

**INTEGRATED  
REGULATORY  
REVIEW SERVICE  
MISSION**

TO

**The Islamic Republic of Iran**

**Tehran, Islamic Republic of Iran**

*20 February to 2 March 2010*

**DIVISION OF NUCLEAR INSTALLATION SAFETY**







## **INTEGRATED REGULATORY REVIEW SERVICE**

Under the terms of Article III of its statute, the International Atomic Energy Agency (IAEA) has the mandate to establish or adopt, in consultation and, where appropriate, in collaboration with competent organizations, standards of safety for protection of health and minimization of danger to life and property (including such standards for labour conditions), and to provide for the application of these standards to its own operations as well as to assisted operations and, at the request of the parties, to operations under bilateral or multilateral arrangements or, at the request of a State, to any of that State's activities concerning peaceful nuclear and radiation activities. This includes the publication of a set of Safety Standards, whose effective implementation is essential for ensuring a high level of safety. As part of its providing for the application of safety standards, the IAEA provides safety review and appraisal services, at the request of Member States, which are directly based on its Safety Standards.

In the regulatory framework and activities of the regulatory bodies, the IAEA had been offering, for many years, several peer review and appraisal services. These included: (a) the International Regulatory Review Team (IRRT) programme that provided advice and assistance to Member States to strengthen and enhance the effectiveness of their legal and governmental infrastructure for nuclear safety; (b) the Radiation Safety and Security Infrastructure Appraisal (RaSSIA) that assessed the effectiveness of the national regulatory infrastructure for radiation safety including the safety and security of radioactive sources; (c) the Transport Safety Appraisal Service (TransSAS) that appraised the implementation of the IAEA's Transport Regulations; and (d) the Emergency Preparedness Review (EPREV) that was conducted to review both preparedness in the case of nuclear accidents and radiological emergencies and the appropriate legislation.

The IAEA recognized that these services and appraisals had many areas in common, particularly concerning the requirements on a State to establish a comprehensive regulatory framework within its legal and governmental infrastructure and on a State's regulatory activities. Consequently, the IAEA's Department of Nuclear Safety and Security has developed an integrated approach to the conduct of missions on legal and governmental infrastructure to improve their efficiency, effectiveness and consistency and to provide greater flexibility in defining the scope of the review, taking into account the regulatory technical and policy issues.

In 2006 a new IAEA peer review and appraisal service, called the Integrated Regulatory Review Service (IRRS) was established. The IRRS is intended to strengthen and enhance the effectiveness of the State's regulatory infrastructure in nuclear, radiation, radioactive waste and transport safety, whilst recognizing the ultimate responsibility of each State to ensure the safety of nuclear power plants, the protection against ionizing radiation, the safety and security of radioactive sources, the safe management of radioactive waste, and the safe transport of radioactive material. The IRRS is carried out by comparisons against IAEA regulatory safety standards with consideration of regulatory technical and policy issues.

The IRRS is structured in modules that cover general requirements for the establishment of an effective regulatory framework, regulatory activities and management systems for the regulation and control in nuclear safety, radiation safety, waste safety, transport safety, emergency preparedness and response and security. The aim is to make the IAEA services more consistent, to enable flexibility in defining the scope of the missions, to promote self-assessment and continuous self-improvement, and to improve the feedback on the use and application of the IAEA Safety Standards. The modular structure

also enables tailoring the service to meet the needs and priorities of the Member State. The IRRS is neither an inspection nor an audit but is a mutual learning mechanism that accepts different approaches to the organization and practices of a national regulatory body, considering the regulatory technical and policy issues, and that contributes to ensuring a strong nuclear safety regime. In this context, considering the international regulatory issues, trends and challenges, and to support effective regulation, the IRRS missions provide:

- a balance between technical and policy discussions among senior regulators;
- sharing of regulatory experiences;
- harmonization of the regulatory approaches among Member States; and
- mutual learning opportunities among regulators.

Regulatory technical and policy discussions that are conducted during IRRS missions take into account the newly identified issues coming from the self-assessment made by the host organization, visits to installations to observe inspections and interviews with the counterparts.

Other legally non-binding instruments can also be included upon request of the Member States, such as the Code of Conduct (CoC) on the Safety and Security of Radioactive Sources, which was adopted by the IAEA Board of Governors in 2004 and for which more than 80 Member States have written to the Director General of the IAEA committing themselves to implementing its guidance, and the Code of Conduct on the Safety of Research Reactors, which was adopted by the IAEA Board of Governors in 2005.

The IRRS concept was developed by the IAEA Department of Nuclear Safety and Security and then discussed at the Third Review Meeting of the Contracting Parties of the Convention on Nuclear Safety in 2005. The meeting acknowledged the importance of the IAEA regulatory peer reviews now recognized as a good opportunity to exchange professional experience and to share lessons learned and good practices. The self-assessment performed prior to the IAEA peer review mission is an opportunity for Member States to assess their regulatory practices against the IAEA safety standards. These IAEA peer review benefits were further discussed at the International Conference on 'Effective Nuclear Regulatory Systems' in Moscow in 2006, at which note was taken of the value of IRRS support for the development of the global nuclear safety regime, by providing for the sharing of good regulatory practices and policies for the development and harmonization of safety standards, and by supporting the application of the continuous improvement process. All findings coming from the Convention on Nuclear Safety review meetings and from the Moscow conference are inputs for the IRRS to consider when reviewing the regulatory technical and policy issues.

In addition, the results of the IRRS missions will also be used as effective feedback for the improvement of existing safety standards and guidance and the development of new ones, and to establish a knowledge base in the context of an integrated safety approach. Through the IRRS, the IAEA assists its Member States in strengthening an effective and sustainable national regulatory infrastructure, thus contributing towards achieving a strong and effective global nuclear safety and security regime.

The Global Nuclear Safety Regime has emerged over the last ten years, with international legal instruments such as safety Conventions and Codes of Conduct and significant work towards a suite of harmonized and internationally accepted IAEA safety standards. The IAEA will continue to support the promotion of the safety Conventions and Codes of Conduct, as well as the application of the IAEA safety standards in order to prevent serious accidents and continuously improve global levels of safety.



## REPORT

# INTERNATIONAL REGULATORY REVIEW SERVICE

## MISSION REPORT TO THE GOVERNMENT OF THE ISLAMIC REPUBLIC OF IRAN

**Mission date:** 20 February–2 March 2010

**Regulatory Body:** Iran Nuclear Regulatory Authority (INRA)

**Location:** Tehran, Islamic Republic of Iran

**Regulated Facilities:** Nuclear Power Plants (BNPP)

**Organized by:** IAEA, under Technical Cooperation Project IRA/9/018

**IRRS Review Team:**

MYKOLAICHUK, Olena	(Ukraine, Team Leader)
SAMAIN, Jean-Paul	(Belgium, Deputy Team Leader)
GANCHEV, Tinko	(Bulgaria)
SVAB, Miroslav	(Czech Republic)
MISAK, Jozef	(Czech Republic)
LUX, Ivan	(Hungary)
BIRO, Lucian	(Romania)
JANKO, Karol	(Slovakia)
GRAVES, David	(IAEA Coordinator/NSNI)
SALEM, Rosalie	(IAEA Administrative Support/NSNI)

IAEA-2010

Issue date: November 2010

## **FOREWORD**

### **IAEA Director General**

The IAEA Integrated Regulatory Review Service (IRRS) programme assists Member States to enhance the organization and performance of their nuclear safety regulatory body. Such a regulatory body must work within the framework of its national legal system, which in turn should ensure both the independence and the legal powers available to the regulatory body. Additionally, the national administrative and legislative system should ensure that the regulatory body has sufficient funding and resources to carry out its functions of reviewing and assessing safety submissions; licensing or authorizing nuclear safety activities, establishing regulations and criteria; inspecting nuclear facilities and enforcing national legislation. The regulatory body should be resourced and staffed by capable and experienced people to a level commensurate with the national nuclear programme. IRRS missions focus on all these aspects in assessing the regulatory body's safety effectiveness. Comparisons with successful practices in other countries are made and ideas for improving safety are exchanged at the working level.

An IRRS mission is made only at the request of a Member State. It is not an inspection to determine compliance with national legislation, rather an objective review of nuclear regulatory practices with respect to international guidelines. The evaluation can complement national efforts by providing an independent, international assessment of work processes that may identify areas for improvement. Through the IRRS programme, the IAEA facilitates the exchange of knowledge and experience between international experts and regulatory body personnel. Such advice and assistance will enhance nuclear safety in all nuclear countries. An IRRS mission is also a good training ground for observers from newly formed regulatory bodies in developing countries who follow the evaluation process. This approach, based on voluntary cooperation, contributes to the attainment of international standards of excellence in nuclear safety at the regulatory body level.

Essential features of the work of the IRRS experts and their regulatory body counterparts are the comparisons of regulatory practices with international guidelines and best practices, and a joint search for areas where practices can be enhanced. The implementation of any recommendations or suggestions, after consideration by the regulatory body, is entirely voluntary.

**The number of recommendations, suggestions and good practices is in no way a measure of the status of the regulatory body. Comparisons of such numbers between IRRS reports from different countries should not be attempted.**

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY</b> .....	<b>1</b>
<b>I. INTRODUCTION</b> .....	<b>3</b>
<b>II. OBJECTIVE AND SCOPE</b> .....	<b>4</b>
<b>III. BASIS FOR THE REVIEW</b> .....	<b>5</b>
<b>1. LEGISLATIVE AND GOVERNMENTAL RESPONSIBILITIES</b> .....	<b>7</b>
1.1. PRINCIPAL LAWS OR OTHER LEGAL PROVISIONS.....	7
1.2. POSITION AND RESOURCES OF THE REGULATORY BODY .....	11
1.3. OTHER REQUIREMENTS FOR GOVERNMENTAL RESPONSIBILITIES .....	13
<b>2. RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY</b> .....	<b>19</b>
2.1. GENERAL SITUATION .....	19
<b>3. ORGANIZATION OF THE REGULATORY BODY</b> .....	<b>25</b>
3.1. GENERAL ORGANIZATION .....	25
3.2. STAFFING AND TRAINING .....	26
3.3. INTERNATIONAL COOPERATION .....	29
3.4. ADVISORY BODIES AND RESEARCH ORGANIZATIONS .....	30
3.5. RELATIONS BETWEEN THE REGULATORY BODY AND THE OPERATOR	31
<b>4. AUTHORIZATION PROCESS</b> .....	<b>32</b>
4.1. AUTHORIZATION ACTIVITY OF INRA/NNSD.....	32
4.2. BASIS OF AUTHORIZATION.....	33
4.3. STEPS OF AUTHORIZATION .....	33
<b>5. REVIEW AND ASSESSMENT</b> .....	<b>36</b>
5.1. ESTABLISHMENT AND USE OF REVIEW AND ASSESSMENT CRITERIA..	36
5.2. AREAS OF EXPERTISE AND TECHNICAL SUPPORT ORGANISATIONS ...	37
5.3. MANAGEMENT OF REVIEW AND ASSESSMENT .....	39
5.4. PERFORMANCE OF MAJOR REVIEW AND ASSESSMENT TASKS .....	39
5.5. INDEPENDENT VERIFICATION OF SAFETY ASSESSMENT.....	40
5.6. USE OF PROBABILISTIC SAFETY ASSESSMENT .....	41
5.7. REVIEW AND ASSESSMENT OF OPERATIONAL EXPERIENCE FEEDBACK	42
<b>6. INSPECTION AND ENFORCEMENT</b> .....	<b>43</b>
6.1. INSPECTIONS .....	43
6.2. ENFORCEMENT .....	48
6.3. VISIT TO BNPP .....	50
<b>7. DEVELOPMENT OF REGULATIONS AND GUIDES</b> .....	<b>54</b>
7.1. THE REGULATIONS AND GUIDES FOR BNPP.....	54
7.2. PROCESS FOR DEVELOPMENT OF REGULATIONS AND GUIDES .....	56
<b>8. THE MANAGEMENT SYSTEM</b> .....	<b>61</b>
8.1. GENERAL .....	61
8.2. MANAGEMENT RESPONSIBILITY .....	62
8.3. RESOURCE MANAGEMENT .....	63
8.4. PROCESS IMPLEMENTATION.....	63
8.5. MEASUREMENT, ASSESSMENT AND IMPROVEMENT .....	64
8.6. CONCLUSION .....	64
<b>APPENDIX I – LIST OF PARTICIPANTS</b> .....	<b>67</b>
<b>APPENDIX II – MISSION PROGRAMME</b> .....	<b>68</b>
<b>APPENDIX III – MISSION COUNTERPARTS</b> .....	<b>72</b>
<b>APPENDIX IV – RECOMMENDATIONS/SUGGESTIONS/GOOD PRACTICES</b> .....	<b>73</b>
<b>APPENDIX V – REFERENCE MATERIAL PROVIDED BY INRA</b> .....	<b>79</b>



**APPENDIX VI – IAEA REFERENCE MATERIAL .....80**  
**APPENDIX VII –INRA ORGANIZATIONAL CHART .....81**



## EXECUTIVE SUMMARY

At the invitation of the Government of the Islamic Republic of Iran, an international peer review team visited the Iran Nuclear Regulatory Authority (INRA), to conduct an Integrated Regulatory Review Service (IRRS) mission. The purpose of the IRRS mission was to review the effectiveness of the Islamic Republic of Iran's regulation of nuclear safety and to propose possible improvements in view of preparation for operation of the first nuclear power plant (NPP) in The Islamic Republic of Iran.

The review was conducted from 20 February to 2 March 2010. The review team comprised eight senior regulators from seven Member States, a staff member from the IAEA and an IAEA administrative assistant. INRA had submitted to the IAEA, in advance of the mission, an information package including a self-assessment and plans for improving its regulatory effectiveness.

The IRRS activities took place at the INRA offices in Tehran, Islamic Republic of Iran and also through a technical visit to the Bushehr NPP (BNPP) site in Bushehr, Islamic Republic of Iran.

Both regulatory technical and policy issues were addressed during the mission. The policy issues discussed included independence of the regulatory body, leadership and management for safety, enhancing regulatory effectiveness and competence, and human resources and knowledge management.

The team concluded that INRA has achieved significant progress as a nuclear regulatory authority, as demonstrated by the regulatory work done on the BNPP construction and in preparation for the unit commissioning.

The team acknowledged that important steps are expected to transform INRA into a legally independent authority with the anticipated enactment of the draft Law on Safe Use of Nuclear Energy and Radiation Sources in the Islamic Republic of Iran.

The team also emphasized other issues to be considered as priorities to strengthen the legal and regulatory infrastructure for the safety of nuclear power in the Islamic Republic of Iran. These include accession to the Convention on Nuclear Safety and to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, and the establishment of a comprehensive system of national nuclear safety regulations harmonized with the IAEA Safety Standards.

The team highlighted a number of important considerations that require continued attention of the Government and the INRA management. These considerations include:

- increasing the number of technical staff positions dealing with licensing, inspection, review and assessment;
- establishing incentives (competitive salaries, career and personal development opportunities) to attract and retain qualified experts for regulatory jobs;
- assuring independent technical support and safety verification capabilities;
- establishing advisory bodies, as appropriate;
- establishing a comprehensive programme on regulatory competence management with due account to emerging needs relating to further nuclear power development.

In the course of its review, the IRRS team identified the following strengths:

- INRA is effectively regulating safety of the BNPP, with the INRA staff being dedicated, conscientious and demonstrating clear commitments to further improvements;
- INRA has demonstrated clear recognition of the value of the international peer review activities and safety related conventions, as well as its willingness and ability to consider participation in the global safety regime as soon as the relevant legal formalities can be completed;
- INRA has established an authorization process that is well structured and covers all relevant issues, with the supporting documentation being thorough and sufficiently detailed;
- Under conditions of a staff shortage, INRA demonstrated strong leadership while performing both review and assessment and inspection tasks during the BNPP construction and pre-commissioning;
- INRA has developed and put into implementation an excellent computerized documentation control system, thus the efficiency of NRPD management system has been already increased and a significant improvement of the NNSD management efficiency is expected as soon as this computerized system is fully implemented.

This report includes a number of recommendations and suggestions to further strengthen the regulatory body in the Islamic Republic of Iran and to support the observed improvement activities. The IRRS team believes that consideration of the following recommendations and suggestions should be given high priority either because they are identified in several areas of the review or because the experts consider they will contribute significantly to the enhancement of the overall performance of the regulatory system:

- the Government of the Islamic Republic of Iran should support the prompt enactment of a law establishing INRA as an independent nuclear regulatory authority as well as provide it with all needed powers and resources, particularly human resources, to carry out its regulatory functions;
- INRA should replace in due time the existing set of ad hoc regulations governing the regulatory process with a comprehensive system of national nuclear safety regulations, supported with the necessary guides;
- INRA/NNSD should develop the necessary administrative procedures and guidelines to impose enforcement actions, and should consider ways and means to institute prosecution through the legal process in line with the legal system and enforcement practices in the country;

The IRRS team also made note of important positive regulatory developments in many areas. The most relevant good practices identified were an effective and efficient use of regulatory support from the country of design origin; as well as promotion of safety culture with the use of positive incentives.

The team noted that INRA staff put significant effort into the preparation for the mission. During the review, the administrative and logistical support was excellent and the team was extended full cooperation in technical discussions with INRA personnel. INRA counterparts were enthusiastic and were interested in obtaining further advice related to the way they conduct their work, and their plans for further development.

## I. INTRODUCTION

At the request of the Islamic Republic of Iran, a team of eight experts and two IAEA staff visited the Iran Nuclear Regulatory Authority (INRA) in February–March 2010 to conduct an Integrated Regulatory Review Service (IRRS) mission with reduced scope. In July 2009, a preparatory mission was carried out in the INRA offices in Tehran to discuss the objective/purpose of the review in connection with the regulation and licensing of nuclear power plants.

The purpose of the mission was to conduct a review of the regulatory infrastructure of INRA with regard to licensing and regulating the operation of NPPs (specifically BNPP), to review the effectiveness of INRA, and to exchange information and experience in the regulation of nuclear safety in selected predetermined areas considered in the IRRS. The selected areas were: Legislative and Governmental Responsibilities, Responsibility and Functions of the Regulatory Body, Organization and Staffing of the Regulatory Body, Authorization Process, Review and Assessment; Inspection and Enforcement; Development of Regulations and Guides; and the Management System.

The review was conducted from 20 February to 2 March 2010. Before the mission, INRA made available a collection of Advance Reference Material (ARM) for the team to review. This material comprised a large number of legal, regulatory and internal documents, in particular the report of the INRA Self-Assessment. During the mission, the team performed a systematic review of the predetermined topic areas using the Self-Assessment, the ARM, interviews with INRA staff and direct observation of INRA working practices. Most of the IRRS activities took place at the INRA offices in Tehran. In addition, some members of the team conducted a technical visit to the BNPP in Bushehr.

## **II. OBJECTIVE AND SCOPE**

The key objectives of IRRS missions are to enhance safety by:

- Providing the host country (regulatory body and governmental authorities) with a review of their nuclear and radiation safety, regulatory technical and policy issues;
- Providing the host country with an objective evaluation of their nuclear and radiation safety regulatory practices with respect to international safety standards;
- Contributing to the harmonization of regulatory approaches among Member States;
- Promoting sharing of experience and exchange of lessons learnt;
- Providing key staff in the host country with an opportunity to discuss their practices with reviewers who have experience of other practices in the same field;
- Providing the host country with recommendations and suggestions for improvement;
- Providing other States with information regarding good practices identified in the course of the review;
- Providing reviewers from States and the IAEA staff with opportunities to broaden their experience and knowledge of their own field; and
- Providing the host country through completion of the IRRS self-assessment of a comparison of its activities against international safety standards and thereby identifying potential areas for improvement.

