DNSFFAA)
- Ministry of Foreign Affairs (MRREE)
- Ministry of Livestock, Agriculture and Fishing (MGAP).
- Ministry of Interior (MI): Police Headquarter (JJPP), National Direction of Road Police (DNPC), National Direction of Police Health (DNSP). National Direction of Fire-fighters (DNB) and 911 Head Office
- Ministry of Transport and Public Works (MTOP)

- Ministry of Labour and Social Security (MTSS): National Institute of Foodstuff (INDA)
- Ministry of Economy and Finance (MEF)
- Ministry of Education and Culture (MEC): Institute of Biological Research 'Clemente Estable' (IIBCE)
- State Sanitary Works (OSE)
- University of the Republic (UDELAR): Clinics Hospital (HC), Faculty of Sciences: Centre of Nuclear Research (CIN).

It is stated in the plan that other non-governmental organizations have the option to participate.

The national plan has been conceived for the following accident scenarios:

- Accidents with sources or radioactive materials (lost, theft and abandonment of radioactive material, transport accidents)
- Accidents occurring abroad with transboundary impact
- Re-entry of satellites driven with nuclear energy or accidents of aircraft transporting radioactive material nationwide

In relation to the PRENAR, it is necessary to highlight the following major findings:

- The content of the plan is based on the IAEA-TECDOC-718 "*A Model National Emergency Response Plan for Radiological Accidents*". It has been recognized that this document was superseded by reference [3].
- Threat category V is partially addressed in the plan. But improvements could be made regarding the threat from an NPP located in a neighboring State, which is approximately 80 km from the Uruguayan border. It means that some portion of the national land should be considered as part of the food restriction planning zone. Essential arrangements for an effective response to a transboundary emergency are not developed in the PRENAR.
- The organizational structure of the response organization at the national level is not explained in the PRENAR.
- According to Annex 1 of the PRENAR, all fixed facilities were considered as emergency planning category III. Nevertheless, this categorization is not in line with the threat assessment category established in Ref [2].

Articles 38 and 40 of the Regulation UY 100, request the licensee of a radiation source to submit an emergency plan as part of the complementary technical information for applying for an authorization or registration. No guidance is provided for the preparation of an emergency plan. There is also no evidence of coordination among the facilities and local response organizations that would assist in case of an emergency.

The PRENAR establishes that each participating institution should develop its own plan and detailed procedures.

The mechanism to update emergency plans, procedures and other arrangements to incorporate lessons learned from research, operating experience (such as response to emergencies) and emergency drills and exercises is unclear.

RECOMMENDATIONS
Basis for Recommendation 16. GS-R-2 Paragraph 5.17 states that "The appropriate responsible authorities shall ensure that: c) the content, features and extent of emergency plans take into account the results of any [threat assessment] and any lessons learned from operating experience and from [emergencies] that have occurred with sources of a similar type."
Recommendation 16. The SINAE, in close cooperation with the ARNR, should review and revise the National Emergency Plan to Respond to Radiological Emergencies (PRENAR) taking into account threat category V.
Basis for Recommendation 17. GS-R-2 Paragraph 5.17 states that "The appropriate responsible authorities shall ensure that: d) emergency plans [are] periodically reviewed and updated"
Recommendation 17. The SINAE should implement a mechanism to review and update emergency plans to respond to a radiological emergency.

Ref. to (ii): The PRENAR establishes that each participating institution should develop a plan and detailed procedures. Emergency plans to respond to radiological emergencies of participating organizations to the PRENAR were not provided to the EPREV team during its mission (see Sections 3.4.1 Ref. to (i), 3.7.1 Ref. to (ii)). The EPREV team found that there is coordination among some of the response organizations, but formal agreements on coordination were not demonstrated. It is important to highlight the involvement of the Ministry of Interior and the Ministry of Defense in the development of capabilities to respond to a radiological emergency.

The organizational structure and the relationships between the main response organizations are not clearly documented.