The scope of the IRRS mission described in the present report was to review the effectiveness of the regulation of nuclear power plants in the Islamic Republic of Iran.

### **III. BASIS FOR THE REVIEW**

#### **A) PREPARATORY WORK AND IAEA REVIEW TEAM**

The preparatory work for the mission was carried out by the IRRS IAEA Coordinator, Mr. David Graves, Senior Safety Officer, IAEA, and the appointed Liaison Officer, Mr. Kamran Sepanloo, Director of the National Nuclear Safety Department of INRA.

An IRRS preparatory meeting was held in July 2009 to discuss the technical and administrative details of the mission. It took place in the INRA offices in Tehran, Islamic Republic of Iran with the participation of the appointed IRRS Team Leader, Ms. Olena Mykolaichuk, Chairperson, State Nuclear Regulatory Commission of Ukraine (SNRCU); Mr. Jean-Paul Samain, former Chairman of The Scientific Council for Ionizing Radiation of Belgium; and Mr. David Graves, the IAEA Coordinator. The preparatory meeting was opened by Mr. Nasir Rastkhah, President of INRA. All the preliminary organizational aspects of the mission were defined during the preparatory meeting with the participation of the IRRS team members that were present and the INRA staff.

During the preparatory meeting discussions it was agreed that the advance reference material (ARM), including the output from the self-assessment, would be provided to the IAEA in December 2009. In addition, the scope of the IRRS mission was agreed to include the regulation of nuclear power plants. On-site reviews and visits, the ARM and the main agenda items were discussed and agreed. This included agreeing to a visit to the BNPP. Discussions were also held regarding the policy issues that were proposed to be included in the IRRS mission. Mr. Graves presented an overview of the IAEA's IRRS mission objectives, purpose and methodology to a large group of interested INRA staff.

Significant work was carried out by the reviewers and by the IAEA staff before the mission in order to prepare initial impressions on the ARM, to review the INRA self-assessment and report, to prepare for the interviews and additional observations and to identify additional relevant material necessary to review during the mission.

An initial IAEA team meeting took place on Friday, 19 February 2009 and was attended by the IRRS team, the INRA Liaison Officer and another senior INRA staff member. The IRRS Team Leader and the IRRS IAEA Coordinator discussed specific aspects of the mission and the basis for the review. The background, context and objectives of the IRRS and IRRS methodology for the review and the evaluation were also agreed among all of the mission reviewers. The Liaison Officer presented the logistical and other aspects of the mission.

#### **B) REFERENCES FOR THE REVIEW**

The main reference documents provided by INRA for the review mission are indicated in Appendix V. The most relevant IAEA Safety Standards and other reference documents used for the review are indicated in Appendix VI.

#### **C) CONDUCT OF THE REVIEW**

The entrance meeting was held on Saturday, 20 February with the participation of:

- Mr. N. Rastkhah, President of Iran Nuclear Regulatory Authority (INRA)
- Mr. K. Sepanloo, Director of the National Nuclear Safety Department (NNSD), INRA, Liaison Officer of IRRS

- Mr. M. Amiri, Head of National Nuclear Safeguards (NNSG), INRA
- Mr. R. Kardan, Head of the National Radiation Protection Department (NRPD)
- Mr. A. Movafeghi, Head of the Nuclear and Radiation Services Department (NRSD)
- Mr. M.B. Sebteahmadi, Head of the Nuclear Safety Regulations and Guides Development Section of NNSD, INRA
- Ms. M. Vaziri, Head of the Licensing Section of NNSD, INRA
- Ms. S. Rafiei, Head of the Inspection and Enforcement Section of NNSD, INRA
- Ms. Z. Naseri, Head of the Safety Assessment Section of NNSD, INRA
- Mr. A. Sedghkerdar, Head of the Representative Office of Inspection and Enforcement Section of NNSD in BNPP
- and the Review Team (see Appendix I).

Opening remarks were made by Mr. Nasir Rastkhah, President of INRA and IRRS Team Leader Ms. Olena Mykolaichuk, Chairperson, State Nuclear Regulatory Commission of Ukraine (SNRCU). During the mission, a systematic review was conducted of all the predetermined areas. The review was conducted through meetings, interviews and discussions with INRA personnel, assessment of the ARM, and direct observations regarding the national practices and activities.

The team performed its activities in accordance with the Mission Programme, outlined in Appendix II

The exit meeting was held on Tuesday, 2 March 2009 with Mr. Ali Akbar Salehi, President of the Atomic Energy Organization of Iran; Mr. Philippe Jamet, IAEA Director of the Division of Nuclear Installation Safety; Mr. N. Rastkhah, President of INRA; Mr. K. Sepanloo, Director of the National Nuclear Safety Department (NNSD) of INRA; INRA counterparts and other INRA staff. The main conclusions of the IRRS mission were presented by the IRRS Team Leader Ms. O. Mykolaichuk, and closing remarks were made by Mr. Philippe Jamet, IAEA Director of the Division of Nuclear Installation Safety.



## **1. LEGISLATIVE AND GOVERNMENTAL RESPONSIBILITIES**

The legislative and statutory framework for regulating the safety of nuclear power plants in The Islamic Republic of Iran is provided primarily through the Atomic Energy Organization (AEOI) Act (1974) and the Radiation Protection (RP) Act (1989). These Acts and corresponding decrees (1990 and 2006) are the existing legislations in force that cover the whole area to be regulated. They empowered the competent authority to develop, approve and issue safety principles, criteria, regulations and regulatory guides in the field of its competence and to perform the regulatory functions.

### **1.1. PRINCIPAL LAWS OR OTHER LEGAL PROVISIONS**

- 1) The Atomic Energy Organization (AEOI) Act of Iran (1974) provides the initial framework to regulate nuclear safety.

The functions of the Organization are as follows:

- a. Promoting the development of atomic science and technology and creating the basis for the use of the technology in the national development plans.
- b. Carrying out necessary studies and research.
- c. Promoting the application of the technology in industry, agriculture, and service industries.
- d. Providing technical services required.
- e. Carrying out surveys and exploration activities to find resource of source materials for atomic industries, exploiting these resources, and using the said materials in the national atomic industries, power plants, factories and various installations. The Organization must endeavor to procure the atomic fuel and other basic materials required for the country's atomic industries, keeping in mind the future needs.
- f. Establishing atomic power plants, and operating them to help supply the country's need for electrical power.
- g. Establishing desalination installations, and operating them to help supply the country's need for water.
- h. Producing and distributing radioisotopes and other materials and equipment
- i. Coordinating and supervising activities undertaken by other governmental, government-affiliated, or non-governmental institutions, and drafting the requisite rules, guidelines and regulations, and proposing them for the approval of competent legal authorities.
- j. Establishing relations with international authorities or foreign countries, in the name of the Government of The Islamic Republic of Iran. The Organization shall represent the Government of The Islamic Republic of Iran in the International Atomic Energy Agency.
- k. Carrying out research to use unexploited sources of energy existing in nature, and endeavouring to benefit from the experience of other nation in this area by means of establishing appropriate contacts.

The law, i.e., created the organs of the organization as follows:

- The Atomic Energy Council
- The Atomic Energy Committee
- The President of the Organization

The Committee is composed of three members, as follows:

- The Minister of Water and Electricity, who shall be the Chairman of the Committee;
- The Minister of Finance;
- The Minister of State and President of the Plan and Budget Organization

According to this law (see i. above), AEOI appears to be the regulatory body.

- 2) The Radiation Protection Act of Iran (1989), further mentioned as the “RP Act”, fixed very clearly its objectives: “In view of the ever increasing development of radiation applications in different areas and essentially of protection of workers, public, future generations and environment against harmful effects of radiation, the following regulations have been enacted.”

Again, this law fixes that the AEOI is the competent authority. The scope of the law is very large, apparently including all activities involving any use of radiation. It appears to be sufficiently broad to cover the facilities and activities listed in paragraph 1.5<sup>1</sup> of GS-R-1.

This RP Act introduces the principle of a prior authorization from the competent authority before to conduct any activities involving the use of ionizing radiation. This “work licence” adds to a “business licence” according to other pertinent legislation. An addendum to the law addresses the specific case of medical uses of ionizing radiation: it

---

<sup>1</sup> This publication establishes legal and governmental responsibilities which are common to a broad range of facilities and activities including the following:

**Activities**

- (1) Sources of ionizing radiation; their production, use (e.g. in industrial, research and medical applications), import and export;
- (2) transport of radioactive material;
- (3) mining and processing of radioactive ores (e.g. uranium and thorium ores), and close-out of associated facilities;
- (4) site rehabilitation;
- (5) Activities in radioactive waste management (such as discharge and clearance).

**Facilities**

- (1) Enrichment and fuel manufacturing plants;
- (2) nuclear power plants;
- (3) other reactors (such as research reactors and critical assemblies);
- (4) spent fuel reprocessing plants;
- (5) radioactive waste management facilities (such as treatment, storage and disposal facilities);
- (6) nuclear and irradiation facilities for medical, industrial and research purposes;
- (7) Decommissioning or closure of nuclear facilities and site rehabilitation.

creates a commission composed of two radiation experts from the competent authority and two experts from the Ministry of Health. This commission gives advice to the competent authority which delivers the work licence. Nevertheless the final licence for establishment of the medical institution shall be issued by the Ministry of Health.

Another point of interest within this RP Act, is the obligation for the licensee to introduce two persons:

- A qualified person : it is a competent operator
- A health physics officer whose function is very similar to the radiation protection officer defined in the BSS or other pertinent documents from the IAEA.

The RP Act also determines a formal duty, in charge of the licensee, to inform the competent body of pertinent events affecting the activity and safety of the facility: suspension of operation, loss or theft of the sources, accident or incident increasing the likelihood of risk, non-planned exposures.

As far as workers are concerned the RP Act prescribes the obligation of a medical examination prior to any employment in a job involving the use of ionizing radiation and the prohibition to engage people less than 18 years of age.

Compliance with protective legislation, regulations and standards, implementation of protective measures and to give the use of protective instruments are obligations for the licensee and his qualified person and health physics officer as well as to avoid any unnecessary exposures.

A similar obligation to use the protective tools and to comply with regulations and instructions relies on the individual workers.

The chapter dedicated to supervision and inspection contains clear provisions. The obligations relying on the holder of the licence, the qualified person and the health physics officer are stated in an unambiguous way.

The chapter dedicated to offenses and punishments describes a very graduated approach of the sanctions linked with the type of violations of the law. The gradation is between a fine of  $10 \times 10^3$  Iranian Rials to a fine of  $15 \times 10^6$  Iranian Rials and an imprisonment of 3 years.

The RP Act also contains some special provisions about extraordinary advantages given to radiation workers: reduction of the working hours, increase of the salaries, bonus for calculation of the retirement and so on. This type of provisions is not in accordance with the philosophy of the IAEA.

Finally, we note some provisions of great importance, but expressed in a very general form. To discharge its assigned responsibilities the regulatory body is empowered:

- to recruit the necessary qualified experts;
- to prepare and develop criteria, regulations, standards and instructions.

One of the last articles of the RP Act obliges each entity of the government to cooperate with the regulatory body.

1. To complete the picture of the relevant legislative framework, we have to mention the Act of 2007 establishing the “National Disaster Management Organization” (NDMO). This organization had been established for responding to conventional as well as radiological emergencies. It discharges the classical responsibilities in case of emergency with the emphasis put on the preparedness prior to any event.

The NDMO has assigned different specialized committees with members from other related authorities. Each specialized committee has to prepare their procedures to respond to the emergency. Each participating organization has responsibilities and capabilities that pertain to all types or radiological emergencies.

NDMO and specialized committees within respective ministries have agreed to a set of responsibilities with regard to a radiological emergency response.

Such provisions seem to be in accordance with requirements regarding infrastructure for emergency preparedness as designed in GS-R-1.

2. The key issue in the present remains to determine how INRA had been entrusted as the competent body.

As we see above, according to the laws (1974 and 1989), AEOI is appointed as the regulatory body. INRA – Iran Nuclear Regulatory Authority – is the body established within AEOI to proceed as the safety authority. This appointment occurred in the course of the internal procedures of AEOI: a proposal of the Regulatory Commission of INRA had been approved by the head of AEOI and consequently integrated in the organizational chart of AEOI. This decision had recently been confirmed (September 2009) after the new government was entered into function by a decision signed by the Vice President of the Islamic Republic of Iran and President of the AEOI. This decision states clearly: “...for sake of adequate assurance on the Safety of Nuclear facilities and implementing regulatory supervision, indicated in item “D” of Article 9 of the Atomic Energy Act ... also indicated duties of radiation protection Act which the AEOI is called the legal Body (Regulatory Authority), it is necessary that according to the Organizational chart of AEOI, Respected Authority to be granted to the INRA is the legal Body.”

We note that the president of INRA is nominated by the head of AEOI and appointed by the President of the Islamic Republic of Iran.

There is no doubt that INRA is de facto independent from AEOI; nevertheless the embedding of INRA within AEOI looks like a potential conflict of interest and the way INRA is empowered as the regulatory body is not very transparent with regard to other stakeholders (operators, general public).

There is a clear understanding of situation within INRA; therefore INRA has developed a draft law entitled “Act on Safe Use of Nuclear Energy and Radiation Sources in the Islamic Republic of Iran.”

This draft assigns unambiguous responsibility for authorization, regulatory review and assessment, inspection and enforcement, and for establishing safety principles, criteria, regulations and regulatory guides to INRA. The promulgation of such a law will be an adequate answer to the evocated concerns. The draft was prepared several years ago with the assistance of IAEA and is now being circulated in the governmental for review prior to being submitted to the parliament for final approval.

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

(1) **BASIS:** GS-R-1, §2.4 states that: “*Legislation shall be promulgated to provide for the effective control of nuclear, radiation, radioactive waste and transport safety. This legislation:...*

*(4) shall establish a regulatory body with the authority outlined in para. 2.6;*

*(5) shall arrange for adequate funding of the regulatory body;”*

(2) **BASIS:** Draft GSR Part 1 states that:

*“Requirement 3: Establishment of a regulatory body.*

*The government, through the legal system, shall establish and maintain a regulatory body, and shall confer on it the legal authority and provide it with the competence and the resources necessary to fulfil its statutory obligation for the regulatory control of facilities and activities.*

*Requirement 4: Independence of the regulatory body.*

*The government shall ensure that the regulatory body is effectively independent in its safety related decision making and that it has functional separation from entities having responsibilities or interests that could unduly influence its decision making.”*

**R1 Recommendation:** The Government should support the enactment of a law as soon as possible to assure status of INRA as an effective and independent regulatory body with adequate authority and resources to discharge its responsibilities.

### 1.2. POSITION AND RESOURCES OF THE REGULATORY BODY

INRA is a separated organization but embedded in the AEOI, the Atomic Energy Organization of Iran, which is in charge of all nuclear matters in accordance with the law of 1974.

The concerns about this position have already been largely expressed. (see previous recommendation).

The entire resources of INRA come from the State budget following two different routes.

- 1) All expenses related to the functioning of INRA including salaries of the personal, energy consumption and so on are automatically put on the State budget without any intervention of INRA. For this reason it is difficult to give a precise amount; it is only possible to give an approximation of the amount for salaries between US \$5 and 6 million. The total amount is linked with the number of personal corresponding to the rules of the national civil service.
- 2) The projects of INRA are financed in the framework of the National Development Programme following a five-year cycle. The Islamic Republic of Iran is preparing, for the time being, the fifth cycle whose plans are submitted to the Parliament. The Parliament have indeed to approve (or to reject) the main features of the plans.

Each organization (INRA included) is required to prepare a general plan with the needed justifications. The particular plan of INRA is included in the more general plan of AEOI where a first arbitration may take place. The plans of each organization are gathered at the level of government to ensure coherency. The plan of AEOI (including INRA) is discussed in the Chapter “ENERGY” as subchapter “Atomic Energy” besides other related energy topics.

This National Development Programme supersedes other acts and it is useful to use such an opportunity to clarify some legal situations. It is the reason why INRA has introduced in the text which is expected to be ratified by the Parliament before the Iranian New Year (21st of March 2010) a specific statement about the status of INRA's regulations: each regulation approved by INRA is mandatory for governmental, non-governmental, legal or real person everywhere in the country.

In general, INRA has no difficulty with this part of its budget taking advantage of the full support of the AEOI chairman during the arbitration within this organization and the favourable flavour of INRA within the Parliament.

This part of the budget involves many of the supervisory activities related to the nuclear power plant and radiological protection including expenses for consultants, for the monitoring network or in radon prone areas.

The total amount for this part reaches US \$12 million.

- 3) INRA suspects some problems in its functioning budget as far as personnel are concerned, both quantitative as well as qualitative.

As in many countries in the world streamlining of the personnel in the civil service is a recurrent trend due to persisting budgetary problems. Thus to hire new people a special authorization at a high level of the Government is needed. That principle has already led to some unfavourable consequences some time ago when many experts had to retire due to their age; and a strict compliance with the general principles of the national civil service only allowed the replacement of half of the retirees.

Moreover the level of salaries in the civil service, and by way of consequences, the level of salaries within INRA is far under the level of the private companies for comparable jobs and similar academic degrees. The problem is thus the lack of attractiveness of the civil service for highly educated people.

While it is recognized that the regulatory body is in principle subject to the same financial controls as the rest of government, the budget of the regulatory body should not be subject to review and approval by government agencies responsible for exploiting or promoting the development of nuclear technologies.

To conclude, the considerations about budget and staffing reinforce the needs expressed in the previous paragraph about the legal framework.

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- (1) **BASIS:** GS-R-1, §4.6 states that: *“the regulatory body shall employ a sufficient number of personnel with the necessary qualifications, experience and expertise to undertake its functions and responsibilities.”*
  - (2) **BASIS:** Draft GSR Part 1 states:  
*“Requirement 18: Staffing and competence of the regulatory body  
The regulatory body shall employ a sufficient number of qualified and competent staff, commensurate with the nature and the number of facilities and activities to be regulated, to perform its functions and to discharge its responsibilities.”*
- R2 Recommendation:** The Government should ensure that INRA employs and retains a sufficient number of personnel with the necessary qualifications, expertise and experience to perform the mandated regulatory functions.
- Some particular cases of this issue are addressed in relevant sections of this report.

### 1.3. OTHER REQUIREMENTS FOR GOVERNMENTAL RESPONSIBILITIES

#### 1. Environmental protection.

Following INRA’s opinion the relationship with the authority responsible for the protection of the environment is good.

The sharing of the responsibilities is quite clear: the Environmental Protection Act excludes radioactivity from the scope of the Environmental organization. Therefore AEOI (INRA) is unambiguously the only competent body to manage the environmental aspects of radioactivity. Nevertheless the need remains to create good coordination in areas of common interest.

#### 2. Health

The RP Act of 1989 clearly indicated the way to follow for close cooperation between the regulatory body and the Ministry responsible for Health. Addenda to Articles 4, 15 and 23 determine clearly the responsibility of the Ministry of Health in the processes for licensing and preparing regulations.

The creation of a joint commission where both partners are equally represented seems a good way to cooperate.

### 3. Labour

Following INRA's opinion, there appears to be very few potential sources of conflict, and the operators have to comply simultaneously with both legislation.

### 4. Emergency preparedness

As stated previously, a recent law<sup>2</sup> organizes emergency preparedness. Besides the already discussed topics of radiological emergency some areas remain where coordination could be necessary.

Some examples include:

- fire fighters have to be coached when they have to access the controlled zone or the compliance with the regulation;
- for non-radiation areas where the regulation on chemical hazards has to be followed, the need to exchange information between relevant bodies has been identified.

These situations put a supplementary emphasis on the necessity to ensure coherency between development programmes of different organizations. Such processes take place in the latest stages of the adoption of the development programme. It is obvious that INRA must be sure that its priorities are carefully taken into account.

GS-R-1, states in §6.5 (last sentence) that the arrangements of all parties shall be exercised on a periodic basis and shall, where appropriate, be witnessed by the regulatory body. Some partial drills on industrial safety have already been conducted in BNPP where INRA has evaluated the radiological protection side. Nevertheless no complete exercise has been carried out around the NPP.

According to INRA regulations the licensee is solely responsible for on-site emergency response and has to take the appropriate measures.

Respectively, drills have been exercised in some other nuclear installations and according to the information from INRA, a similar drill is planned for BNPP in near future before the start-up of the plant

---

<sup>2</sup> Law of 2007 on "National Disaster Management Organization".



## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- (1) **BASIS:** GS-R-1, §6.5 states that: *“The emergency arrangements shall include a clear allocation of responsibility for notifications and decision making...The arrangements of all parties shall be exercised on a periodic basis and shall, where appropriate, be witnessed by the regulatory body.”*
  - (2) **BASIS:** NS-R-2, §2.36 states that: *“Appropriate emergency arrangements shall be established from the time that nuclear fuel is brought to the site, and complete emergency preparedness as described here shall be ensured before the commencement of operation.”*
  - (3) **BASIS:** NS-R-2, §2.37 states that: *“The emergency plan shall be tested in an exercise before the commencement of operation. There shall thereafter at suitable intervals be exercises of the emergency plan, some of which shall be witnessed by the regulatory body. Some of these exercises shall be integrated and shall include the participation of as many as possible of the organizations concerned. The plans shall be subject to review and updating in the light of experience gained.”*
  - (4) **BASIS:** Draft GSR Part 1 states:  
*“Requirement 8: Emergency preparedness and response  
The government shall make provision for emergency preparedness to enable a timely and effective response in a nuclear or radiological emergency.”*
- S1 Suggestion:** Adequate attention should be paid to the establishment and the exercise of the emergency response plan prior to the commissioning and on a regular basis.

### 5. Transport

INRA uses TS-R-1 as its national regulation for the transport of radioactive material.

Iran Nuclear Waste Management Company (INW) is the only company which is authorized for the transport of radioactive waste and another company is authorized for the transport of medical sources.

INRA applies a system of a unique licence covering all aspects for such activities as industrial radiography. It is a respectable practice from the viewpoint of the limitation of administrative burden.

### 6. Nuclear Liability

The 1989 RP Act establishes a framework to take care of workers or outsiders injured by a radiation exposure. The provisions of the DMO Act of 2007 also compensates the victims of natural and other unpredictable events, creating a duty for the government to pay something to charge on the general budget of the State.

Nevertheless INRA has clearly identified that the present legislation and regulations from the Islamic Republic of Iran are not sufficient to manage the question of the compensation in case of a nuclear accident. It became obvious that, due to the expansion of nuclear power, special rules must be developed. An expert group had been committed to prepare a new legislation, starting with a comparison of pertinent legislation in several countries. The general rules rely on the evidence of a fault. The regime of nuclear liability should not necessitate establishing a fault.

The government is considering the matter and is drafting a new special law. To join the Vienna Convention needs some time to compare the international rules with the national legislation but is under consideration.

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- (1) **BASIS:** GS-R-1, §2.4 states: “*Legislation shall be promulgated to provide for the effective control of nuclear, radiation, radioactive waste and transport safety. This legislation:...*  
*(11) shall define liabilities in respect of nuclear damage<sup>3</sup> ...”.*
- (2) **BASIS:** Draft GSR Part 1 states:  
“*Requirement 14: International obligations and arrangements for international cooperation*  
*The government shall fulfil its respective international obligations, participate in the relevant international arrangements, including international peer reviews, and promote international cooperation to enhance safety globally.”*
- R3 Recommendation:** The government should undertake all necessary efforts for the Islamic Republic of Iran to establish specific national nuclear liability arrangements, and to become a party to the international nuclear liability regime.

### 7. Waste management and decommissioning

A central radioactive waste management organization had been established as the Iran Nuclear Waste Management Co (INW) which will be in charge of managing all the radioactive waste through contracts with the operators.

A plan has been elaborated for BNPP which can be summarized as follows:

- irradiated fuel (high level waste) is deemed to return back to the Russian provider, and
- low and intermediate level waste have to be managed locally.

The need for The Islamic Republic of Iran to draw up a national waste management plan is clearly identified; it is an ongoing action for which the requirements for HLW (spent fuel) are under development. For low and intermediate level waste, the plan is completed and the repository is under construction.

INRA has issued some rules about the management of waste. For example, any application to produce or import radioactive sources must contain information about the final destination of the source when decommissioned (for instance, back to the provider) and/or a contract with INW.

INW and BNPP have signed a contract for the management of the low and intermediate waste. They carry on the needed work, study and design, in cooperation with the Technical Cooperation Department from IAEA. The environmental studies are presently under evaluation by INRA.

---

<sup>3</sup> Nuclear damage is as defined in the Protocol amending the Vienna Convention on Civil Liability for Nuclear Damage of 1997.

In the case of BNPP, owned by Nuclear Power Corporation (NPC), INRA had given some attention to the necessary funding needed to cover the decommissioning of the NPP. Through the licensing conditions INRA stated that the contract was not sufficient to deliver the responsibility of NPC.

INRA considers only the principle of the management but doesn't specify the exact amount of money needed. It considers that it is the responsibility of the management of the operator, which states in the Quality Assurance Programme, that enough money has to be reserved.

INRA seems to have already done a lot of job in the field of waste management and decommissioning. Therefore it appears particularly beneficial for INRA that the Islamic Republic of Iran become a member of the Joint Convention on Waste and Spent Fuel.

#### 8. Other international legal instruments

The Islamic Republic of Iran has already acceded to two international conventions regarding nuclear safety:

- Convention on Early Notification of a Nuclear Accident or Radiological Emergency as of 9 November 2000;
- Convention on Assistance in the case of a Nuclear Accident or Radiological Emergency as of 9 November 2000.

The proposal on ratification of the Convention on Nuclear Safety has been submitted to the Parliament and it is expected that the decision will be taken before the BNPP start up and in due time so the Islamic Republic of Iran would have the opportunity to participate in the Fifth Review Meeting.

The issue of accession to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, and to the Convention on the Physical Protection of Nuclear Material is being considered.

The senior officials of INRA expressed their view on the importance of participation in the safety conventions as well as their intentions to proceed with the issue of ratification.

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- (1) **BASIS:** GS-R-1, §4.11 states: *“The safety of facilities and activities is of international concern. Several international conventions relating to various aspects of safety are in force. National authorities, with the assistance of the regulatory body, as appropriate, shall establish arrangements for the exchange of safety related information, bilaterally or regionally, with neighbouring States and other interested States, and with relevant intergovernmental organizations, both to fulfil safety obligations and to promote co-operation.”*
- (2) **BASIS:** Draft GSR Part 1 states:  
*“Requirement 14: International obligations and arrangements for international cooperation  
The government shall fulfil its respective international obligations, participate in the relevant international arrangements, including international peer reviews, and promote international cooperation to enhance safety globally.”*
- R4 Recommendation:** The government should undertake all necessary efforts for the Islamic Republic of Iran to become a party to the Convention on Nuclear Safety and to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

## 2. RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY

### 2.1. GENERAL SITUATION

#### **Regulatory body – fulfilling statutory obligations**

INRA policies, safety principles and associated criteria as a basis for its regulatory actions are set out in regulations and guides. They are defined mainly in its established management system. The IAEA standards requirements and other internationally recognized documents are incorporated into the INRA system of regulations, as appropriate.

In accordance with the management system “procedure of establishing of regulations, codes and standards”, INRA establishes, promotes or adopts regulations and guides upon which its regulatory actions are based. Sources of information that are considered by INRA in the development of regulations and guides to regulate BNPP at different stages including siting, design, construction, commissioning, operation and decommissioning, in a facility’s lifetime include:

- a) National legislations, existing regulations and guides in areas relating to nuclear facility;
- b) Safety standards and recommendations prepared by international organizations such as IAEA;
- c) Regulations, guides and other relevant information produced by regulatory bodies in other countries;
- d) Normative regulations and guides of the Russian Federation (because of supplying the BNPP facility).

In accordance with the procedure of flow and review of documents for BNPP, INRA reviews and assesses the submitted documents and information which are provided by the operating organization prior to authorization to determine whether the set of documents submitted is complete or not. In case of any deviation from the established safety regulations, revealed during documents review, INRA will require the operating organization to submit additional information to justify the application or may return the submitted documents for completion. The operating organization shall comply with safety regulations completely. In addition; periodical safety reports are specified in the conditions of the granted licence, which the licensee is obliged to submit to INRA for review and assessment within the specified interval.

When issuing, amending, suspending or revoking authorizations, subject to any necessary conditions, INRA specifies:

- In accordance with Article 6 of the RP Act, the licensee shall be solely entitled to carry out his activities within the limitations and the conditions specified in the licence.
- INRA issues, amends, suspends or revokes authorization commensurate to the nuclear or radiation facility or activity. The conditions in which an authorization can be issued, maintained and modified are established in the regulations.
- Where the operating organization has been found to have contravened requirements or has consistently failed to comply with the terms and conditions of an authorization, INRA may cancel or suspend the authorization.

- In accordance with Article 8 of the RP Act, the licensee shall inform INRA about any of the following events immediately:
  - a) Suspension or stoppage of operation of radiation sources.
  - b) Loss or theft of radiation sources.
  - c) Any accident, disorder, fault or changes connected with radiation sources which may increase the probability of potential risks of exposure to radiation for individuals.
  - d) Incidents resulting in exposure to radiation as well as dubious exposure of individuals to radiation.
- In accordance with regulations for licensing:
  - a) Licensee shall not perform any modification or other technical or organizational changes having a significant impact on nuclear safety without obtaining the relevant approval from INRA.
  - b) Licensee shall inform INRA of any planned modification and/or changes to the facility, supported by substantiating documents prior to performance of that modification, well in advance.
- Obligations of the operating organization are laid down in the licence and the associated regulations. The operating organization is responsible for the safe operation of the nuclear power plant; and shall ensure that the plant is operated in a safe manner and in accordance with INRA requirements.
- In accordance with Article 6 of the RP Act, licensee shall be solely entitled to carry out his activities within the limitations specified in the licence. The licence shall specify exactly within which limits and under which boundary conditions the licenced facility shall be operated. Limits such as maximum thermal power, permissible activity release to the atmosphere and water, intervention action level, and the licence validity term are laid down in the licence conditions.
- Requirements on how to handle radioactive waste arising during the operation of a nuclear power plant, which are according to the radioactive waste management regulations, will be specified. Requirements for the waste generator to utilize without detrimental effects or dispose of as radioactive waste in a regulated manner, are contained in the licensing scope of the operating licence. The applicant has to draw up a waste management concept in this respect which is a licensing document and thus part of the licence.
- In accordance with the “Regulations for Radioactive Waste Management,” the licensee shall establish and implement a programme to manage radioactive waste safety. This programme is designed to ensure that management of radioactive waste from its generation through disposal is controlled and is in conformance with INRA’s applicable regulations; and is managed in a manner to protect the health and safety of the public and the environment from any hazards associated with the radioactive waste. This programme shall be approved by INRA.
- INRA does not issue any additional separate authorization than those explicitly specified in its licensing and supervisory regulations and licence/permit conditions for BNPP. Any licence/permit issued by INRA does not substitute for any other

authorization required by other governmental bodies within their sphere of competence.

- In accordance with INRA's regulations, licensee shall report regularly to INRA on conditions of the authorization including routine reporting and event reporting. The conditions related to the report that the operating organization is required to make to INRA are provided in licensing regulation and licence conditions. This is to ensure that INRA will have the necessary information for its regulatory supervision function.
- All the records that the operating organization is required to retain are described in regulations and licence conditions.
- Licensee shall keep records relating to issues mentioned in regulations or in licence conditions.
- Records shall be provided in an accessible way and will be readily retrievable for INRA's inspectors.
- On-site emergency plan is part of the documents that the operating organization shall submit to INRA with the aim to obtain a relevant licence as specified in licensing regulations. The operating organization's preparedness to implement the on-site emergency plan is a licence condition.
- In accordance with Article 13 of the RP Act, INRA is responsible for the supervision over all the affairs specified in Article 3. INRA carries out its regulatory inspections in accordance with the supervisory procedure for Assurance of Safety of Nuclear Power Plants in The Islamic Republic of Iran.

In accordance with Article 17 of the RP Act, INRA, in implementation of regulations, is obligated in case of awareness of any violations of regulations in work with radiation or in operation, after giving prior written notice in case of non-compliance, shall order for stoppage or termination of operation or related sources or to cancel the issued licence and to embark upon sealing them up. The possibilities of imposing sanctions are fully specified in supervisory procedure and conditions of issued licences.

INRA's licensing regulations specify the process required to deal with the applications for issuance of licences and authorizations, and for organizations registration, through a routine procedure. In accordance with Article 7 of the RP Act, any changes in the legal status of the holder of a licence shall be subjected to obtain a permit from INRA. Licensing regulations and licence conditions specify the process of changing the licence conditions.

Licensing regulations refer to a guideline on content and format of safety analysis which must be used by the operating organization of nuclear power plants. In addition, licence conditions contain a requirement that the operating organization shall conduct a safety review periodically (on a time period defined by INRA).

Applicable regulations are available for the protection of classified information proprietary to the licensees.

In accordance with Section 4 of the licensing regulations, in the course of document review, in the case that additional information is needed for review to satisfy relevant regulatory conditions, INRA requires the applicant to submit additional justifications or will return the set of documents for completion, and in case of rejection the reasons for rejection of submitted documents will be explained in writing to the operating organization.

In accordance with Article 21 of the RP Act, Ministers, Islamic revolutionary entities, organizations or institutions affiliated to government are obligated to cooperate with INRA. Channels of communication are established with the relevant organizations.

INRA communicates with the public through the Public Relation Department of AEOI by means of interviews, publications and web services. INRA does not have its own website.

Regulations for collection, analysis, and dissemination of operating experience regarding lessons learned are considered by INRA's Quality Management System (QMS) and shall be implemented by the operating organization.

In accordance with the QMS regulations, the safety related records to be kept in the Quality Management Systems of the operating organization are identified so that reports and records shall be retained retrievable and under control.

Safety criteria and principles of INRA are in accordance with international safety standards and recommendations such as those issued by the IAEA and ICRP, and also according to its Management System. They are under continuous review and upgrading, to comply with the latest IAEA safety principles and criteria.

INRA considers the IAEA Safety Standards in developing its safety principles and criteria. INRA participate in the Safety Standards committees to follow the Agency's programme in order to develop its safety regulations and guides. INRA adopts the safety standards of the IAEA or takes the IAEA and other internationally accepted standards and recommendations into account when developing its own safety regulations and guides

IAEA guidelines on periodic safety review will be laid down as the set of conditions of operation licence for the BNPP.

In accordance with Article 21 of the RP Act, all mentioned governmental and non-governmental organizations and institutes shall cooperate with INRA. Whenever necessary, INRA advises them on safety issues regarding nuclear and radiation facilities and activities.

In accordance with the regulatory requirements for shift personnel of the BNPP to obtain a licence, INRA authorizes specific categories of the BNPP operating personnel, after INRA is satisfied with their qualification. When shift personnel are transferred to another department requiring a licence, they shall obtain a new licence. The previous licence becomes invalid and shall be returned to INRA within 10 days after the assignment to the new position.

In accordance with supervisory procedures and licensing regulations, INRA verifies compliance with regulatory requirements during the issue of licences and the conduct of inspections/controls.

### **Regulatory body – cooperation with other relevant authorities**

INRA cooperates with other relevant authorities, advises them and provides them information in their respective areas, as necessary. This cooperation is based on request from these authorities. INRA represents the advisory agency for the Government regarding radiological and nuclear safety, and radiological emergencies. It cooperates with other ministries and authorities during exercises to test the emergency plans. INRA cooperates namely with:

- Environmental protection: INRA personnel take part of the National Committee on Environmental Risks;
- Public and occupational health: INRA is part of the Review Committee on standards related with occupational exposure and quality of water and food;



- Emergency planning and preparedness: INRA regularly takes part in the Committee for Emergency Preparedness and performs inspections, conducts exercises and evaluations and shares all the results with the different Task Forces;
- Radioactive waste management (including determination of national policy): INRA works very closely with the responsible party (Iran Nuclear Waste Management Company) who has the responsibility to define the policy and strategy for radioactive wastes in The Islamic Republic of Iran;
- Public liability (including implementation of national regulations and international conventions concerning third party liability): INRA has a relevant initiative to promote its Atomic Act;
- Water use and consumption of food: INRA is the agency responsible for the assessment of imported goods in the content of radioactive contamination.
- Land use and planning: No interaction with any governmental agency up to now;
- Safety in the transport of dangerous goods: INRA is part of the Committee on Standards and Norms on Transport of dangerous goods at the Ministry for Road and Transport.

### **Regulatory body – additional functions**

INRA has additional functions, as follows:

- 1) National Radiation Protection Department (NRPD) performs independent radiological monitoring in and around NPPs;
- 2) INRA performs independent testing and quality control measurements. In a specific case, NDT is performed by Nuclear and Radiation Support Department (NRSD);
- 3) INRA initiates, co-ordinates and monitors safety related research and development work in support of its regulatory functions. INRA departments, NRSD and part of NRPD, are acting as the TSO for the regulatory functions. Also planned is to initiate a research institute at the national level;
- 4) INRA is partially involved in providing personnel monitoring services and conducting medical examinations. These services were provided by INRA through NRPD before companies and other national institutes received the licence in these areas. The neutron dosimeter services are still provided by NRPD due to lack of experience in the country;
- 5) INRA monitors the nuclear non-proliferation issues;
- 6) INRA assures regulatory control of industrial safety. NRPD and NNSD are the involved departments.

There are various written documents which define the INRA interfaces with other organizations. All these arrangements have been established under the RP Act, Art 4 and 21. Some of the written arrangements are as follows:

- a) Between AEOI and Ministry of Industry and Mining;
- b) Between AEOI and Environmental Protection Organization;
- c) Between AEOI and INRA;
- d) Between INRA and Ministry of Health;
- e) Between INRA and University of Tehran;
- f) Between INRA and Committee for Standards Development;

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- (1) **BASIS:** GS-R-1, §2.6 states that: *“The regulatory body shall have the authority:...(13) to liaise and co-ordinate with other governmental or non-governmental bodies having competence in such areas as health and safety, environmental protection, security, and transport of dangerous goods”*.
- S2** **Suggestion:** INRA should consider appropriate arrangements, including periodic ad hoc meetings chaired by INRA, with all relevant national agencies to liaise and coordinate its activities with other governmental or non-governmental bodies having competence in such areas as health and safety, environmental protection, security and transport of dangerous goods. These arrangements should cover the interfaces, roles and responsibilities of each authority to ensure that there is comprehensive and consistent safety regulation and oversight.

### **3. ORGANIZATION OF THE REGULATORY BODY**

#### **3.1. GENERAL ORGANIZATION**

The regulatory role has been assigned to the Iran Nuclear Regulatory Authority (INRA) by delegation of necessary competencies from the Atomic Energy Organization of Iran (AEOI). Organizational changes within AEOI establishing INRA started in the mid-1990s. The status of INRA to perform ('de facto') duties of regulatory body for nuclear and radiation facilities was confirmed also by the President of the Islamic Republic of Iran, who based on the proposal of the Head of AEOI, appoints the Head of the INRA. Recently, to assign regulatory function legally to INRA and to implement latest best regulatory practices, the draft Act on "Safe Use of Nuclear Energy and Radiation Sources in the Islamic Republic of Iran" has been prepared. The adoption of this new act should improve the legal status of INRA and empower INRA with the authority and resources necessary for further development.