Ref. to (iii): The following facilities for activating during conventional emergencies of the SINAE are available for a radiological emergency:

- The Presidential Communication Centre to host the public information centre in case of a radiological emergency, if appropriate.
- The Departmental Emergency Coordination Centres (one for each Department) for coordinating the local response actions. Through these centres, local resources are made available for any emergency situation and national support can be requested in accordance with national arrangements for conventional emergencies.
- The National Direction of Road Police, and the National Direction of Fire-fighters are ready to provide resources if they are available.
- The National Direction of Police Health, the National Direction of Health of the Armed Forces and the Clinics Hospital (HC) are available to provide resources to manage the medical response.

The Nuclear Research Centre (CIN) has been assigned the role of supporting the ARNR and SINAE with its capabilities for radioactive waste management, environmental radioactivity measurements, portable equipment and human resources in case of a radiological emergency. The EPREV team's visit to the CIN found that expertise and resources to carry out radiation measurements (e.g. dose rate,

radionuclide detection, gamma spectrometry, gross alpha and beta activity in environmental samples) was available. However, plans and procedures have not been developed to formally make these capabilities available in a radiological emergency.

The Radiological Emergency Group of the ARNR has limited resources (personnel and equipment) for deploying at the scene of a radiological emergency. This group does not have arrangements for activation and deployment of additional personnel from other departments of ARNR.

Currently, the availability and reliability of all supplies, equipment, communication systems and facilities needed during various types of emergencies cannot be guaranteed. It is expected that, based on the postulated emergency conditions and radiological accident scenarios analysis, necessary resources (radiation monitoring instruments, sources recovery tools, shielding, personal protective equipment, etc.) are identified for an effective radiological response. Analytical capabilities of laboratories for measuring radioactivity in environmental samplings and assessing internal contamination can also be assessed.

RECOMMENDATION
Basis for Recommendation 18. GS-R-2 Paragraph 5.25 states that *"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"*
Recommendation 18. The ARNR should assess the adequacy of existing resources and have in place plans and procedures to acquire and maintain necessary resources for an effective radiological response.

Ref. to (iv): The role and responsibilities of concerned organizations are defined in the PRENAR. During discussions with the relevant response organizations it was noted that:

- Coordination of local off-site response actions are performed by the CECOEDs.
- Coordination of national response actions is performed by the DNE.
- Coordination of public information is unclear. There are no formalized procedures for public communication.
- There is no clear allocation of responsibilities or procedures for coordinating the off-site monitoring and assessment.

Ref. to (v): Training in emergency preparedness is included as a subject in some radiation protection courses. Regional IAEA courses on emergency preparedness and response are also attended. The staff of the off-site response organizations have a general knowledge on emergency preparedness and response, which is regularly updated through IAEA training courses and other national training events or exercises.

Training requirements for each position and teams within the response organization have not been established, as well as the required knowledge, skill and abilities that response personnel should have to perform their assigned response functions for

radiation emergencies. There is no formal training program for members of response organizations.

RECOMMENDATION
Basis for Recommendation 19. GS-R-2 Paragraph 5.31 states that *"The operator and the response organizations shall make arrangements for the selection of personnel and for training to ensure that the personnel have the requisite knowledge, skills, abilities, equipment, and procedures and other arrangements to perform their assigned response functions. The arrangements shall include ongoing refresher training on an appropriate schedule and arrangements for ensuring that personnel assigned to positions with responsibilities for emergency response undergo the specified training".*
Recommendation 19. The operator and response organizations should prepare procedures for personnel selection and training programmes for each position of their organizational structure.

Ref. to (vi): Drill and exercise programmes for testing specified functions of response organizations were not shown to the EPREV team for the ARNR, nor for the first response organizations. National level exercise programmes for testing organizational interfaces were also not shown to the EPREV team. Some exercises have been organized and conducted by first response organizations in cooperation with the ARNR.

There is a requirement for the operators (licensees and registrant) to conduct drills and exercises of their emergency plans systematically, but there was no evidence of its implementation.