INRA represents the regulatory body in charge of monitoring and controlling nuclear and radiation safety measures in the Islamic Republic of Iran; and is entrusted to ensure the safe, secure and peaceful utilization of nuclear energy and radiation activities in the country in order to protect workers, public and the environment against potential hazards associated with the operation of nuclear and radiation facilities. INRA is the only authority in the Islamic Republic of Iran who is responsible for licensing and supervision of nuclear and radiation facilities and activities.

INRA comprises four departments:

- National Nuclear Safety Department (NNSD)
- National Radiation Protection Department (NRPD)
- National Nuclear Safeguards Department (NNSG)
- Nuclear and Radiation Support Department (NRSD)

In each department qualified staff is involved performing regulatory work regarding nuclear or radiation safety in all phases of the life cycle of BNPP and use of radioactive sources and material. The functions of INRA, its departments and other organizational units according to its valid organizational structure are described in the internal document of INRA "Description of Functions of Iran Nuclear Regulatory Authority".

Regulatory functions related to the BNPP are mainly concentrated in NNSD, which shall mainly: develop or adopt the safety regulations, guidelines and standards, and required procedures relevant to siting, construction, commissioning, operation and decommissioning of BNPP; issue licences, perform inspection activities, audit the contractors, enforce the operator and contractors in the event of violation, and register qualification of legal person involved in safety related activities for BNPP. The described scope of NNSD duties covers all areas of regulation of BNPP in compliance with the national legal system. The work of the main departments is further supported by: Management System Committee, Manpower and Education Committee, Commission for Licensing, Head of INRA's Office, IT Committee, Consultants (unit). These units provide services to and coordinate cross-cutting activities of the four main departments.

The organizational structure of INRA is shown in Appendix (1).

The organizational structure of INRA has been appropriate up to now. The new nuclear activities in the country may invoke a need to reassess the structure of INRA contributing to an optimized use of resources according to new needs and conditions.

### RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- |   |
|---|
| <p>(1) <b>BASIS:</b> GS-R-1, §4.1 states that: <i>“The regulatory body shall be structured so as to ensure that it is capable of discharging its responsibilities and fulfilling its functions effectively and efficiently. The regulatory body shall have an organizational structure and size commensurate with the extent and nature of the facilities and activities it must regulate, and it shall be provided with adequate resources and the necessary authority to discharge its responsibilities.”</i></p> |
| <p>(2) <b>BASIS:</b> Draft GSR Part 1, §4.5 states that: <i>“The regulatory body has the responsibility for structuring its organization and managing its available resources so as to fulfil its statutory obligations effectively.”</i></p>   |
| <p><b>S3 <u>Suggestion:</u></b> INRA should reassess the existing organizational structure to ensure that it is capable of discharging its responsibilities and fulfilling its functions effectively and efficiently according to the new nuclear arrangements in the country.</p>  |

### 3.2. STAFFING AND TRAINING

The authorized staffing level of INRA is 248 (at the time of the IRRS mission) including professional and support staff. There are more than 30 vacant positions in various departments. In the NNSD unit (70 staff members) there are approximately 30 professional and 40 support staff members. In addition to existing positions, five new professional staff have been planned to be hired for the NNSD in 2010.

A graphical presentation of staffing is shown below:

“The National Development Plan for INRA”, in Section 2.5.6, addresses, among other areas, issues of staffing, development of human resources and training stressing the need to: “...develop domestic human resource both in quantity and quality... planning to hire and educate human resources to get specialized and experienced personnel in various fields of nuclear and radiation safety.”

According to the new nuclear activities and commercial nuclear programme there could be a need for additional personnel with the necessary qualifications, experience and expertise. In connection with future development of human resources the number of professional and support personnel should be reviewed and justified.

INRA has experienced some difficulties hiring highly qualified and experienced staff because of less attractive work conditions (mainly salaries) compared to the industry and to

commercial research. As recruitment and hiring of new staff could have a long term impact, INRA should develop a strategy to address this area.

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- (1) **BASIS:** GS-R-1, §4.6 states that: *“The regulatory body shall employ a sufficient number of personnel with the necessary qualifications, experience and expertise to undertake its functions and responsibilities. It is likely that there will be positions of a specialist nature and positions needing more general skills and expertise. The regulatory body shall acquire and maintain the competence to judge, on an overall basis, the safety of facilities and activities and to make the necessary regulatory decisions.”*
  - (2) **BASIS:** Draft GSR Part 1, §4.11 states that: *“The regulatory body has to have appropriately qualified and competent staff. A human resources plan shall be developed that states the number of staff necessary and the essential knowledge, skills and abilities for them to perform all the necessary regulatory functions.”*
- R5 Recommendation:** INRA should review expert staffing needs. The review should identify which areas of expertise require more staffing.
- (1) **BASIS:** GS-R-1, §4.6 states that: *“The regulatory body shall employ a sufficient number of personnel with the necessary qualifications, experience and expertise to undertake its functions and responsibilities. It is likely that there will be positions of a specialist nature and positions needing more general skills and expertise. The regulatory body shall acquire and maintain the competence to judge, on an overall basis, the safety of facilities and activities and to make the necessary regulatory decisions.”*
  - (2) **BASIS:** Draft GSR Part 1, §4.12 states that: *“The human resources plan for the regulatory body shall cover recruitment and, where relevant, rotation of staff to obtain staff with appropriate competence and skills, and shall include a strategy to compensate for the departure of qualified staff.”*
- R6 Recommendation:** INRA should develop and implement a recruitment strategy that hires staff with appropriate technical qualifications and experiences and enables INRA to be more competitive in the labour market.

Training activities for INRA staff are implemented according to the “Training Programme and Effectiveness Evaluation”, which serves as the basis for planning, coordination of implementation, and evaluation of the required training programmes. The document is applicable to all organizational units of INRA. INRA has taken actions to improve its capacity to perform its regulatory functions effectively, including an extensive on-the-job training programme for professional staff. Using available resources, part of the training activities are also performed in cooperation with AEOL.

In recent years INRA has been successful in using international cooperation to fulfil many of its training needs. Significant training support was received under IAEA Technical Cooperation Department projects. A dedicated IAEA training course on inspection practices and assessment methods for WWER reactors has been prepared, where 20 staff members from NNSD take part. The training course covers not only the theoretical part but also an on job training at nuclear sites with WWER reactors in Bulgaria and Hungary.

A training course in cooperation with a consultant company from the Russian Federation, the Federal State Unitary Enterprise VO “Safety” (VO Safety) has also been prepared for NNSD

staff. The course should contribute to further education and training of INRA (NNSD) staff. This training activity should be followed by on-the-job training at the BNPP site. With respect to the short time available for training before starting the preoperational phase of BNPP, INRA should accelerate implementation of planned training activities relating to the operation of BNPP, taking advantage of train-the-trainer concept.

Gap analyses using IAEA methodology have been performed to find weak points in the level of training and knowledge. The areas recognized will be addressed. IAEA training materials will be made available to foster different types of training, including self-study.

INRA has also prepared a training programme for the senior nuclear safety related staff, including management positions. It should be implemented during a 4 week training course performed in cooperation with SNRCU (Ukraine) in the course of 2010.

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

(1) **BASIS:** GS-R-1, §4.6 states that: *“The regulatory body shall employ a sufficient number of personnel with the necessary qualifications, experience and expertise to undertake its functions and responsibilities. It is likely that there will be positions of a specialist nature and positions needing more general skills and expertise. The regulatory body shall acquire and maintain the competence to judge, on an overall basis, the safety of facilities and activities and to make the necessary regulatory decisions.”*

(2) **BASIS:** Draft GSR Part 1, §4.13 states that: *“A process shall be established to develop and maintain the necessary competence and skills of staff of the regulatory body, as an element of knowledge management. This process shall include the development of a specific training programme on the basis of an analysis of the necessary competence and skills. The training programme shall cover principles, concepts and technological aspects, as well as the procedures followed by the regulatory body for assessing applications for authorization, for inspecting facilities and activities, and for enforcing the regulatory requirements.”*

**G1 Good Practice:** INRA management demonstrated a strong commitment to human resources development issues to cope with the rapidly increasing inspection and assessment tasks for BNPP.

### 3.3. INTERNATIONAL COOPERATION

INRA actively participates in activities of the International Atomic Energy Agency and the group of countries operating nuclear facilities of WWER design. INRA also has cooperation with regulatory administrations from neighbouring countries and from the Persian Gulf region and has a close cooperation with the regulatory authorities from the Russian federation.

With respect to development in the nuclear area, international cooperation could accelerate the improvement of regulatory conditions and contribute to implementation of best international practices by INRA. INRA should benefit from the membership in the platform of WWER operators by an active participation in working groups and should consider extending its international cooperation participation in other open groups, e.g. group of countries operating small nuclear programmes (“NERS”).

### 3.4. ADVISORY BODIES AND RESEARCH ORGANIZATIONS

INRA is supported by several technical support organizations (TSO); and in some specific areas technical support has been received through IAEA technical cooperation projects. The main support for the BNPP is provided by VO Safety. VO Safety has local offices at the INRA headquarters and arrangements to facilitate easier communication were implemented. There are a few other organizations giving technical support to INRA, e.g. OFOGH, for nuclear facilities (except BNPP), KANAVARAN, for radioactive waste management, YEKTA, for development of regulatory documents. According to the current arrangements, use of support from TSOs and consultants does not affect the responsibility of INRA to make independent conclusions on complex safety issues. As the number of technical support organizations which could provide support to INRA and the nuclear industry is limited, INRA should ensure arrangements are in place for receiving independent support from TSOs.

#### RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

(1) **BASIS:** GS-R-1, §4.3 states that: *“If the regulatory body is not entirely self-sufficient in all the technical or functional areas necessary to discharge its responsibilities for review and assessment or inspection, it shall seek advice or assistance, as appropriate, from consultants. Whoever may provide such advice or assistance (such as a dedicated support organization, universities or private consultants), arrangements shall be made to ensure that the consultants are effectively independent of the operator.”*

(2) **BASIS:** Draft GSR Part 1, §4.20 states that: *“Arrangements shall be made to ensure that there is no conflict of interest for those organizations who provide the regulatory body with advice or services.<sup>4</sup> If this is not possible domestically, then the necessary advice or assistance shall be sought from organizations in other States or, as and where appropriate, from international organizations which have no such conflicts of interest.”*  
§4.21 states that: *“If the necessary advice or assistance can be obtained only from organizations whose interests potentially conflict with those of the regulatory body, the seeking of this advice or assistance shall be monitored, and the advice given shall be carefully assessed for conflicts of interest.”*

**S4 Suggestion:** INRA should assure that consultants’ support is independent of the operator.

Advisory bodies for INRA are not formalized yet, but communication with advisors (senior experts) in various issues has been utilized by INRA top management. To have a more significant involvement of independent senior experts in nuclear and regulatory issues, INRA should consider establishing formalized advisory teams.

---

<sup>4</sup> If an organization that provides the regulatory body with advice or services were also to advise an authorized party on the same subject, the potential conflict of interest could compromise its reliability.



## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- (1) **BASIS:** GS-R-1, §2.4 states that: *“This legislation:...(9) shall allow for the creation of independent advisory bodies to provide expert opinion to, and for consultation by, the government and regulatory body.”*
- (2) **BASIS:** Draft GSR Part 1, §4.18 states that: *“The regulatory body may decide to give formal status to the processes by which it is provided with expert opinion and advice. If the establishment of advisory bodies, whether on a temporary or a permanent basis, is considered necessary, it is essential that such bodies provide independent advice, whether technical or non-technical in nature.”*
- S5 Suggestion:** INRA should consider establishing advisory groups including independent experts to provide the management with independent opinions of experts on technical or non-technical issues.

### 3.5. RELATIONS BETWEEN THE REGULATORY BODY AND THE OPERATOR

In addition to common regulatory contacts (e.g. inspections, licensing issues) INRA meets with the operators periodically. A tree level (top management, senior management, management) system was implemented for meetings with most important operators. Meetings with representatives of BNPP are frequent at all levels. A similar system is also used in case of other operators. These meetings foster flexible communication and contribute to the maintenance of an open and frank relationship with operator.

## 4. AUTHORIZATION PROCESS

### 4.1. AUTHORIZATION ACTIVITY OF INRA/NNSD

The Licensing Section of INRA/NNSD bears full responsibility for controlling and processing authorization documents, to give expert opinion on the issuance of an authorization and also to initiate any possible action affecting the various authorizations related to the BNPP. The Licensing Section is staffed with 5 full time experts and works according to an administrative procedure. A very dedicated staff and organized work planning of the Licensing Section make it possible to cope with the authorization tasks of INRA/NNSD in spite of the fact that this staff is responsible also for the licensing activities related to nuclear installations other than BNPP (see also, Section 4.3.1 below).

Interviews and discussions with the staff members clarified to the review team the overall structure of the licensing process. In regulating the BNPP INRA makes use of the following types of authorizations:

- 1) License – authorizes the operator to initiate large scale activities related to the construction, commissioning, operation or decommissioning of BNPP.
- 2) Permit – allows special activities having safety effect on the plant but not needing a licence. Permits are needed for any activity affecting systems or components in the safety classes 1 and 2 and to selected activities for lower safety classes. Guidance for granting permits has so far been elaborated for the construction and commissioning periods of BNPP. Preparation of the respective procedure for the operational period is underway.
- 3) Special permit – authorizes specific safety related activities within a given permit.
- 4) Registration – certifies the ability of an organization to perform certain safety related activities. Registration is necessary for all organizations having activities related to systems and components of safety classes 1 and 2 as well as to building and structures in seismic stability classes I or II.

(Note that a specific inspection activity aimed at the identification and checking of certain equipment and components in the power plant is also called “registration”.)

Further documents serve specific purposes in the authorization process:

- 5) Decision – regulatory approval of a document prepared by the licensee or a change in a previously approved document or process related to manufacturing, installation or maintenance activity at the BNPP
- 6) Technical decision – approval by the on-site inspectorate of a document prepared by the licensee or by its subcontractor on minor changes in the previously approved activities related to the BNPP

(Note that the expression “Decision” is used in parallel to the above meaning to denote the outputs of the Licensing Committees inside INRA and also of the Permit Committee within NNSD when internally approving a requested activity or a regulatory reaction on deviations from an authorized activity. The dual use of this word is somewhat confusing.)

Licensing of the plant personnel is a specific authorization activity. In the present practice of NNSD the personnel operating the control room need licences (although the operator, with the consent of NNSD, may extend the list of licensed shift personnel). These persons are: the unit shift supervisor, the shift supervisor of the reactor compartment, the senior reactor operator, the shift supervisor of the turbine hall, and the senior turbine operator. A licence is granted

after training and after having passed an examination (including theoretical and practical exams). The licence will be valid for 6 years. Training includes full scope simulator exercises; and the BNPP shall have its own full scope training simulators by the time of its commissioning.

## **4.2. BASIS OF AUTHORIZATION**

The authorization process is based on a great number and variety of legal documents, regulatory requirements, guides, agreements, and internal procedures as well as on an Appendix to the supply contract of BNPP (see Section 4.3.2 below). This contract lists the Iranian, Russian, German, U.S. and international rules and regulations to be respected in an authorization process. A specific feature of this Appendix to the Contract is that it cannot be altered without the explicit consent of NNSD. (More details in this are given in the chapter on review and assessment.)

A dedicated regulatory requirement document (called a procedure) gives details of the licensing process for all life cycles of the BNPP (although the title of the document refers only to construction and commissioning). The procedure and requirements for registration are also given in this document. Another document (also entitled a procedure but serving as a guideline) describes the process of requesting and granting permits. Similarly, a regulatory requirement document sets the rules for personnel licensing, including also those of the examination board and the licence issuance and withdrawal.

The various documents have undergone several modifications and/or additions. Some of them have changed even since the completion of the Advance Reference Material of the IRRS mission. In some cases their identifications have also been changed. In this respect it is to be noted that the regulatory materials included in the Advance Reference Material reflected a much less developed and systematized document management system than the one in fact in force in INRA.

## **4.3. STEPS OF AUTHORIZATION**

The authorization process comprises a number of definite steps with some steps falling outside the activity of the NNSD Licensing Section. The submitted applications are first checked for completeness. In case of an incomplete application it is returned to the applicant or additional documents are requested. The completed documentation is forwarded to the Review and Safety Assessment Section. The review process is described in the next section of this Report. In case the submitted document complies with the regulations and fulfils the authorization requirements a report is compiled and submitted to the dedicated Licensing Commission of INRA for taking a decision. On the basis of this decision the head of INRA issues the license and the Director General of the NNSD issues the permit completed with the validity conditions as compiled by the Licensing Section.

Note, that special permits can also be issued by the on-site resident inspectorate, after due consultation with the headquarter.

In connection with the BNPP the INRA/NNSD has so far issued two licences (Preliminary Construction License and Construction License of unit 1) and 288 permits. Application for the Commissioning License is foreseen in the near future.

## Issues related to the authorization process

### 4.3.1. Insufficient staffing

The Licensing Section of INRA/NNSD is considerably understaffed with its 5 employees as compared to the workforce needed for the licensing activity to be performed by the Section.

For the respective Recommendation, see Section 1.2 of this Report.

### 4.3.2. Lack of a uniform, systematic and comprehensive regulation

The documents providing the basis for authorization (and also those related to other fields of the regulatory activity) are of various legal statuses, forms and level of detail. Although in the present state of the BNPP this system of documents may serve the actual regulatory needs and also may cover the possible authorization issues, the lack of a systematic and concise regulatory framework may make the future regulatory work unnecessarily complicated and failure prone. Obviously this issue is not limited to the regulatory supervision of the single facility BNPP, but addresses the entire nuclear regulatory system in The Islamic Republic of Iran.

Note that this weakness of the existing regulatory system has also been recognized by AEOI when formulating its “National Development Plan for INRA”. This document explicitly mentions among the constraints and limitations the “inadequacy of existing laws and regulations to cover and support nuclear safety comprehensively”.

For the respective Recommendation, see Section 7.1 of this Report

### 4.3.3. Qualification of suppliers

The practice that INRA certifies the potential suppliers of the licensee from the point of view of their ability to cope with the qualification requirements raises the possibility that the regulatory body might take over some of the responsibilities of the licensee. Furthermore, this activity requires regulatory resources that might be utilized in a more effective way in other regulatory tasks.

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- (1) **BASIS:** GS-R-1, §2.3 states that: *“The prime responsibility for safety shall be assigned to the operator.”*
- (2) **BASIS:** Draft GSR Part 1, Requirement 5 states that: *“The government shall expressly assign the prime responsibility for safety to the person or organization responsible for a facility or an activity, and shall confer on the regulatory body the authority to require such persons or organizations to comply with stipulated regulatory requirements, as well as to demonstrate such compliance.”*
- S6 Suggestion:** NNSD might consider having a less active role in the qualification of the subcontractors of the licensee.
- (1) **BASIS:** GS-G-1.1, §3.16 states that: *“Authorization is the principal mechanism connecting the laws and regulations which form the legal framework of the regulatory system with the responsibilities of the principal parties concerned (the regulatory body and the operator). The regulatory body should be organized to enable it to conduct the authorization process efficiently...The regulatory body shall keep records of authorization*

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

*and shall retain the relevant documents in connection with the authorization process.”*

**G2 Good Practice:** The authorization documents are managed in a systematic, well organized and effective way from their submittals to the issuance of the authorizations including the process of review and assessment.

## 5. REVIEW AND ASSESSMENT

### 5.1. ESTABLISHMENT AND USE OF REVIEW AND ASSESSMENT CRITERIA

Review and assessment criteria (more specifically requirements, regulations, regulatory guides, designations and units of measurements) were initially specified in the Appendix M to the contract on completion of Unit 1 BNPP. The Appendix also fixed the hierarchy of safety requirements and criteria, with Iranian regulations at the top of pyramid, with Russian (the OPB-88/97 being the most important one), German, USA and the IAEA requirements, codes, standards at lower levels. The Appendix also required that use of foreign requirements, or any modification in use of the requirements shall be under strict control of INRA. The Appendix was signed in July 1998 by two high level representatives of INRA in order to indicate the regulatory nature of the document. In September 1999 the Appendix was incorporated into the legal basis by the "Licensing Procedure for the Bushehr Nuclear Power Plant Unit 1 Construction and Operation, INRA-NS-RE-051-10/1-1 Sep. 1999" (Art. 4.3). This fact was reconfirmed by the Validity Condition no. 3.4 of the Construction Licence, and the compliance with the Appendix M was stated in Chapter 1 of the FSAR (Revision 0 of 30 August 2005) together with the specific list of applicable Russian normative documents.

Although the present approach with its ad hoc specification of requirements and acceptance criteria (for BNPP only) is acceptable, it would be more appropriate for future use to codify such criteria comprehensively in the regulation. In addition, it is necessary to take into account that some IAEA documents listed in the Appendix M are now obsolete and have been replaced by new ones, both in the area of safety requirements for the design (NS-R-1) as well as safety requirements on safety assessment (GSR Part 4). These new approaches should be considered in future upgrades of the BNPP and updates of the safety analysis report, as well as for any new NPPs.

### RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

(1) **BASIS:** GS-R-1, §5.8 states that: "...the regulatory body shall define and make available to the operator the principles and associated criteria on which its judgements and decisions are based." and in Section 5.26 that "The main purpose of regulations is to establish requirements with which all operators must comply. Such regulations shall provide a framework for more detailed conditions and requirements to be incorporated into individual authorizations." Similarly, Draft GSR Part 1, §4.26 states that "...In connection with its reviews and assessments and its inspections, the regulatory body shall inform applicants of the objectives, principles and associated criteria for safety on which its requirements, judgements and decisions are based." Further on, Draft GSR Part 1, Requirement 32 states: "The regulatory body shall establish or adopt regulations and guides to specify the principles, requirements and associated criteria for safety upon which its regulatory judgements, decisions and actions are based" and Requirement 33 states: "Regulations and guides shall be reviewed and revised as necessary to keep them up to date, with due consideration of relevant international safety standards and technical standards and of relevant experience gained."

**S7 Suggestion:** In the NNSD programme for development of a comprehensive system of new regulations, a generic regulatory document specifying safety requirements, acceptance criteria and methods for safety assessment of nuclear power plants in compliance with new

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

IAEA Safety Standards should be considered. Such document should be used for any future plant safety upgrading and updating of safety documentation.

For a more general recommendation related to this issue, see Section 7.1 of this report.

### 5.2. AREAS OF EXPERTISE AND TECHNICAL SUPPORT ORGANISATIONS

In accordance with the document INRAMA01D01, the main responsibility for review and assessment rests with “Nuclear Safety Assessment” Section. There are 9 people in the section: 2 of them are senior experts with more than 15 years of experience, 3 have from 5 to 15 years of experience, and the remaining 4 are junior. Only 2 members of the section have optimum background of nuclear engineers. In major reviews, in order to utilize fully the in-house expertise, other NNSD sections are involved as necessary. In spite of this support the small number of available experts in the majority of cases with limited background contradicts to the large volume of review and assessment work. Not only is a large number of documents reviewed with each submission, but in addition to BNPP there are 9 other nuclear installations (e.g. research reactors, fuel cycle facilities, etc.) under NNSD supervision. Having in mind the spectrum of various qualifications needed for a comprehensive review (9 areas, such as neutronic, thermal-hydraulic, structural, etc. were identified) it is obvious that there is a need to increase the number of specialists in the review and assessment section significantly and provide them with the necessary training. However, this is a difficult task due to scarcity of people with adequate level of relevant experience, as well as due to difficulties in recruitment and maintaining the high-skilled technical staff in the regulatory body. Moreover, due to the present stage of the BNPP construction, more attention is being paid to strengthening human resources in the area of inspections. While this focus is understandable, in the long term such trend could seriously impact the NNSD review and assessment capability in future licensing stages, supervision of plant operation and modifications, as well as activities associated with other potential nuclear projects.

Since the number of qualified personnel of the NNSD is limited, the Russian consultant organization VO Safety is regularly used for all review and assessment tasks. Advantage is taken from the regulatory background and experience with WWER designs of VO Safety experts. VO Safety support is based on a 4-year contract with extensions. The contract includes the time limit for individual reviews. Communication between the NNSD and VO Safety is very well organized. The copy of any document developed in Russia by the vendor is sent in parallel to The Islamic Republic of Iran and to VO Safety. In accordance with the procedure INRA-NS-PR-051-30/01-0, Oct. 2001 the VO Safety shall submit its expert conclusions through the vendor’s representative in Tehran to the NNSD. After the review, a meeting is held between NNSD and VO Safety to exchange views on the results with the objective to formulate a common regulatory position. The arrangement for cooperation with the VO Safety is considered as a good practice.

There is another consultant organization established recently in The Islamic Republic of Iran (Faranegar Novin Yekta company), which is considered a local TSO. At present this TSO is working for updating and writing the regulatory documents, but in the future they intend to also cover the area of review and assessment.

The NNSD can also hire other consultants on various subjects as needed and it was stated during the interviews that there are adequate resources in case of such need.

Cooperation with the IAEA is also used extensively in the area of review and assessment. In addition, an IAEA training programme including the area of review and assessment was prepared and partially implemented. Within this programme the NNSD has established close contacts with regulatory bodies in Bulgaria, Czech Republic, Hungary, Romania, Slovakia and Ukraine. A possibility to obtain additional technical support from regulatory bodies and TSOs in countries operating similar reactor types in the area of review and assessment should be further explored. The NNSD's personnel should also participate in the relevant (review and assessment oriented) IAEA technical meetings in order to exchange experience with WWER operating countries.

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

(1) **BASIS:** GS-R-1, §4.8 states that: *“In undertaking its own review and assessment of a safety submission presented by the operator, the regulatory body shall not rely solely on any safety assessment performed for it by consultants or on that conducted by the operator”*, §4.1 that *“The regulatory body shall have an organizational structure and size commensurate with the extent and nature of the facilities and activities it must regulate...”* and §4.7 that *“In order to ensure that the proper skills are acquired and that adequate level of competence are achieved and maintained, the regulatory body shall ensure that its staff members participate in well defined training programmes.”* Similarly, Draft GSR Part 1, §4.11 states that: *“The regulatory body has to have appropriately qualified and competent staff. A human resources plan shall be developed that states the number of staff necessary and the essential knowledge, skills and abilities for them to perform all the necessary regulatory functions.”* and §4.13 states that: *“A process shall be established to develop and maintain the necessary competence and skills of staff of the regulatory body, as an element of knowledge management. This process shall include the development of a specific training programme on the basis of an analysis of the necessary competence and skills.”*

**R7 Recommendation:** In view of the current and potential future nuclear projects, sufficient manpower and competence in the area of review and assessment, including deterministic and probabilistic safety analysis, should be available in NNSD for its decision making. A staff development and training programme should reflect these needs.

(1) **BASIS:** GS-R-1, §4.3 states that: *“Whoever may provide such advice or assistance (such as a dedicated support organization, universities or private consultants), arrangements shall be made to ensure that the consultants are effectively independent of the operator. If this is not possible, then advice or assistance may be sought from other States or from international organizations whose expertise in the field concerned is well established and recognized.”* Similarly, Draft GSR Part 1, §4.20 states *“Arrangements shall be made to ensure that there is no conflict of interest for those organizations who provide the regulatory body with advice or services.”*<sup>5</sup> *If this is not possible domestically, then the necessary advice or assistance shall be sought from organizations in other States or, as and where appropriate, from international organizations which have no such conflicts of interest.”*

**S8 Suggestion:** In view of present limited availability of in-country expertise for regulatory review and assessment, NNSD should further broaden exchange of information and

---

<sup>5</sup> If an organization that provides the regulatory body with advice or services were also to advise an authorized party on the same subject, the potential conflict of interest could compromise its reliability.



## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

technical support with IAEA and countries operating similar reactor types.

- G3 Good Practice:** NNSD makes effective and efficient use of support in the area of review and assessment from the country of reactor origin.

### 5.3. MANAGEMENT OF REVIEW AND ASSESSMENT

Review and assessment is performed in accordance with the Nuclear Safety Assessment Procedure No. INRANS4PR02 and the Administrative Document “Procedure of Flow and Review of Documents for BNPP Completion and Reconstruction, INRA-NS-PR-051-50/01-0 Feb 2000”. The scope and procedure for the review is defined in the above listed documents. Positive evaluation by the Nuclear Safety Assessment Section is a precondition for issue of an authorization. Only after such evaluation is the document considered finalized and can it proceed with the submission to the decision making commission.

The submission comes from the office of the NNSD Director General to the Nuclear Safety Assessment Section Head. Depending on the complexity of the submission, the Section Head in agreement with the NNSD Director General decides on appointment of the Senior Expert to lead the review and on formation of technical subgroups and distribution of tasks among them. In general, any NNSD staff member can be included in the review subgroups. The review is performed in accordance with the internally established schedule, with time limits imposed by the decision of NNSD Director General. In case of a need the regulatory body has enough flexibility to require additional justification from the licensee. The review findings are recorded in a systematic way in the review report, together with the responses to the findings. In parallel the review of the submission is done by VO Safety, with involvement of other consultants as appropriate. The common position on the report is reached in a series of meetings. Final Review and Assessment Report is approved by the Senior Expert, Section Head and Director General of NNSD before submitting the report to the Licensing Commission.

The process of review and assessment is well managed and controlled.

### 5.4. PERFORMANCE OF MAJOR REVIEW AND ASSESSMENT TASKS

The requirements for the review of technical documents are specified in “Licensing Procedure for the Bushehr Nuclear Power Plant Construction and Operation, INRA-NS-RE-051-10/1-1 Sep. 1999” and in “The Procedure of Granting Permits for the BNPP Construction and Commissioning; INRA-NS-RE-051-10/03-2-November 2009”.

As stated in the procedures there is a large number of documents to be reviewed (only authorizations connected with the BNPP are discussed here). There are 5 types of authorizations corresponding to different major stages of the plant lifetime (see Chapter 4) with 13 to 23 documents attached to each submission for a licence. Major documents from review point of view are Safety Analysis Report, Probabilistic Safety Analysis (PSA), Environmental Report, Quality Assurance Programme, Emergency Plan (on- and off-site), and Operational Limits and Conditions. Other attachments include various design documents, equipment integration reports, results of design and test calculations, schedules for implementation, etc. There are also 23 types of permits, and for all of them, 7 to 14 attachments are specified (registrations, lists of equipment affected, QA of executing organizations, certificates, various kinds of reference information). Since the list of those

attachments is not given as fully exhaustive it is possible that the regulatory body can ask for submission of additional reports. There were examples presented during the mission, such as reports on incorporation of beyond design basis accidents into the design and PSA, verification of the mathematical model of the BNPP full scope simulator, and analysis of severe accidents. Other kinds of documents will be reviewed during the plant operation, such as submissions on plant modifications, radiation protection programmes, reports on operational events, periodic safety reviews, results of environmental reviews, training programmes and status reports on staff qualification and certification.

The procedures also specify the reference documents to be used for the review, in accordance with Appendix M of the contract. Among the reference documents, special importance is given to the US NRC Regulatory Guide 1.70, NUREG 0800 and Regulatory Guide 4.2, used for the review of SAR and Environmental Report, respectively. While these documents significantly facilitate the review, in some cases strict reliance on them appears to be counterproductive, since Russian counterparts (both the vendor as well as the consultant) have sometimes used the reference to RG 1.70 to justify limiting the amount of information provided to the licensee and the NNSD.

Many documents listed above have been already reviewed in connection with licensing of BNPP, namely the documents associated with construction licences and nearly 300 permits. NNSD staff, VO Safety, other consultants and IAEA review missions were extensively used for the review. Lessons learned in these reviews show that in addition to well developed internal procedures dealing with the organization of the review it would be useful to develop an internal guidance document for verification of the technical quality of the safety assessments, similarly as is presently done in Standard Review Plan NUREG 0800. Such a document could also take into account new NNSD regulations and current IAEA Safety Standards.

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- (1) **BASIS:** GS-R-1, §5.10 states that: *“The regulatory body shall prepare its own programme of review and assessment of the facilities and activities under scrutiny. The regulatory body shall follow the development of a facility or activity, as applicable, from initial selection of the site, through design, construction, commissioning and operation, to decommissioning, closure or closeout.”* Similarly, Draft GSR Part 1, §4.26 states that: *“The regulatory process shall be a formal process that is based on specified policies, principles and associated criteria and that follows specified procedures as established in the management system. The process shall ensure the stability and consistency of regulatory control and shall prevent subjectivity in decision making by the individual staff members of the regulatory body.”*
- S9 Suggestion:** NNSD should consider, as part of the management system, developing an internal guidance document on review and assessment (review plan) aimed at verifying compliance of licensee’s submissions with the technical requirements contained in new NNSD regulations and current IAEA Safety Standards.

### 5.5. INDEPENDENT VERIFICATION OF SAFETY ASSESSMENT

It was stated in the Advance Reference Material that there are no relevant computer codes available in The Islamic Republic of Iran for performing independent verification of the safety assessment provided by the vendor.

Independent verification of the design by the licensee is a very important element for ensuring plant safety. Responsibility for such verification is stated in Art. 3.6 of the IAEA Fundamental Safety Principles, and further on both verification by the licensee, and additional independent verification by the regulatory body is described more in detail in Art. 4.66-4.71 of the IAEA Safety Requirements GSR Part 4. The verification should include some independent safety analyses. Although the independent safety analysis shall not necessarily be performed by the regulatory body, under the current conditions when there is no independent verification performed by the licensee, this issue is more sensitive.

Although independent verification of the safety assessment by the operator was not originally required by the regulatory body (with reference made to USNRC RG 1.70), such verification was requested by a letter to the licensee. The NNSD should insist that such verification will be performed by the licensee or by another organization on its behalf and submitted to the regulatory body in due time. Such independent verification is even more important due to the fact that in BNPP certain specific design solutions were used which are not usual in standard WWER 1000 plants.

Since the independent computational analyses are not covered by the INRA contract with VO Safety the consultant only verifies that the Russian codes used by the vendor are certified by GAN. Availability of the certificates was also verified by the NNSD.

In the short term the NNSD may investigate a possibility for performing selected independent analyses by its TSO/consultants either in The Islamic Republic of Iran or abroad. For the longer term, the NNSD in accordance with its Action Plan, should either make available resources for development of the most important computer codes by Iranian experts or further explore the possibility for obtaining the codes as necessary.

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

(1) **BASIS:** GSR Part 4, §4.66 states that: *“The operating organization is to carry out an independent verification to increase the level of confidence in the safety assessment before it is used by the operating organization or submitted to the regulatory body”* with additional clarification in Section 4.67 stating that *“The independent verification is performed by suitably qualified and experienced individuals or a group different from those who carried out the safety assessment. The aim of independent verification is to determine whether the safety assessment has been carried out in an acceptable way”*.

**R8 Recommendation:** NNSD should ensure that an independent verification of the safety assessment for BNPP will be performed by the licensee in due time.

### 5.6. USE OF PROBABILISTIC SAFETY ASSESSMENT

Although probabilistic acceptance criteria are not prescribed quantitatively by the NNSD, deterministic and probabilistic supporting calculations are both used in submissions to demonstrate acceptability of the request.

PSA Level 1 is an obligatory attachment to the submission for the construction, and later on its updated version for the operation of the BNPP. PSA methodology was used by the plant designer for finalization of the design. The first version of the PSA Level 1 was submitted to the NNSD 5 years ago. It was partially reviewed by the IAEA, and fully reviewed by the VO Safety. Through the licence conditions for the construction licence (conditions 3.14 and 3.15), the licensee was obliged to submit the supplements to the PSA Level 1 taking into account the

review reports of the NNSD and by the IAEA. The review was finalized, the study was updated accordingly, and was accepted by the regulatory body. The scope of the PSA was initially considering events during operation at power. The shutdown PSA was also already developed as a separate document, but not yet formally submitted to the regulatory body. In addition, the fire PSA and seismic PSA were also developed and submitted to the NNSD.

Development of the PSA Level 2 study was not originally required by the regulatory body for the licensing, but it was developed by the vendor upon request of the licensee. The study is currently being reviewed by the regulatory body.

The NNSD should continue encouraging the licensee to use and update the PSA Level 1 and 2 in accordance with the progress of the project. It is a powerful tool for evaluating the design and for maintaining future safety during plant operation. Such task is already covered in the draft Requirements to the operating organization of NPPs in The Islamic Republic of Iran.

The NNSD should also pay attention to enhancing capabilities of its own staff in the area of PSA due to its importance not only for evaluating safety of BNPP, but also as a tool for enhancing the efficiency and effectiveness of the regulatory work by concentrating on more risk significant matters. Adequate staff development and training should be considered within the recommendation formulated in Section 5.2.

## **5.7. REVIEW AND ASSESSMENT OF OPERATIONAL EXPERIENCE FEEDBACK**

Two aspects of the operational experience feedback were discussed during the IRRS mission: reporting of unusual events, and systematic collection and utilization of experience from operation of NPP both in the Islamic Republic of Iran as well as internationally.

At present reporting of unusual events from the BNPP is to some extent covered by the existing Radiation Protection Act. In the future, after adoption of the new draft Act on the Safe Use of Nuclear Energy and Radiation Sources in the I.R. of Iran, there will be both requirements for regular systematic assessment of the plant safety, as well as reporting of unusual events.

Procedure INRA-NS-PR-051/1-0-Nov. 2009 “Procedure of Investigation and Registration of Safety-Related Events at BNPP” is in place, and is mandatory for all organizations involved in construction, commissioning and operation of BNPP. The procedure specifies categories of events, registration and reporting the events, and investigation of the events. Every reported event shall be investigated by a Committee; and the level at which this Committee is established depends on severity of the event.

Draft regulation “Requirements to Operating Organization of NPPs in Iran” has been developed (not yet approved). Among other duties, the draft regulation requires the operating organization to establish jointly with the regulatory body “mutually supplementing programmes for analysis of operational experience warranting learning of lessons and taking effective measures on their basis” and further on to assure “accumulation, assessment, accounting and propagation of operational experience, including the information on the results of operation of the foreign nuclear power plants, analysis and uses it during design, construction, operation and decommissioning of nuclear power plants for enhancing safety and preventing violations of NPP operation (feedback from operational experience).”

During the discussion it was clarified that the NNSD is aware of the importance of the subject. After adoption of the new Act on the Safe Use of Nuclear Energy and Radiation Sources in the I.R. of Iran and the draft regulation there will be provisions in place for addressing the issue of operational experience feedback adequately.

## **6. INSPECTION AND ENFORCEMENT**

The legal regulatory framework for the inspection and enforcement is contained in Article 3 i.) of the Atomic Energy Organization of Iran (AEOI) Act (1974) and in Articles 13, 14, 16, 17 and 18 of the Radiation Protection (RP) Act (1989). The AEOI Act determines as one of the main functions of the AEOI the coordination and supervision of activities in the field of atomic science and technology. The RP Act defines the AEOI as the Competent Authority (Regulatory Body) for regulating nuclear and radiation safety. In 2006 the AEOI delegated its regulatory functions on authorization, review and assessment, inspection and enforcement and establishing safety principles, criteria, regulations and regulatory guides, to Iran Nuclear Regulatory Authority (INRA), which is part of AEOI.

### **6.1. INSPECTIONS**

INRA/NNSD is authorized for conducting regulatory supervision and inspections of BNPP and associated activities. The inspection and enforcement activities are aimed at ensuring compliance with the laws and decrees of the Government, regulations, safety requirements, as well as the conditions specified in the authorizations (licences/permits) issued by the NNSD. The performance of regulatory supervision and inspection is the responsibility of the inspection section of the NNSD of INRA.