There are no procedures to evaluate the users' exercises by ARNR. There are also no procedures for evaluating national exercises.

RECOMMENDATION
Basis for Recommendation 20. GS-R-2 Paragraph 5.33 states that *"Exercise programmes shall be conducted to ensure that all specified functions required to be performed for emergency response and all organizational interfaces for facilities in threat category I, II or III and the national level programmes for threat category IV or V are tested at suitable intervals…. The exercises shall be systematically evaluated and some exercises shall be evaluated by the regulatory body."*
Recommendation 20. Response organizations should prepare, conduct and evaluate drills and exercises according to established local and national programmes.

Ref. to (vii): At present, most of the necessary supplies, equipment, communication systems, and facilities recognized for response to radiation emergencies are part of the existing capabilities for conventional emergencies. The equipment for measuring radiation and other facilities needed during radiation emergencies are limited.

Representatives of DNE informed the EPREV team that a protocol is under development to allow designated governmental officials to release additional funds when a disaster situation is declared.

Ref. to (viii and ix): Currently, Uruguay has no facilities in threat category I and II, so on-site emergency control centres are not required.

Ref. to (x): Currently, Uruguay has some capabilities for internal dosimetry. Detailed procedures for internal monitoring of emergency response workers are not in place.

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 do 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.

ACRONYMS

ASSE	"Administración de Servicios Sanitarios del Estado" (State Sanitary Service Administration)
ARNR	"Autoridad Reguladora Nacional en Radioprotección" (National Authority on Radiation Protection)
CECOED	"Centro de Operaciones de Emergencia Departamental" (Local Emergency Operations Centre)
CCU	"Centro de Comando Unificado" (Centre of Unified Command)
DNB	"Dirección Nacional de Bomberos" (National Direction of Fire-fighters)
DNE	"Dirección Nacional de Emergencia" (National Emergency Direction)
DINAMA	"Dirección Nacional de Medio Ambiente" (National Direction of Environment)
DNM	"Dirección Nacional de Meteorología" (National Direction of Meteorology)
DNPC	"Dirección Nacional de Policía Caminera" (National Direction of Road Police)
DNPT	"Dirección Nacional de Policía Técnica" (National Direction of Technical Police)
DNSFFAA	"Dirección Nacional de Sanidad de las Fuerzas Armadas" (National Direction of Health of the Army)
DNSP	"Dirección Nacional de Sanidad Policial" (National Direction of Police Health)
DTOP	"Dirección Técnica y Operativa Permanente (Permanent Technical and Operative Direction)
CIN	"Facultad de Ciencias, Centro de Investigaciones Nucleares" (Faculty of Sciences: Centre of Nuclear Research)
EAL	emergency action level
EPREV	emergency preparedness review
FF.AA.	"Fuerzas Armadas" (Army)
GR-U6	"Guardia Republicana – Unidad 6" (Republican Guard – Unit 6)

HAZMAT	hazardous materials
HC	"Hospital de Clínicas Dr. Manuel Quintela" (Clinics Hospital)
HCFF.AA.	"Hospital Central de la Fuerzas Armadas" (Central Hospital of the Army)
HP	"Hospital Policial" (Police Hospital)
IIBCE	"Instituto de Investigaciones Biológicas Clemente Estable" (Institute of Biological Research "Clemente Estable")
IAEA	International Atomic Energy Agency
ICS	incident command system
INDA	"Instituto Nacional de Alimentación" (National Institute of Foodstuff).
JJPP	"Jefaturas de Policía" (Police Headquarter)
MERCOSUR	"Mercado Común del Sur" (Southern Common Market)
MDN	"Ministerio de Defensa Nacional" (Ministry of National Defence)
MEF	"Ministerio de Economía y Finanzas" (Ministry of Economy and Finance)
MEC	"Ministerio de Educación y Cultura" (Ministry of Education and Culture)
MGAP	"Ministerio de Ganadería, Agricultura y Pesca" (Ministry of Livestock, Agriculture and Fishing)
MIEM	"Ministerio de Industria, Energia y Mineria" (Ministry of Industry, Energy and Mining)
MRREE	"Ministerio de Relaciones Exteriores" (Ministry of Foreign Affairs)
MSP	"Ministerio de Salud Pública" (Ministry of Health)
MTSS	"Ministerio de Trabajo y Seguridad Social" (Ministry of Labour and Social Security)
MTOP	"Ministerio de Transporte y Obras Públicas" (Ministry of Transport and Public Works)
MVOTMA	"Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente" (Ministry of Housing, Territorial Code and Environment)

MI	“Ministerio del Interior” (Ministry of Interior)
NPP	nuclear power plant
OIL	operational intervention level
OSE	“Obras Sanitarias del Estado” (State Sanitary Works)
PRENAR	“Plan de Respuesta de Emergencia Nacional para casos de Accidentes Radiologicos (National Emergency Plan to Respond to Radiological Accidents)
SINAE	“Sistema Nacional de Emergencias” (National Emergency System)
UDELAR	“Universidad de la República” (University of the Republic)
UY 100	“Norma UY 100 Reglamento Básico de Protección y Seguridad Radiológica” (Basic Regulation on Radiation Safety)

REFERENCES

[1] INTERNATIONAL ATOMIC ENERGY AGENCY, Convention on Early Notification of a Nuclear Accident (1986) and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (1987), Legal Series No. 14, IAEA, Vienna (1987).

[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).

[3] INTERNATIONAL ATOMIC ENERGY AGENCY, Method for Developing Arrangements for Response to a Nuclear or Radiological Emergency, EPR-METHOD, IAEA, Vienna (2003).

[4] INTERNATIONAL ATOMIC ENERGY AGENCY, Generic Procedures for Determining Protective Actions during a Reactor Accident, IAEA-TECDOC-955, Vienna (1997).

[5] INTERNATIONAL ATOMIC ENERGY AGENCY, Generic Procedures for Assessment and Response during a Radiological Emergency, IAEA-TECDOC-1162, Vienna (2000).

[6] INTERNATIONAL ATOMIC ENERGY AGENCY, Generic Procedures for Assessment and Response during a Radiological Emergency or Terrorism: Part 1 Manual for First Responders and Early Response, IAEA, Vienna (in preparation).

[7] INTERNATIONAL ATOMIC ENERGY AGENCY, The International Nuclear Event Scale (INES), User's Manual 2001 Edition, IAEA, Vienna (2001).

[8] INTERNATIONAL ATOMIC ENERGY AGENCY, WORLD HEALTH ORGANIZATION, Diagnosis and Treatment of Radiation Injuries, Safety Reports Series No.2, IAEA, Vienna (1998).

[9] INTERNATIONAL ATOMIC ENERGY AGENCY, Generic Procedures for Medical Response During a Nuclear and Radiological Emergency (IAEA–TECDOC in preparation).

[10] INTERNATIONAL ATOMIC ENERGY AGENCY, Emergency Notification and Assistance Technical Operations Manual, Emergency Preparedness and Response Series EPR-ENATOM 2007, IAEA, Vienna (2007).

[11] INTERNATIONAL ATOMIC ENERGY AGENCY, Manual for First Responders to a Radiological Emergency, EPR-First Responders, IAEA, Vienna (2006).

[12] INTERNATIONAL ATOMIC ENERGY AGENCY, Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency, GSG-2, IAEA, Vienna (2011).

[13] INTERNATIONAL ATOMIC ENERGY AGENCY, Arrangements for Preparedness for a Nuclear or Radiological Emergency, GS-G-2.1, IAEA, Vienna (2007).