The basic regulatory document, defining methods and scope of inspections, is the regulation “Supervisory Procedure for Assurance of Safety of Nuclear Power Plants in Iran”. The document regulates policy of the INRA/NNSD in the field of arranging and performing of supervision at all stages of the licensing process and during the NPP lifecycle including siting, design, manufacturing, construction, commissioning, operation and decommissioning of NPPs in The Islamic Republic of Iran. Inspection requirements for construction and commissioning stages are outlined in the regulations “Instruction for Supervision over Safety assurance in BNPP Construction” and “Instruction for Supervision over Safety Assurance in BNPP Commissioning”. In addition, other regulatory documents which are implemented during the inspection process include the following: “Licensing Procedure for the Bushehr NPP Unit 1 Construction and Operation”, “Regulations for Supervision over Fire Safety Assurance at the BNPP”, and “Quality Assurance Criteria for Nuclear facilities”. There are also four guides in place related to the supervision of mechanical, electrical I&C and civil construction and installation activities.

In the inspection section of INRA/NNSD there are 19 inspection positions occupied, from which 8 positions are in the Tehran headquarters office and 11 are in the representative office at the BNPP site. Not all of the available positions are occupied. INRA/NNSD has developed qualification requirements for new inspectors and intends to initiate the recruitment process for 25 additional inspectors. About half of the inspectors at the headquarters are experienced and well qualified.

Performance of inspections and analysis of their results are done by inspectors of INRA/NNSD with the assistance of a foreign consultant (VO Safety). The INRA/NNSD takes into account the activities of suppliers through registration, issuing permits and by inspecting their activities. According to “Procedure for Granting Permit for Construction and Commissioning of BNPP”, manufacturing of high safety class equipment is subject to registration of its manufacturer and obtaining a permit (by the operating organization) from INRA/NNSD. Because of the fact, that INRA/NNSD is not able to maintain its own

permanent inspectors at the manufacturing plants abroad to control the granted permit, the resident inspectors of VO Safety at the respective manufacturing plants in Russia perform inspection activity on behalf of INRA/NNSD in accordance with the inspection plan and programme developed separately for each particular piece of equipment. These inspections are performed in accordance with the manufacturer QC plan. In specific cases when equipment important to safety is being produced, the INRA/NNSD inspectors participate in the inspections to the manufacturer (Witness and Hold Point). The inspection procedures during the equipment production are developed by VO Safety and approved by the Russian Nuclear Regulatory Authority GAN. By the assistance of the foreign consultant VO Safety, INRA/NNSD managed to solve the important problem of the supervision of activities and quality control during the manufacturing of equipment in a foreign country.

Most inspection activities at BNPP are performed by the resident inspectors of the INRA/NNSD representative office at the plant. The inspectors from the headquarters are mainly engaged in planning and programming of site inspections and with other activities. INRA/NNSD performs different types of inspections, which are clearly defined in the regulation “Supervisory Procedure for Assurance of Safety of NPPs in Iran”, issued by NNSD in 2000. Inspections may be scheduled and non-scheduled (announced and unannounced). They fall into two major groups:

a) Inspection of operating organizations and other organizations performing activities subject to licensing at different stages of NPPs lifecycle:

- Comprehensive inspection for an examination of the organization’s activities for the whole scope of INRA/NNSD competence. Inspection of NPPs systems and equipment are conducted within such inspection.
- Special (ad hoc) inspection for a detailed examination of one or several particular matters of organizations’ activities. These inspections may be conducted by teams of inspectors and experts as well as by one inspector.
- Routine inspection for a detailed examination of the fulfilment of safety requirements at working places in subdivisions of organizations and facilities in order to undertake prompt efficient measures to eliminate possible shortcomings. These inspections are arranged and conducted by the INRA/NNSD resident inspectors at BNPP site.

b) Inspections to verify condition of NPP, its system and equipment important to safety:

These inspections are carried out at the stages of manufacturing, construction/ installation, adjustment (pre-commissioning) and tests and trials during the process of NPP commissioning and operation. Such inspections are carried out by the INRA/NNSD inspectors or on its behalf by foreign consultant organization VO Safety during the manufacturing of equipment.

INRA/NNSD also carries out inspections at short notice (reactive inspections), if an abnormal occurrence warrants immediate investigation. Inspections are carried out in accordance with the new “Procedure on Investigation and Registration of Safety-Related Events at BNPP”, which has been adopted recently. Experts from the VO Safety are also available at the representative office of INRA/NNSD on site. This makes it possible for INRA/NNSD to undertake inspection immediately after significant events. INRA/NNSD has an intention to consider the important requirement for evaluation of experience feedback when developing conditions for the BNPP operation licence.

INRA/NNSD implements a planned and systematic approach when performing its inspection activities. A general plan of inspections of stages of the BNPP construction, commissioning, operation and decommissioning has been created. The plan is implemented by development of

annual inspection plans, which are linked to the operator schedules for performance and completion of activities at different stages of the authorization process. Frequency of inspections and type of inspections are specified in these plans. When planning the frequency of inspections, the safety classification of systems, structures and components and the complexity of the work are considered. The inspection frequency is commensurate to the potential magnitude and nature of the hazard associated with the facility or activity. The frequency of inspections increases when violations of safety requirements are observed in past performance.

The annual inspection plans cover all inspection areas and are prepared according to the operating organization ongoing activities. The annual plan is discussed within the NNSD and is sent for comments to BNPP. Finally the Director General of the NNSD approves the annual plan. The team was able to review the annual inspection plans for BNPP for 2008, 2009 and 2010, as well as selected inspection reports.

Prior to commencement of the comprehensive and individual inspections the preparation of a working programme and plan for inspection performance should be done. The inspection group is appointed by the Inspection Section Head, which consist of inspectors and experts and the group head. The working programme includes inspection goals, checklist, structural subdivision of the organization to be inspected, time terms of inspection, as well as the scope of information to be prepared by the inspected organization and submitted to the INRA/NNSD in advance. Inspection plans contain types and scope of activities and documents to be inspected and employees to be contacted and participate in discussions of inspection results and recommendations as well as the names of inspecting group members.

Whenever inspection performed by consultant or independent foreign organization as VO Safety, INRA/NNSD retains the responsibility for making any decision by taking into account the results of inspections as well as recommendations of such experts. Due to the increased number of qualified resident inspectors on site during the last two years, the INRA/NNSD staff have obtained the competence and experience necessary to evaluate and assess the results of the inspections performed by the foreign inspectors. An internal procedure has been developed by the INRA/NNSD representative office on-site, which provides practical guidance on the technical and organizational aspects of the cooperation with foreign consultants. The guidance is in the form of a document distribution flowchart, which defines the order of the documents exchange between the VO Safety and the on-site office of INRA/NNSD. In addition there is procedure in place for supervision of consultant activities on site by the INRA/NNSD representative office.

The results of comprehensive and individual inspections are documented in the form of an inspection report. In case the inspection resulted in revealing of violations of safety requirements, an Assignment (Directive, Prescription) is issued to the inspected organization to eliminate these violations as well as the causes and conditions that led to them. The format of the Assignment is defined by the basic regulatory document "Supervisory Procedure for Assurance of Safety of NPPs in Iran". The results of routine inspections which show any deviation are documented through an Act. Violations of safety requirements revealed during inspections are classified depending on their relation to the concerned safety regulations as well as the licence/permit validity conditions. The head of inspecting group discuss the inspection report with the head of organization inspected and hand over the Assignments to him so that the violations are eliminated by the inspected organization. If the inspected organization does not agree with the assignment or the content of inspection report, it has a right to appeal to the NNSD within 10 days upon receiving of Assignment or inspection report. No other possibilities of appeal are considered by the existing regulatory system. While

reviewing the appeal, the corrective actions prescribed through the Assignment must be accomplished by the inspected organization. In particular cases it is possible to prolong the time terms of the fulfilment of the Assignment.

INRA/NNSD recognized that the training and qualification of existing inspectors is not sufficient, especially taking into account the next stages of the BNPP life time. Thus a training programme for improving the knowledge and skills of existing inspectors has been planned and its implementation has already started within the framework of the IAEA TC Programme. However a proper solution of the issue concerning on-the-job training of inspectors has to be found. Another important issue is the training of newly hired inspectors. INRA/NNSD has already started development of a training programme with the assistance of VO Safety. In addition under the IAEA TC Programme “Train-the-trainers” some instructors will be trained, which will be further involved in the training of inspectors. Qualification and education criteria for recruitment of new inspectors have been developed, taking into account the peculiarities of the duties of inspectors at the headquarters and resident inspectors on the site.

INRA/NNSD also recognized the need for an internal guidance document for inspection activities during the operation stage of BNPP. Development of guidance is at its final stage.

The basic regulatory document defining methods and scope of inspections, the regulation “Supervisory Procedure for Assurance of Safety of NPPs in Iran”, requires that INRA/NNSD shall record and analyze results of state supervision over NPPs safety assurance. All reports and Assignments issued as a result of inspections of organizations, as well as all records made in documents and Assignments based on equipment and systems inspection, must be recorded and analyzed. The order and procedure of assessment of the inspection results are specified in two regulations on supervision for stages of NPP lifecycle construction and commissioning. On the whole, analysis of results of inspections during construction and commissioning stage shall provide acquisition of initial data and information: for expertise and assessment of safety during licensing of the BNPP operation; for development of the validity conditions of the BNPP operating licence; for making corrections to the PSA and SAR; and for subsequent supervision over the BNPP operation.

All safety-related deficiencies and violations and corrective measures are properly recorded and the corresponding database is maintained.

Based on the conditions specified in the licences/permits as well as on previous INRA/NNSD inspection reports, the operating organization has an obligation to submit to INRA/NNSD periodic reports on assurance of safety conditions and observance of safety criteria and quality requirements. The task of the INRA/NNSD is to control on a random basis the fulfilment of the operator’s responsibilities.



## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- (1) **BASIS:** GS-R-1, §4.6 states that: “*The regulatory body shall employ a sufficient number of personnel with the necessary qualifications, experience and expertise to undertake its functions and responsibilities. It is likely that there will be positions of a specialist nature and positions needed more general skills and expertise. The regulatory body shall acquire and maintain the competence to judge, on an overall basis, the safety of facilities and activities and to make the necessary decisions.*”

**See Recommendations 2 and 7.**

- (1) **BASIS:** GS-R-1, §4.7 states that: “*In order to ensure that the proper skills are acquired and that adequate levels of competence are achieved and maintained, the regulatory body shall ensure that its staff members participate in well defined training programmes. This training should ensure that staff are aware of technological developments and new safety principles and concepts.*”

**S10 Suggestion:** In connection with the forthcoming transition of INRA into an independent regulatory authority, INRA/NNSD should reconsider its training policy, as well as the effectiveness of its training programmes, to ensure that the adequate level of competency for discharging its statutory inspection functions is achieved and maintained through sustainable development and effective training of its inspectors.

**G4 Good Practice:** INRA/NNSD found an effective temporary solution for the training issue related to the need for improvement of the knowledge and practical skills of inspectors. A training programme was developed within the framework of the IAEA Technical Cooperation programme and implementation of the training has started.

- (1) **BASIS:** GS-R-1, §5.12 states that: “*Regulatory inspection and enforcement activities shall cover all areas of regulatory responsibility. The regulatory body shall conduct inspections to satisfy itself that the operator is in compliance with the conditions set out, for example, in the authorization or regulations. In addition, the regulatory body shall take into account, as necessary, the activities of suppliers of services and products to the operator. Enforcement actions shall be applied as necessary by the regulatory body in the event of deviations from, or non-compliance with, conditions and requirements.*”

- (2) **BASIS:** GS-R-1, §5.15 states that: “*Inspection by the regulatory body, both announced and unannounced, shall be a continuing activity. If the regulatory body uses the services of consultants for the inspections, than it shall have the responsibility for taking any actions on the basis of these inspections.*”

- (3) **BASIS:** GS-G-1.3, §3.17 states that: “*The regulatory body, including a dedicated support organization if appropriate, should have staff capable of performing the activities needed for its inspection programme or, if outside consultants are used, staff capable of adequately supervising the consultants’ work and independently evaluating its quality and the results.*”

- (4) **BASIS:** GS-G-1.3, §3.18 states that: “*It is neither necessary nor practicable for the regulatory body to be entirely self-sufficient in all technical areas relating to inspection. It may therefore be necessary for it to use consultants in specified areas. It may occasionally be necessary owing to a heavy short term workload to augment the regulatory body’s*

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

*inspection staff with consultants having as much knowledge and experience as the regulatory body's inspection staff.”*

- S11 Suggestion:** INRA/NNSD should consider review and further development of its policy and programmes in order to gradually achieve self-sufficiency in fulfilment of its inspection functions during the next stages of the BNPP lifetime so not to fully rely on consultants.

### 6.2. ENFORCEMENT

The INRA/NNSD has the authority to take enforcement actions against the NPP operator as a result of identified violations of regulatory requirements. In accordance with Articles 17, 18 and 19 of the Radiation Protection (RP) Act the INRA/NNSD takes the necessary enforcement measures in the event of violation of INRA regulations or any conditions specified in the authorization (licence/permit). General principles for enforcement are contained in Section 14 of the regulation “Supervisory Procedure for Assurance of Safety of NPP in Iran”. Within its regulatory function and in accordance with the legislation valid in The Islamic Republic of Iran, INRA/NNSD has the authority to use different methods for enforcement:

- Issue mandatory-for-fulfilment assignments for elimination of revealed violations of requirements or on suspension of activities performed with violations of requirements to nuclear and radiation safety, if these violations damage or can damage health of site personnel, public and environment;
- Suspend or cancel the validity of the previously issued licence or permit in case of violation of safety requirements and licences and permit conditions;
- Prohibit use of equipment and techniques non-conforming safety requirements;
- Impose administrative penalties in the form of warnings and fines on supervised organization and/or managers/officers of organizations in case of severe or recurring violations of safety requirements.

Enforcement measures are in conformance with the nature and degree of influence of violations on safety and with recurrence of violations.

All revealed violations of requirements are documented in the inspection report, regardless of the safety significance of the violation. In case of issuance of assignment to the inspected organization, it is directed to eliminate or rectify the violations revealed and causes and conditions that led to them, as well as to prevent recurrence of the violation. Monitoring of fulfilment of the issued assignments and recommendations is an important element of inspection activities. The basic regulation “Supervisory Procedure for Assurance of Safety of NPP in Iran” requires the INRA/NNSD to review information submitted by the inspected organization about the assignment fulfilment and to register the timeliness of the submission. During subsequent or specially arranged inspections the INRA/NNSD examines the assignment fulfilment.

Violations of safety requirements revealed during inspections are classified depending on their safety significance. Before issuance of assignment the inspectors perform analysis of violations in order to assess their potential or actual effect on NPP safety, causes and conditions that led to violation and persons responsible for violations. Corrective actions and other enforcement measures prescribed in the assignment depend on the safety significance of

the violation. In case of serious violation or situation which is considered to pose an imminent radiological hazard, the INRA/NNSD is authorized to issue assignment on suspension of activities performed. In the event of extremely serious non-compliance the regulator is authorized to suspend or cancel the validity of the licence or permit and/or impose administrative penalties in the form of warnings and fines.

Not all the inspectors of the INRA/NNSD have the authority to take on the spot enforcement actions. During the construction and commissioning stage enforcement authorization is limited to INRA/NNSD headquarters (only the Head of Inspection Section) and to the INRA/NNSD representative office at BNPP site (only the Head of the office).

Administrative penalties, including fines, can be imposed on legal and physical entities in accordance with the legislation. If causes and conditions that led to violations are the result of the practice established within the organization, the administrative penalty should be applied towards the organization. This does not exclude the possibility of application of simultaneous enforcement to guilty persons and officers.

Article 18 of the RP Act describes different levels of punishment in case of offences. The level of punishment is commensurate to the degree, severity and safety significance of the offence. The punishment includes payment of fines or/and discretionary imprisonment from one month to three years. However in the existing regulations there is a lack of provisions describing the authorities and conditions under which the INRA/NNSD inspectors can initiate prosecution through the legal process. In addition, there is also a lack of clear guidance about the practical implementation of the obligations of inspectors with respect to the imposing of administrative penalties (including fines). This is the main reason why this kind of enforcement has not been imposed up to now. The shortage of administrative guidance for the practical implementation of all available methods of enforcement may decrease the effectiveness of the supervisory activities of INRA/NNSD.

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- (1) **BASIS:** GS-R-1, §5.18 states that: *“Enforcement actions are designed to respond to non-compliance with specified conditions and requirements. The action shall be commensurate with the seriousness of the non-compliance.”*
- (2) **BASIS:** GS-G-1.3, §5.13 states that: *“The regulatory body should have the authority to impose or recommend penalties, such as fines on the operator as a corporate body or on individuals, or to institute prosecution through the legal process, depending upon the legal system and authorization practices in the State concerned. The use of penalties is usually reserved for serious violations, for repeated violations of a less serious nature or for deliberate and wilful non-compliance. Experience in some States shows that imposing penalties on the organization rather than on individuals is preferable and is more likely to lead to improvements in safety performance.”*
- (3) **BASIS:** GS-G-1.3, §5.14 states that: *“The regulatory body should adopt clear administrative procedures and guidelines governing the use and implementation of enforcement actions. All inspectors and other staff of the regulatory body should be trained in and should be knowledgeable about the procedures and guidelines. The procedures and guidelines should state the policy of the regulatory body for the use of regulatory and enforcement measures and the associated authority delegated to inspectors and other regulatory body staff. Depending on national practices, the need to allow the operator to state a point of view on regulatory decisions, to respond to enforcement”*

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

*notifications and to appeal against enforcement decisions should be recognized and taken into account in the procedures and guidelines. The procedures and guidelines should cover in detail the decision making approach of the regulatory body in determining the level of actions to be taken and the way in which the actions should be taken, including dealing with failure of the operator to comply with requirements for regulatory enforcement.*”

**R9 Recommendation:** INRA/NNSD should develop the necessary administrative procedures and guidelines to impose enforcement actions, and should consider ways and means to institute prosecution through the legal process in line with the legal system and enforcement practices in The Islamic Republic of Iran.

### 6.3. VISIT TO BNPP

#### *General*

INRA/NNSD resident inspectors at BNPP site conduct inspections to control compliance with legal requirements and the conditions specified in the authorizations (licences/permits). The inspection programme of the resident inspectors takes into account the current stage of the plant project implementation, namely the pre-commissioning stage. The inspections include plant walk downs, control of the overall plant condition, conditions of systems and components, and the performance of corrective actions and of modifications (if any). Another type of inspection is related with the review and assessment of the information and documents presented by applicants for granting a licence or permit. These inspections, which are done according to an inspection plan in the form of special and comprehensive inspection, include control of the availability and validity of procedures, instructions and programmes for performance of the pre-commissioning and commissioning activities and compliance with the requirements of the commissioning programme. During the inspections of organizations involved in activities, which might influence the safety of the plant and are subject to registration or obtaining permit from INRA/NNSD, the knowledge and skill of the personnel, training and examination and QA programmes are also inspected or reviewed.

#### *Inspection activities*

The internal document governing the performance of on-site inspectors is guide named “Procedure for Inspection and Enforcement”, which is based on the regulation “Supervisory Procedure for Assurance of Safety of NPPs in Iran”. The document prescribes all the steps of different inspection activities, including preparation for site inspections (inspection plan), conduct of inspections and documentation of inspection results (inspection report). In addition there is in place an internal document which defines different steps of special inspections in the form of a process flow diagram. Results of the special inspections are documented in an inspection report. The format and content of the report are prescribed by the procedure on format and content of inspection report No. INRA-NS-WI-200-30/01-0-Aba.1386 (2007). Main parts of the inspection report are as follows:

- Introduction (e.g. committee members, organizations to be inspected);
- Results of inspection in compliance with the programme;
- Conclusions and recommendations (findings, required corrective measure, responsible persons and time frame for implementation.