[14] INTERNATIONAL ATOMIC ENERGY AGENCY, International Basic Safety Standards for Protection Against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series no. 115, IAEA, Vienna (1996)

APPENDIX I: MISSION TEAM COMPOSITION

Name	Position and Organization	Address
SALINAS MARIACA, Genaro Rodrigo	Emergency Preparedness Officer Incident and Emergency Centre Department of Nuclear Safety and Security International Atomic Energy Agency	Wagramerstrasse 5 A-1400 Vienna Austria Tel: +43 1 2600-22123 Mobile: + 43 699165-22123 Email: R.Salinas@iaea.org; Genaro.Rodrigo.Salinas-Mariaca@iaea.org
DOS SANTOS, Raul	Jefe de Division Radioprotection and Dosimetry Institute (IRD) National Nuclear Energy Commission (CNEN) Radiation Emergency Assistance Division	Av. Salvador Allende s/n - Recreio 22780-160 Rio de Janeiro R.J. Brazil Tel: 0055 21 2173 2921 Fax: 0055 21 2173 2928 E-mail: raul@ird.gov.br
JEREZ VEGUERIA, Pablo Fabian	Especialista Superior en Regulación Control y Seguridad Centro Nacional de Seguridad Nuclear (CNSN)	Calle 28, No. 504 entre 5ta y 7ma 11300 La Habana Cuba Tel: 0053 7 2023166 Fax: 0053 7 2023166 E-mail: pablo@orasen.co.cu
CORTÉS CARMONA, Alejandro	Director de Evaluación y Licenciamiento Comisión Nacional de Seguridad Nuclear y Salvaguardias (CNSNS) Radiological Safety Dept. Licensing and Evaluation Section	Dr José María Barragán 779, Colonia Narvarte. Deleg. Benito Juárez 03020 Ciudad de México D.F. México Tel: 00 52 55 50953220 Fax: 00 52 55 50953291 E-mail: acortes@cnsns.gob.mx

APPENDIX II: MISSION SCHEDULE

Sunday, 04 November 2012		
	Arrival to Montevideo	
19:00-20:30	Initial Team meeting	
Monday, 05 November 2012		
08:15-09:00	Initial meeting with ARNR representatives	
09:00-12:00	Opening meeting with ARNR and other relevant organizations	
12:30-14:30	Hospitality lunch	
14:30-19:30	Meeting with ARNR discussing general aspects of all 14 main elements	
20:00-21:00	Team meeting	
Tuesday, 06 November 2012		
08:30–12:00	Meeting with ARNR discussing general terms of all 14 main elements	EPREV team Blanca Faller Olga Gonzalez
13:20-15:30	Team meeting	EPREV team
16:00-17:10	Meeting with representatives of the SINAE	EPREV team Crnel. Gustavo Gil Crnel. Rodolfo Costas Graciela Dede Walter Morroni Olga González Blanca Faller
18:20-21:00	Team meeting	EPREV team
Wednesday, 07 November 2012		
09:00–11:30	Visit to CECOED	EPREV team Olga González Blanca Faller Jorge Cuello
15:00–18:30	Visit and discussions with Central Hospital of the Army (HCFF.AA.) personnel	EPREV team Olga González Blanca Faller Dr. Carlos Heuguerot Dr. Juan Carlos Hermida

		Dr. Juan José López Dra. Fernanda Xalambrí Dr. Néstor Cuello Dr. Alvaro Tondo
18:30-22:30	Team meeting	EPREV team Olga González Blanca Faller
Thursday, 08 November 2012		
09:00–11:30	Field exercise	All relevant organizations and EPREV team
14:30–16:30	Visit and discussions with the Clinics Hospital (HC)	EPREV team Olga Gonzalez Blanca Faller Juan Carlos Hermida Fátima Coppe Eugenia De Marco Yanet Asambuya
17:00-18:00	Visit to the "Laboratorio secundario de metrología de las radiaciones ionizantes"	EPREV team (Pablo Jerez) Olga Gonzalez Alejandro San Pedro
Friday, 09 November 2012		
08:30-10:30	*Visit to the CIN*	EPREV team (Alejandro Cortes; Pablo Jerez) Olga Gonzalez Daniel Blanco Karina Bayardo
09:30-11:00	*Visit to the CCU*	EPREV team (Raul Dos Santos, Rodrigo Salinas) Blanca Faller Crio. Silvio Sanguinetti
14:00-15:00	*Visit to the biodosimetry laboratory of the Biological Research Centre 'Clemente Estable'*	EPREV team (Alejandro Cortes) Olga González Blanca Faller Wilner Martinez
16:00-18:00	*Presentation of initial findings and recommendations to be included*	EPREV team Walter Cabral

		Olga Gonzalez Blanca Faller
19:00-21:00	*Drafting EPREV Mission Report*	EPREV team
Saturday, 10 November 2012		
All day	*Drafting EPREV Mission Report*	EPREV team
22:00	*Initial draft sent to ARNR counterpart as requested*	
Sunday, 11 November 2012		
All day	*Drafting EPREV Mission Report (cont.)*	EPREV team
22:00	*First draft sent to Uruguayan counterparts to be distributed among all organizations the team interacted with*	EPREV team
Monday, 12 November 2012		
All day	Revision of first draft of the EPREV report	Uruguayan counterparts
All day	Preparation of presentation to be made during the exit meeting	EPREV team
All day	Experts answering questions and clarifying some elements of the report, as requested	EPREV team
21:00	*First feedback sent by Uruguayan counterparts to the EPREV team*	Uruguayan counterparts
Tuesday, 13 November 2012		
Morning	Inclusion of comments into the report	EPREV team
12:00	*Second feedback sent by Uruguayan counterparts to the EPREV team*	Uruguayan counterparts
Afternoon	Discussion of open issues	EPREV team Olga Gonzalez Blanca Faller
Afternoon	Inclusion of comments into the report	EPREV team
All day	Preparation of presentation to be made during the exit meeting	EPREV team
Wednesday, 14 November 2012		
10:00-12:00	Final plenary meeting with representatives of all organizations involved in the national EPR	All relevant organizations and EPREV team

APPENDIX III: LIST OF ATTENDEES OF THE EPREV MISSION MEETINGS

ENTRY MEETING WITH NATIONAL REGULATORY AUTHORITY ON RADIATION PROTECTION (ARNR) AND OTHER STAKEHOLDERS

05 November 2012

No.	Name	Position	Organization
1.	Walter Cabral	Director Nacional	ARNR
2.	Blanca Faller	Directora Dpto	ARNR
3.	Olga Gonzalez	Directora Dpto	ARNR
4.	Jorge Cuello	Director	CECOED
5.	Daniel Blanco	Docente	CIN
6.	Daniel da Cunha	Jefe	DNB - Dpto. Materiales peligrosos
7.	Alessander Tironi	Sub Comisario	DNPC
8.	Jose Manuel Azambuya	Jefe	DTOP - División criminalística.
9.	Ignacio Camaño	Jefe	DTOP - Dpto. Inspección pericial
10.	Silvio Sanguinetti	Director	CCU
11.	Mario D Elia	Jefe	Estado mayor general de jefatura de policía de Montevideo
12.	Julio Rodriguez	Oficial sub ayudante	Guardia republicana. Unidad 6
13.	Juan Carlos Hermida	Prof. agregado	HC
14.	Juan Jose Lopez Lerena	Jefe medico	DNB - Sanidad bomberos
15.	Pablo Brugnoni	Director técnico	SINAE

APPENDIX IV: TERMS OF REFERENCE

APPENDIX V: REVIEWED PERFORMANCE INDICATORS

The evaluation was made against the relevant standards provided in Ref. [2], for clarity and ease of reference the meaning of each performance indicator is described below:
3: Appraisal criteria fully met
2: Appraisal criterion is partially met and an action plan is implemented to fully meet the criterion within a defined time scale.
1: Appraisal criterion is not met and actions are under way to make improvements, but these will not achieve full compliance with the criterion.
0: Appraisal criterion is not met and no significant efforts are being made to improve the situation.