For routine inspections a report is prepared by the site inspectors and signed by the head of the representative office of INRA/NNSD on site. In case there are no deviations and non-compliances only an internal report is prepared, which is submitted to the head of the representative office. Shortcomings or non-conformities are reported to the operating organization and the INRA/NNSD inspectors require initiation of proper corrective actions. During inspections resident inspectors control whether the revealed non-conformities and deficiencies are properly corrected in accordance with the corrective action plan.

The BNPP Construction Licence includes conditions, the fulfilment of which is followed by INRA. The utility is obliged to send to INRA a quarterly report evaluating the conditions of fulfilment. Conditions where appropriate are checked through inspections by resident inspectors.

### ***Local enforcement***

During the construction and commissioning stage enforcement is limited to the INRA/NNSD representative office at BNPP site (Head of the office) and INRA/NNSD headquarters (Head of Inspection Section). The head of local inspection is authorized to stop activities, to require re-examination of a person, and to ask for replacement of workers. The report of the inspection is sent to the utility, which in many cases implements its own enforcement measures.

### ***Staffing and qualification of inspectors***

Staffing of the INRA/NNSD representative office at Bushehr NPP includes 11 resident inspectors. There are 8 inspectors in the mechanical and nuclear section, one in the I&C and 1 for management system and training. Five of the inspectors have MS degrees in nuclear engineering, one of them has an MS in material engineering and welding and one has an MS in chemical engineering. The team noted the high qualification and experience of the site inspectors. However INRA has recognized that the number of inspectors is not sufficient to effectively fulfil its statutory functions, in particular taking into account the next stages of the plant lifetime. For this reason, INRA intends to recruit 25 new inspectors.

### ***Behaviour of inspectors, attitude of the plant personnel***

The team observed a planned technical examination – external inspection of TA system (volume control of primary circuit), which is a part of registration and supervision of the plant pressure system. During the inspection the inspectors performed their duties in compliance with the particular process flow diagram in good coordination with the consultants from VO Safety. The behaviour of site inspectors was professional. The utility personnel respected the INRA inspectors.

### ***Access of the inspectors to information and premises***

Site inspectors have permanent and full access to all the premises, equipment and information at the plant at any time.

### ***Interaction and contacts with headquarters***

Interaction of the INRA representative office at BNPP site and the INRA headquarters is well defined, regular and comprehensive. Daily information exchange between the site and headquarters contributes to effective decision making and prompt response to any unusual situation.

### ***Cooperation with foreign consultant***

There are 7 inspectors of VO Safety on site with the following competences: 3 electrical engineers, 3 mechanical engineers, 1 nuclear and radiation safety specialist and 1 head of the VO Safety on site inspection branch. The legal bases for the cooperation between VO Safety and INRA is contained in the contract. For each activity envisaged in the contract there is an internal procedure in place in a form of a process flow diagram. The functions of VO Safety are limited to the consultation of NNSD staff, while final decisions are left with the INRA.

### ***Training of resident inspectors***

Training of the inspectors is composed of three different categories:

- Category 1: Training courses (workshops) of a technical nature, organized by the utility.
- Category 2: Workshops on QA and project management control, organized both internally and by the utility;
- Category 3: Training courses and workshops on supervision of commissioning, organized by INRA in cooperation with the IAEA.

In addition inspectors are trained through on-the-job training, organized by the IAEA in different countries like Bulgaria and Romania. There is also envisaged training of inspectors in Russia.

Licensing of the shift personnel of BNPP:

The team discussed with the inspectors of the INRA representative office at the BNPP site some practical aspects of licensing of the shift personnel of BNPP. Conditions for licensing of the shift personnel are outlined in the regulation INRA-NS-RE-051-16/01-1-Oct.2006 “Requirements for Obtaining License by Shift Personnel of the BNPP-1”. The procedure establishes the process of granting of licences by INRA to the Russian and Iranian shift personnel of the BNPP taking part in BNPP commissioning and operation. The following personnel, as a minimum, shall obtain a licence for the right to carry out technological processes:

- Shift Supervisor of the Unit
- Shift Supervisor of the Reactor Compartment
- Shift Supervisor of the Turbine Hall
- Senior Reactor Operator
- Senior Turbine Operator

The remaining operating personnel of the BNPP who are not subject to licensing by INRA, shall be examined and authorized for independent work under the procedure established by the utility. Decision on issuance or rejection to issue a licence to Russian and Iranian shift personnel of the BNPP shall be taken by INRA on the basis of the consideration of the results of:

- Theoretical knowledge (including knowledge of safety regulations and standards) and practical skills test of the candidate at the utility examination board;
- Review of the Application and its substantiating documents, including the report of “doubling” of the candidate.

Decision of issuance or rejection to issue a licence is taken by the Director General of NNSD in the form of a “decision”, approved by a letter.

Psychological tests are required for the control room shift personnel. This requirement is outlined in the regulation No. INRA-NS-RE-051-16/01-1-Oct.2006 “Requirements for obtaining licence by shift personnel of the BNPP-1”.

***Conclusions of the site visit:***

During the site visit the team observed good performance of resident inspectors during their inspection activities. Existing internal procedures based on IAEA Quality Management System requirements effectively support the inspection activities in all the different areas of inspections. It is evident that the whole staff of the INRA representative office at BNPP site is enthusiastic and is striving to improve its performance, knowledge and qualification. In addition the team also observed good relations and mutual respect with the utility personnel. In spite of the lack of internal guidance for enforcement, especially for imposing administrative penalties and fines, the team observed many cases which show that based on the deviation reports of inspectors the utility imposed such sanctions.

In the opinion of the team the INRA representative office at BNPP site is managed in a professional manner which is a major prerequisite for achievement of effective and successful supervision of BNPP commissioning.

## **7. DEVELOPMENT OF REGULATIONS AND GUIDES**

### **7.1. THE REGULATIONS AND GUIDES FOR BNPP**

The development of regulations, guides and standards, and required procedures, relevant to siting, construction, commissioning, operation and decommissioning of nuclear power plants, as well as revising, if necessary, the regulations, guidelines and standards, is one of the main functions of NNSD. The coordination role in the regulations and guides development is with Regulations and Guides Development Section (RGDS).

The hierarchy of laws, regulations and guides in INRA is described (in Chapter 1), together with the legislative framework. The essential points, with regards to the categorization of regulatory documents and their legal status in the regulatory framework, can be summarized below.

Legally-binding documents include Acts and Regulations. Regulations are defined as documents, approved by INRA/NNSD, regulating the basic technical and organizational requirements that shall be fulfilled for safety assurance in carrying out of an activity in the field of atomic energy utilization. Regulations are binding upon all departments, organizations and enterprises participating in development, manufacturing, commissioning, operation and decommissioning of nuclear power plants and nuclear fuel handling systems.

Non-legally-binding documents include Guides. Guides are procedures for INRA staff how to perform inspections on BNPP (sometimes plant specific).

The INRA nuclear safety regulations related to BNPP (14 regulations and 9 modifications to the regulations) include the specific regulatory procedures for granting of licences and permits for activities related to construction of the BNPP. Guides are in fact procedures for supervision of BNPP. Technical requirements like in NS-R-1 are mentioned only through references to foreign standards (Russian GAN, US NRC, German) in several regulations. On the other hand the INRA radiation protection regulations include such criteria directly.

Selection of the BNPP site was based on US NRC siting criteria and the construction itself started in 1975 using German regulations. Following the suspension of construction, a decision was taken in 1994 to continue construction of BNPP. The contract for completion of the plant was signed between Atomic Energy Organization of Iran and Russian Company ZAO Atomstroyexport. It was necessary to set up the legal requirements on construction, commissioning and operation of the plant. It was agreed that only those codes, standards, regulations and requirements shall be used whose adequacy and applicability have been assessed and which have been supplemented or modified in accordance with requirements of INRA, if necessary. This was carried out by examination of report “Comparison Analysis between Codes, Standards and Rules of Russian Federation and Requirements of Islamic Republic of Iran ( Codes, Standards and Rules of Germany, USA, IAEA )” dealing with 12 Subjects as follows: CCF, Protection Against Missiles, Fire Protection, Classification of Components, Power Peaking Distribution and Xenon Oscillations, Heat Transport to Ultimate Heat Sink, Radiation Embrittlement of Steels, Design Bases of Containment, Hydrogen Content Monitoring, Instrumentation and Control, Safety Criteria of NPP and Strength Calculation.

A large set of standards to be followed during construction, commissioning, and operation and decommissioning of BNPP has been implemented in App. M of the AEOI – ZAO Atomstroyexport Contract on BNPP. Based on INRA regulations, this list of standards



became mandatory. The regulations and guides have been issued before and during the construction process when it was necessary. There is still a need to develop approximately 10 new regulations and guides for BNPP. Drafts of the most important ones have already been prepared. These are as follows:

Regulation: “Requirements to Operating Organization of Nuclear Power Plants in Iran”, and 4 Guides :

- Standard Inspection Programme for Organization and Assurance of Uniformity of Measurements and Metrological Control at the BNPP – 1
- Typical Inspection Programme of Preparation, Training, Maintenance and Improvement of Qualification of the Operating Start at the BNPP
- Typical Programme of Radiation Safety Inspection at the BNPP
- Standard Inspection Programme of the Status of Emergency Planning and Preparedness for Personnel Protection in Case of an Accident at the BNPP

### ***Lack of uniform regulation***

The regulations for licensing of BNPP contains requirements which are combined from different regulatory systems and information sources like Russian, U.S., German and IAEA, and are in such way plant specific, due to the unique design and construction of BNPP. Although the present regulations may serve well now future effective and comprehensive supervision, especially of design modification, may be very complicated.

As INRA identified, and planned, regulations and guides will be developed that are uniform for all nuclear power plants to be built in The Islamic Republic of Iran.

## **RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES**

- |   |
|---|
| <p>(1) <b>BASIS:</b> GS-R-1, §5.25 states that: <i>“The system of regulations and guides shall be chosen so as to suit the legal system of the State, and the nature and extent of the facilities and activities to be regulated.”</i></p>  |
| <p>(2) <b>BASIS:</b> GS-R-1, §5.26 states that: <i>“The main purpose of regulations is to establish requirements with which all operators must comply. Such regulations shall provide a framework for more detailed conditions and requirements to be incorporated into individual authorizations.”</i></p>   |
| <p>(3) <b>BASIS:</b> Draft GSR Part 1, §4.62 states that: <i>“The regulations and guides shall provide the framework for the regulatory requirements and conditions to be incorporated into individual authorizations or applications for authorization. They shall also establish the criteria to be used for assessing compliance. The regulations and guides shall be kept consistent and comprehensive, and shall provide adequate coverage commensurate with the radiation risks associated with the facilities and activities, in accordance with a graded approach.”</i></p> |
| <p>(4) <b>BASIS:</b> GS-G-1.4, §3.1 states that: <i>“A systematic approach should be adopted for the production of regulations and guides, and the regulatory body’s quality management should cover these activities. Procedures should be developed which establish the general method for the development and review of regulations and guides, in accordance with the State’s legal system.”</i></p>  |

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

**R10 Recommendation:** INRA should replace in due time the existing ad hoc set of regulations governing the regulatory process with a comprehensive system of national nuclear safety regulations, and supported by the necessary guides.

### 7.2. PROCESS FOR DEVELOPMENT OF REGULATIONS AND GUIDES

The process for development of regulations and guides is well defined by part of INRA QMS: “Procedure of Establishment of Regulations, Codes, and Standards“ (ID No.: INRANS1PR01). However, the procedure does not include legal support during the preparation of regulations and guides.

Based on documentation practices of various national regulatory organizations in other countries as well as international organizations like IAEA, INRA has followed a process consisting of multi-tier committees to prepare and to revise these documents. In developing regulations and guides INRA usually takes into consideration different sources of information including:

- National legislation and existing regulatory documents;
- IAEA Safety Standards;
- Regulatory documents and other relevant information produced by regulatory bodies in other countries e.g. US NRC;
- Regulations and guides of the country that supplied the NPP

To develop specific regulatory documents a graded approach is considered by NNSD. Established regulations and guides are reviewed, revised or replaced whenever it deems necessary by INRA. There is no periodic regular reviewing of the regulations and guides, but the priorities for review and development of regulations and guides have been determined based on engineering judgment. The PSA is not used for prioritization of regulations and guides development and revision because of limited use of PSA in INRA regulatory framework (see Chapt.5 ).

INRA has a prescriptive regulatory system because of cooperation with Russia during construction of BNPP and the use of USNRC legal documents guides. INRA faces the transition from this prescriptive based regulation to performance-based regulation but concrete plans for the transition do not exist.

INRA plans to issue a new set of guides after the new Act on Safe Use of Nuclear Energy and Radiation Sources in the I.R. of Iran is passed and implemented. The future regulations will be generally valid and will not be plant specific as the majority of them are today.

A working group consisting of NNSD experts and other professionals has prepared the provisional list of 500 safety regulations and safety regulatory guides to be developed or revised to cover all activities related to BNPP and associated activities. The issuance of regulations and guides has been divided based on priorities of their needs into three phases, the first one will include 140 documents. In drafting the list, extensive use has been made of information contained in relevant IAEA safety standards. Based on the recommended documentation practice of IAEA, topics are identified for development of appropriate regulatory documents. During the process of developing or revising regulatory documents a comprehensive comparison with the existing IAEA fundamentals and requirements will be made.

The process looks as follows:

1. The Director General of NNSD assigns the request for establishment of nuclear regulations, codes, and standards to head of RGDS.
2. RGDS head convenes a technical committee composed mainly from section heads according to the instruction of convening technical committees.
3. The committee surveys the possibility of domestic establishment of the requested nuclear regulation/code/standard. For situations in which the committee can establish the requested nuclear regulation/code standard the committee establishes and submits a draft revision of the regulation/code/standard to the section head. If there is no possibility for the committee to establish such a document, the committee adapts a similar document from the international acceptable nuclear regulations, codes, and standards, and submits it to the section head. If the committee is not successful in establishing the required regulation/code/standard, it prepares a report containing the reasons and submits it to the section head.
4. The section head submits the draft revision to the Director General and assigns the comments of the Director General or his consultant(s) to the technical committee.
5. The committee surveys the comments of the director general and makes appropriate changes to the established document.

Draft regulations and guides, while being developed, will be sent for review and evaluation to concerned organizations or individual experts. Safety regulations and regulatory guides are required to be developed by senior experts in INRA.

There are no INRA advisory committees to advise on the need for regulations and on their technical content. Their role is substituted by several advisors to INRA president.

The following flowchart describes the Process of Development of Regulations and Guides (where **A** means aborted).



### *Legal support for Regulations and Guides Development*

The “Procedure of Establishment of Regulations, Codes, and Standards” (INRANS1PR01) does not specify in which points of the process the draft regulation/code/standard is commented on by legal staff. Missing timely and comprehensive legal comments to ensure that regulations do not contain provisions that are beyond the jurisdiction and authority of the regulatory body may extend the time for development of regulatory documents. Additionally, a legal review may verify that the regulations are not in conflict with the national legislative framework.

#### **RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES**

- (1) **BASIS:** GS-G-1.4, §3.1 states that: *“Procedures should be developed which establish the general method for the development and review of regulations and guides, in accordance with the State’s legal system. These procedures should cover the composition of working groups and the drafting and review procedure, including the required legal support.”*
  - (2) **BASIS:** GS-G-1.4, §3.25 states that: *“The purpose of the review by legal staff is to ensure that regulations do not contain provisions that are beyond the jurisdiction and authority of the regulatory body, prohibited by or inconsistent with laws or other regulations, unclear or ambiguous, or otherwise unenforceable.”*
- S12 Suggestion:** The existing procedure for establishment of regulations, codes and standards should be supplemented to include timely and comprehensive consultations with legal support during drafting of regulations and guides

### *Involvement of interested parties into regulations and guides development*

Not all potentially interested parties have the opportunity to comment on proposed regulations and guides in their draft form. The opportunity to comment on proposed drafts of regulations and guides can contribute to their better understanding and to minimize the number of impracticable, misleading or otherwise inadequate regulations, as well as to public acceptance of regulatory activity.

#### **RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES**

- (1) **BASIS:** GS-R-1, §5.28 and GS-G-1.4 §3.3. state that: *“In developing regulations and guides, the regulatory body shall take into consideration comments from interested parties and the feedback of experience.”*
  - (2) **BASIS:** GS-G-1.1, §3.12 states that: *“The production of regulations and guides should be undertaken with full consultation both within and outside the regulatory body. Thus an opportunity should be provided for review and comment by relevant government departments, other regulatory authorities, affected operators and other interested parties and, if appropriate, through consultation with the public.”*
- S13 Suggestion:** INRA should allow all interested parties to have the opportunity to comment on proposed regulations and guides in their draft form.
- (1) **BASIS:** GS-R-1.4, §3.19 states that: *“States embarking on a nuclear programme should consider adapting the IAEA’s safety standards or regulations developed by other States,*

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

*or a combination of these.”*

- G5 Good Practice:** A broad scope comparison of IAEA, USNRC and INRA safety regulations and guides has been performed to specify the range of regulations and guides to be developed by INRA for the safety regulation of BNPP.

## **8. THE MANAGEMENT SYSTEM**

The IAEA Safety Requirements publication GS-R-3, issued in 2006, defines the requirements for establishing, implementing, assessing and continually improving a management system that integrates safety, health, environmental, security, quality and economic elements. This integration aims to ensure that safety is properly taken into account in all the activities of an organization in order to ensure the protection of people and the environment. The requirements are applicable to management systems for nuclear power plants and associated activities as well as for regulation of such facilities and activities. GS-R-3 with its integrative approach, emphasis on safety culture promotion and strong focus on continuous improvement can be seen as an evolution of the earlier concept of quality management.

### **8.1. GENERAL**

INRA began development and implementation of its Management System in 2004. The initial references used for developing the Management System included ISO 9001-2000, IAEA TECDOC 1090, and the draft GS-R-3 (DS-338). In 2005, the Head of INRA announced that the Management System would be implemented on a trial basis, and a trial period was begun. Following the trial period, an audit was performed to determine the status and effectiveness of implantation. Corrective actions were identified and categorized for correction. When GS-R-3 was issued in 2006, it became the main reference document for INRA's Management System development. The programme was initially applied to the Radiation Protection Department, but was later expanded to include NNSD. The goals of the initial programme in NNSD were that implementation would cover all NNSD activities, would include inside and outside expertise and approaches, and should not impact BNPP project schedule.

INRA's Management System is clearly described and documented in its Management System Manual. The Manual describes the scope of the programme, which includes safety related activities associated with nuclear and radiation producing facilities. A more specific listing of INRA regulatory activities covered by the Management System are specified in Section 1 of the manual. The Manual states that INRA's responsibility is the "safe, secure and peaceful use" of nuclear energy. INRA's Management System appears to successfully integrate the requirements of its legal and regulatory functions. In general, INRA has initiated actions to develop processes, procedures and documentation to address the requirements of the management system although many technical procedures remain to be developed.

With regard to promoting and supporting a strong safety culture, INRA senior management clearly addressed safety in the INRA Policy Statement. The National Development Plan for INRA (2008) contains both vision and mission descriptions for INRA development which includes references to safety and the necessary organization to promote safety. Additionally, at the individual level, safety, and thus safety culture, is reinforced during annual performance discussions and in the use of positive reinforcement tools (letters of recognition, monetary incentives). However, there is no formal process in place to periodically assess the organization's safety culture as a whole.