Work element	Appraisal Criteria	Performance Indicator (0,1,2,3) prepared by Uruguay before the mission	Performance indicators based on findings of the EPREV team
01. Basic responsibilities	1.1. Establish a governmental body or organization (or identify an existing one) to act as a national coordinating authority (NCA)	3	3
	1.2. Clearly assign the functions and responsibilities of operators and response organizations and ensure they are understood by all response organizations	3	2
	1.3. Establish a regulatory and inspection system that provides reasonable assurance that emergency preparedness and response arrangements are in place for all facilities/practices in line with the requirements of the international standards	3	1
	1.4. Establish an appropriate management system and all organizations that may be involved in the response to a nuclear or radiological emergency have adopted appropriate management arrangements to meet the timescales and to ensure an effective and coordinated response throughout the emergency	-	2
02. Assessment of threats	2.1. Perform threat assessments of the facilities and activities in the State, categorizing them in accordance with the five threat categories in Table I of GS-R-2	3	2

Work element	Appraisal Criteria	Performance Indicator (0,1,2,3) prepared by Uruguay before the mission	Performance indicators based on findings of the EPREV team
03. Establishing emergency management and operations	3.1. Make arrangements to coordinate the emergency responses 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	3	2
	3.2. Make arrangements for the appraisal of the information necessary for decision making on the allocation of resources throughout the emergency	-	2
04. Identifying, notifying and activating	4.1. Establish a contact point operating 24 hours/day and 7 days/ week	3	2
	4.2. Ensure that on-site managers of scrap metal processing facilities and responsible officials at national borders are aware of indicators of radiation emergency and are able to take immediate actions	2	2
	4.3. Ensure that first responders are aware of the indicators of a radiation emergency and they are familiar with the appropriate notification procedures and other immediate actions warranted if an emergency is suspected	2	2
	4.4. Establish a system for promptly initiating an appropriate level of coordinated and pre-planned on and off-site response in the event of an emergency	3	2
	4.5. Ensure response organizations have sufficient number of qualified personnel available at all times to perform assigned initial response actions	2	2
	4.6. Make known to the IAEA and to other States the country's single warning point of contact responsible for receiving emergency notifications and information from other States and information from the IAEA	3	2
	4.7. Perform the event classification and countermeasures following the requirements of international standards	-	1

Work element	Appraisal Criteria	Performance Indicator (0,1,2,3) prepared by Uruguay before the mission	Performance indicators based on findings of the EPREV team
	4.8. Make arrangements for the prompt determination of the appropriate emergency class by the operator and of the level of response, as well as for notification and provision of updated information to the off-site notification point	-	NA
	4.9. Have arrangements in place to provide a response to an emergency for which detailed plans could not be formulated in advance	-	2
05. Taking mitigatory actions	5.1. 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	2	2
	5.2. Ensure that the operator of a practice in threat category IV is given basic instructions to be able to mitigate the consequences of the emergency situation	2	1
	5.3. Make arrangements to initiate a prompt search and to issue a warning to the public in the event of the loss of a dangerous source	3	1
	5.4. Make arrangements for mitigatory actions to prevent the 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	1
	5.5. The operators of facilities have in place the necessary plans and procedures and guidance for the operator on mitigatory actions for severe conditions, for the full range of postulated emergencies including accidents beyond the design basis	-	1
06. Taking urgent protective action	6.1. Adopt national intervention levels for taking urgent protective actions in accordance with the relevant international standards	3	1

Work element	Appraisal Criteria	Performance Indicator (0,1,2,3) prepared by Uruguay before the mission	Performance indicators based on findings of the EPREV team
	6.2. Make arrangements for effectively making and implementing decisions on urgent protective actions to be taken off the site	2	NA
	6.3. Make arrangements to ensure the safety of all persons on the site in the event of a nuclear or radiological emergency	3	1
07. Providing information and issuing instructions and warnings to the public	7.1. Make arrangements to provide prompt 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	2	2
08. Protecting emergency workers	8.1. Make arrangements for taking all practicable measures to provide protection for: 1) emergency workers in threat category I, II or III or within the precautionary action zone or the urgent protective action planning zone; 2) radiation specialists, radiation protection officers, or an emergency team of radiological assessors and medical personnel who may respond to radiation emergencies	2	1
	8.2. Have arrangements in place to provide effective large scale radiation protection for workers on sites under severe accident conditions	-	NA
	8.3. Radiation workers have the information of the risks of radiation exposure and basic training to deal with an emergency in severe accident conditions	-	NA
09. Assessing the initial phase	9.1. Establish default operational intervention levels (OILs) for radiological emergencies	2	1
	9.2. Ensure the continued availability of radiation monitoring services to make assessments to be used for mitigatory actions, emergency classification, and urgent protective actions on and off the site	-	NA

Work element	Appraisal Criteria	Performance Indicator (0,1,2,3) prepared by Uruguay before the mission	Performance indicators based on findings of the EPREV team
10. Managing the medical response	10.1. 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	2	1
	10.2. Make arrangements, at the national level, to provide initial treatment of people who have been exposed or contaminated	2	2
11. Keeping the public informed	11.1. Make arrangements for providing useful, timely, truthful, and consistent information to the public, responding to incorrect information and rumours and responding to requests for information from the public and from news and information media	3	2
12. Taking agricultural countermeasures, countermeasures against ingestion and longer term protective actions	12.1. Adopt national intervention levels and action levels for agricultural countermeasures and putting restriction on consumption, distribution and sale of locally produced and agricultural produce following a release of radioactive material	2	1
	12.2. Establish OILs for dose rates due to deposition and deposition densities, timely monitoring for ground contamination for temporary relocation and means for accomplishing and assisting those who have been relocated	2	1
13. Mitigating the non-radiological consequences of the emergency and the response	13.1. Make arrangements for responding to public concern in an actual or potential nuclear or radiological emergency	2	2
14. Requirements for infrastructure	14.1. Develop emergency plans that are consistent with the threat and coordinated with all response organizations	3	1
	14.2. Ensure that operating and response organizations develop the procedures needed to perform their response functions	2	1

Work element	Appraisal Criteria	Performance Indicator (0,1,2,3) prepared by Uruguay before the mission	Performance indicators based on findings of the EPREV team
	14.3. Provide, concentrating on the use of existing capabilities, adequate tools, instruments, supplies, equipment, communication systems, facilities and documentation	2	2
	14.4. Identify facilities at which the following will be performed: coordination of on-site response actions; coordination of local off-site response actions (radiological and conventional); coordination of national response actions; coordination of public information; and coordination of off-site monitoring and assessment	3	3
	14.5. Make arrangements, concentrating on the use of existing capabilities, for the selection of personnel and training	2	1
	14.6. a) Conduct exercises and drills to ensure that all specified functions required to be performed for emergency response and all organizational interfaces for facilities in threat category I, II or III and the national level programmes for threat category IV or V are tested at suitable intervals b) Conduct exercises and drills for on-site workers and external responders considering severe accident scenario	2	2
	14.7. Make arrangements to ensure the availability and reliability of all supplies, equipment, communication systems and facilities needed during an emergency, including emergencies with severe consequences	2	2
	14.8. Establish mobilization plans to gather human resources in various fields for a prolonged radiation emergency with severe consequences	-	NA

Work element	Appraisal Criteria	Performance Indicator (0,1,2,3) prepared by Uruguay before the mission	Performance indicators based on findings of the EPREV team
	14.9. The on-site emergency control centre in threat category-I facilities, designed to remain operational for the range of postulated severe accident conditions	-	NA
	14.10. The on-site emergency control centre have available enough information about essential safety related parameters and radiological conditions in the facility and its immediate surroundings	-	NA
	14.11. Make arrangements to conduct internal monitoring of emergency response workers and to ensure the availability of these services under postulated emergency conditions	-	2