The Management System Manual, in Section 5, addresses a graded approach of Management System activities according to the potential safety significance and complexity of the INRA processes. The grading process for technical procedures is informal and is conducted at the section level.

Internal working level procedures covering INRA activities are not yet produced for all activities. A list of documents that still need to be developed has been compiled and are planned to be produced in accordance with their importance. To date, INRA has produced a total of 191 documents related to the Management System. Of these, 36 are related to general management/administrative topics, while 45 are specifically related to NNSD activities.

The Management System is clearly organized and supported by Senior Management. The documentation of the Management System is readily available to all staff electronically. Hard copies of the documents are closely controlled, but are available at the Section level.

## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

- (1) **BASIS:** GS-R-3, §2.8 states that: *“The documentation of the management system shall include the following: ...- A description of the processes and supporting information that explain how work is to be prepared, reviewed, carried out, recorded, assessed and improved.”*
- S14 Suggestion:** INRA should continue efforts to develop internal procedures and guidance regarding how to implement its work, both technical and administrative.
- (1) **BASIS:** GS-R-3, §2.5 states that: *“The management system shall be used to promote and support a strong safety culture.”*
- G6 Good Practice:** INRA senior management promotes safety culture with the use of positive incentives (letters of recommendation and/or financial incentives) for demonstrated good performance related to safety.

## 8.2. MANAGEMENT RESPONSIBILITY

INRA management at all levels appears extremely supportive and committed to the establishment, implementation and improvement of an effective management system. Although dedicated NNSD organizational resources are not assigned for the management system, a formal Management System Committee has been established, with representatives from each Department. The Committee has demonstrated effective implementation of the management system within INRA. A small number of staff are dedicated to maintaining the hardware and software utilized for implementation and tracking of the management system activities. Employees are encouraged to provide suggestions for improvement through their representatives to the Management System Committee.

While senior management clearly supports the management system, they have not developed, for the organization, sets of individual values, institutional values and/or behavioural expectations that can help guide the staff in proper implementation of INRA’s activities, and thus enhance overall nuclear safety.

The processes of INRA for development of some regulatory activities (regulations and guides that apply to licensees), while including directly affected parties such as the operating organization, do not appear to include other potential stakeholders (the public). There does not appear to be a mechanism for the public to be able to comment or participate in the regulatory process, such as in the development of regulations and guides related to BNPP.



## RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

(1) **BASIS:** GS-R-3, §3.2 states that: “*Senior management shall develop individual values, institutional values and behavioural expectations for the organization to support the implementation of the management system.*”

**S15 Suggestion:** INRA senior management should develop and clearly identify to the staff, the individual values and behavioural expectations for the staff as well as values that support INRA’s mission of promoting safety.

(1) **BASIS:** GS-R-3, §3.6 states that: “*The expectations of interested parties shall be considered by senior management in the activities and interactions in the processes of the management system, with the aim of enhancing the satisfaction of interested parties while at the same time ensuring that safety is not compromised.*”

**R11 Recommendation:** INRA should develop ways and means to identify and address the expectations of interested parties in the regulatory process for BNPP.

### 8.3. RESOURCE MANAGEMENT

INRA management has conducted an analysis to determine the amount of resources necessary to conduct its activities necessary for safety. For each position within INRA, a job description has been developed describing competency requirements, expected qualifications, and required training necessary to meet the required competence. INRA management provides resources to conduct its activities to the maximum extent possible as allowed by governmental hiring practices and policies. Training of staff is provided through a combination of contractor consultant activities and IAEA. The adequacy of training provided is evaluated through attendee feedback, presentations of obtained knowledge to colleagues, and on-the-job performance and annual job performance reviews. A Training Committee was established in 2009 to address INRA training and human resource development issues.

### 8.4. PROCESS IMPLEMENTATION

Processes necessary for INRA to conduct its regulatory functions have been identified. The interactions among the various processes have also been identified. Processes where implementing procedures are needed have been identified. Those processes related to the BNPP project have been given priority for development. Responsibility for development of the applicable implementing procedures has been identified and assigned. Each developed process procedure is required under the management system to be reviewed every 4 years for updating as necessary. Procedures may be updated more frequently if the need is identified. Responsibility for this function lies with the Section Heads. Focusing process/procedure development on BNPP means that other parts of the management system within NNSD may not be getting the attention necessary for continued development. Attention should be paid to continuing management system development in other areas of INRA and NNSD responsibility.

The management system elements covering general administrative requirements and activities are extremely well documented, controlled and tracked in a computerized process management system. While the system has only been applied to the National Radiation Protection Department and to INRA general administrative procedures and processes, INRA

has started incorporating NNSD activities, procedures and processes into the system. The same processes documented in the computerized process management system are manually implemented in NNSD. Once this system is fully implemented in NNSD, this system will provide an excellent way to initiate, develop, review, approve, track and distribute NNSD documents and the efficiency of the management system processes related to document control is expected to increase significantly. INRA is encouraged to continue with this implementation process.

Quality requirements associated with contracts for products or services are typically identified by INRA as part of the contract process. However, the overall responsibility of the functions or regulatory products remains with INRA. This is clearly documented in the management system and understood within INRA. One area where the quality implications are not clear is regarding the past acceptance or adoption of foreign documents or requirements as regulatory requirements. It is clear that the procedures used for acceptance of these documents would not meet current management system standards. The existing management system processes would only allow acceptance of these documents following demonstration of acceptability.

Documents are produced, maintained, and stored in accordance with GS-R-3 requirements. Documents maintained include internal documents generated within INRA as well as documents required to be submitted by the licensee/operating organization. The retention times for the documents are specified. Currently, documents are maintained in the INRA offices in hard copy and where possible, in electronic form. This arrangement may not, in the long term, provide the necessary conditions for proper storage. Consideration might be given in the future to different long term storage options.

Internal communications regarding the management system are quite good. The Management System Committee meets every two weeks. Minutes of the meetings are recorded and maintained. Various methods of internal communications are utilized: bulletin board notices, staff meetings to address specific topics or significant changes, suggestion inputs and other methods as may be specified in other procedures.

## **8.5. MEASUREMENT, ASSESSMENT AND IMPROVEMENT**

INRA monitors the performance of its internal processes in accordance with its management system. Each of the management system work instructions contains Service Standards, which include requirements for collecting information related to the performance of the procedure. Information is collected and assessed annually.

Self assessments are required by the management system, although to date only one has been conducted. Independent assessments are required by Section 9.3 of the Management System Manual. To date, several independent audits have been conducted including audits by IAEA and a review of the Inspection and Assessment Sections by INRA senior management. Management system reviews are also conducted periodically in accordance with the Work Instruction on Management Review. All assessments identify deficiencies that are prioritized and addressed. Identified deficiencies are discussed in Level 1 (Head of INRA and Department Directors) and Level 2 (Department Director and associated Section Heads) management committees for further prioritization and action.

## **8.6. CONCLUSION**

INRA senior management demonstrates a strong commitment to the development and implementation of an effective management system. In general, INRA's management system

is well organized and implemented based on the requirements and guidance of GS-R-3. The Management System Manual organizes the programme in close agreement with GS-R-3. Given that the programme was initiated in 2006 and limited resources are available, INRA has initiated a solid foundation for further development of the management system, although there are still many procedures to be developed and implemented. Continued implementation of the self-assessment, independent assessment and management review processes should provide good feedback for continued development and improvement of the overall INRA management system.



## APPENDIX I – LIST OF PARTICIPANTS

<b>INTERNATIONAL EXPERTS:</b>		
1. Olena <b>MYKOLAICHUK</b>	Ukraine, State Nuclear Regulatory Committee of Ukraine	<a href="mailto:mykolaichuk@hq.snrc.gov.ua">mykolaichuk@hq.snrc.gov.ua</a>
2. Jean-Paul <b>SAMAIN</b>	Belgium, Scientific Council for Ionizing Radiation	<a href="mailto:Jean-Paul.Samain@wr-cs.be">Jean-Paul.Samain@wr-cs.be</a>
3. Tinko <b>GANCHEV</b>	Bulgaria, Nuclear Regulatory Agency	<a href="mailto:t.ganchev@bnra.bg">t.ganchev@bnra.bg</a>
4. Miroslav <b>SVAB</b>	Czech Republic, State Office for Nuclear Safety	<a href="mailto:miroslav.svab@sujb.cz">miroslav.svab@sujb.cz</a>
5. Jozef <b>MISAK</b>	Czech Republic, Nuclear Research Institute Rez plc	<a href="mailto:mis@ujv.cz">mis@ujv.cz</a>
6. Ivan <b>LUX</b>	Hungarian Atomic Energy Authority	<a href="mailto:Lux@haea.gov.hu">Lux@haea.gov.hu</a>
7. Lucian <b>BIRO</b>	Romania, National Commission for Nuclear Activities Control	<a href="mailto:lucian.biro@cncan.ro">lucian.biro@cncan.ro</a>
8. Karol <b>JANKO</b>	Slovak Republic, Nuclear Regulatory Authority of the Slovak Republic	<a href="mailto:Karol.Janko@ujd.gov.sk">Karol.Janko@ujd.gov.sk</a>
<b>IAEA STAFF MEMBERS</b>		
1. Philippe <b>JAMET</b>	DIR, Division of Nuclear Installation Safety	<a href="mailto:P.Jamet@iaea.org">P.Jamet@iaea.org</a>
2. David <b>GRAVES</b>	Division of Nuclear Installation Safety	<a href="mailto:D.Graves@iaea.org">D.Graves@iaea.org</a>
3. Ayhan <b>EVRENSEL</b>	Division of Public Information	<a href="mailto:A.Evrensel@iaea.org">A.Evrensel@iaea.org</a>
4. Rosalie <b>SALEM</b>	Division of Nuclear Installation Safety	<a href="mailto:R.Salem@iaea.org">R.Salem@iaea.org</a>
<b>OFFICIAL INRA LIAISON OFFICER:</b>		
1. Kamran <b>SEPANLOO</b>	Iran Nuclear Regulatory Authority	<a href="mailto:ksepanloo@aeoi.org.ir">ksepanloo@aeoi.org.ir</a>

## APPENDIX II – MISSION PROGRAMME

### The Islamic Republic of Iran IRRS Mission Agenda 20 February–2 March 2010

<b>Friday, 19 Feb.</b>		
13:00–17:00	IRRS Team Briefing (Hotel) (see separate programme)	IRRS Team INRA Liaison Officer (LO)
<b>Saturday, 20 Feb.</b>		
09:00–10:00	Entrance meeting: Opening remarks by INRA/AEOI Opening remarks by IRRS Team Leader  Introductions (IRRS review team & IAEA staff; INRA management, liaison officer & counterparts, observers)	Mr. N. Rastkhah Ms. O. Mykolaichuk  INRA team & senior management IRRS Experts IAEA staff
10:00–10:15	Break	INRA counterparts
10:15–12:30	INRA Presentations - Presentations on analysis results of self- assessment (Modules I–VIII)	
12:30–14:00	Lunch	
14:00–17:00	Interviews with counterparts for Modules I–VIII (see separate interview schedule)	Experts & counterparts
17:00–18:00	IRRS Team meeting (INRA offices)	IRRS Team & INRA LO
18:00–	Report writing	
<b>Sunday, 21 Feb.</b>		
09:00–12:00	Interviews with counterparts for Modules I–VIII (see separate interview schedule)	Experts & counterparts
12:00–13:00	Lunch	
13:00–17:00	Continue interviews	Experts & counterparts
17:00–19:00	IRRS Team meeting	IRRS Team & INRA LO

19:00–	Report writing	IRRS team
<b>Monday, 22 Feb.</b>		
09:00–12:00	Interviews with counterparts for Modules I–VIII (see separate interview schedule)	Experts & counterparts
12:00–13:00	Lunch	
13:00–17:00	Continue interviews	Experts and counterparts
17:00–19:00	IRRS Team meeting	IRRS Team & INRA LO
19:00–	Report writing	IRRS team
<b>Tuesday, 23 Feb.</b>		
09:00–11:00	Policy issue discussions (2 topics)	All
11:00–12:00	Interviews with counterparts for Modules I–VIII (see separate interview schedule)Lunch	Experts & counterparts
12:00–13:00	Lunch	
13:00–17:00	Continue interviews	Experts & counterparts
17:00–19:00	IRRS Team meeting	IRRS Team & INRA LO
19:00–	Report writing	IRRS team
<b>Wednesday 24 Feb.</b>		
09:00–10:00	Interviews with counterparts	Experts & counterparts
10:00–12:00	Policy Issues discussions (2 topics)	All
12:00–13:00	Lunch	
13:00–17:00	Interviews with counterparts	Experts & counterparts
17:00–19:00	IRRS Team meeting	IRRS Team & INRA LO
19:00–	Report writing	IRRS Team

<b>Thursday, 25 Feb.</b>		
09:00–18:00	Report writing	IRRS Team
<b>Friday, 26 Feb.</b>		
09:00–17:00	Report Review	IRRS Team
17:00	T. Ganchev, M. Svab and L. Biro travel to BNPP	

<b>Saturday, 27 Feb.</b>		
09:00–12:00	Follow-up interviews as needed Report writing	Experts & counterparts
12:00–13:00	Lunch	
13:00–17:00	Review of report sections with counterparts	IRRS Team
17:00–19:00	IRRS Team meeting  T. Ganchev, M. Svab and L. Biro return from BNPP	IRRS Team & INRA LO
<b>Sunday, 28 Feb.</b>		
9:00–12:00	Review/revision of report sections with counterparts	Experts & counterparts
12:00–13:00	Lunch	
13:00–18:00	Review and revision of report  DRAFT REPORT PROVIDED TO INRA FOR REVIEW	IRRS Team
<b>Monday, 1 Mar.</b>		
09:00–12:00	Resolve INRA comments	IRRS Team/INRA
12:00–13:00	Lunch	
13:00–17:00	Exit meeting preparations	IRRS Team
<b>Tuesday, 2 Mar.</b>		
09:00–12:00	Exit meeting preparations	All
12:00–13:00	Lunch	
13:00–16:00	Exit meeting preparations	All
16:00–17:00	Exit meeting INRA, AEOI, IRRS team leader, IAEA – P. Jamet, Director, NSNI	All



**SITE VISIT TO BUSHEHR NPP**

27 February 2010	T. Ganchev, L. Biro, M. Svab	Meet with resident inspection staff and BNPP management.
------------------	------------------------------	--

### APPENDIX III – MISSION COUNTERPARTS

SUBJECT AREA	IRRS EXPERTS	COUNTERPART
1. LEGISLATIVE AND GOVERNMENTAL RESPONSIBILITIES	Mr. J.P. Samain Ms. O. Mykolaichuk	Mr. N. Rastkhah Mr. M.R. Kardan
2. AUTHORITY, RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY	Mr. L. Biro Mr. K. Janko	Mr. K. Sepanloo Mr. M. Amiri Mr. M.B. Sebteahmadi
3. ORGANIZATION OF THE REGULATORY BODY	Mr. K. Janko Mr. L. Biro	Mr. Movafeghi Mr. K. Sepanloo Mr. M.B. Sebteahmadi
4. AUTHORIZATION PROCESS	Mr. I. Lux Mr. J. Misak	Ms. M. Vaziri Mr. R. Jafarian Ms. S. Davari
5. REVIEW AND ASSESSMENT	Mr. J. Misak Mr. L. Lux	Ms. Z. Naseri Mr. R. Zarghami Mr. A.H. Ekrami
6. INSPECTION AND ENFORCEMENT	Mr. T. Ganchev Mr. M. Svab	Mr. R. Zarghami Ms. S. Rafiei Mr. A. Sedghkerdar
7. DEVELOPMENT OF REGULATIONS AND GUIDES	Mr. M. Svab Mr. T. Ganchev	Mr. M.B. Sebteahmadi Mr. H. Sadeghloo
8. THE MANAGEMENT SYSTEM	Mr. D. Graves Mr. L. Biro	Mr. N. Rastkhah Mr. F. Alamshah Ms. M. Timsar Ms. S. Shirazi

**APPENDIX IV – RECOMMENDATIONS/SUGGESTIONS/GOOD PRACTICES**

<b>AREAS</b>	<b>R: Recommendations, S: Suggestions, G: Good Practices</b>	<b>RECOMMENDATIONS, SUGGESTIONS OR GOOD PRACTICES IDENTIFIED DURING THE MISSION</b>
<b>1. LEGISLATIVE AND GOVERNMENTAL RESPONSIBILITIES</b>	<b>R1</b>	<b><u>Recommendation:</u></b> The Government should support the enactment of a law as soon as possible to assure status of INRA as an effective and independent regulatory body with adequate authority and resources to discharge its responsibilities.
	<b>R2</b>	<b><u>Recommendation:</u></b> The Government should ensure that INRA employs and retains a sufficient number of personnel with the necessary qualifications, expertise and experience to perform the mandated regulatory functions. Some particular cases of this issue are addressed in relevant sections of this report.
	<b>S1</b>	<b><u>Suggestion:</u></b> Adequate attention should be paid to the establishment and the exercise of the emergency response plan prior to the commissioning and on a regular basis.
	<b>R3</b>	<b><u>Recommendation:</u></b> The government should undertake all necessary efforts for the Islamic Republic of Iran to establish specific national nuclear liability arrangements, and to become a party to the international nuclear liability regime.
	<b>R4</b>	<b><u>Recommendation:</u></b> The government should undertake all necessary efforts for the Islamic Republic of Iran to become a party to the Convention on Nuclear Safety and to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

<b>2. AUTHORITY, RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY</b>	<b>S2</b>	<b><u>Suggestion:</u></b> INRA should consider appropriate arrangements, including periodic ad hoc meetings chaired by INRA, with all relevant national agencies to liaise and coordinate its activities with other governmental or non-governmental bodies having competence in such areas as health and safety, environmental protection, security and transport of dangerous goods. These arrangements should cover the interfaces, roles and responsibilities of each authority to ensure that there is comprehensive and consistent safety regulation and oversight.
<b>3. ORGANIZATION OF THE REGULATORY BODY</b>	<b>S3</b>	<b><u>Suggestion:</u></b> INRA should reassess the existing organizational structure to ensure that it is capable of discharging its responsibilities and fulfilling its functions effectively and efficiently according to the new nuclear arrangements in the country.
	<b>R5</b>	<b><u>Recommendation:</u></b> INRA should review expert staffing needs. The review should identify which areas of expertise require more staffing.
	<b>R6</b>	<b><u>Recommendation:</u></b> INRA should develop and implement a recruitment strategy that hires staff with appropriate technical qualifications and experiences and enables INRA to be more competitive in the labour market.
	<b>G1</b>	<b><u>Good Practice:</u></b> INRA management demonstrated a strong commitment to human resources development issues to cope with the rapidly increasing inspection and assessment tasks for BNPP.
	<b>S4</b>	<b><u>Suggestion:</u></b> INRA should assure that consultants' support is independent of the operator.
	<b>S5</b>	<b><u>Suggestion:</u></b> INRA should consider establishing advisory groups including independent experts to provide the management with independent opinions of experts on technical or non-technical issues.
<b>4. AUTHORIZATION PROCESS</b>	<b>S6</b>	<b><u>Suggestion:</u></b> NNSD might consider having a less active role in the qualification of the subcontractors of the licensee.

	<b>G2</b>	<b>Good Practice:</b> The authorization documents are managed in a systematic, well organized and effective way from their submittals to the issuance of the authorizations including the process of review and assessment.
<b>5. REVIEW AND ASSESSMENT</b>	<b>S7</b>	<b>Suggestion:</b> In the NNSD programme for development of a comprehensive system of new regulations, a generic regulatory document specifying safety requirements, acceptance criteria and methods for safety assessment of nuclear power plants in compliance with new IAEA Safety Standards should be considered. Such document should be used for any future plant safety upgrading and updating of safety documentation.
	<b>R7</b>	<b>Recommendation:</b> In view of the current and potential future nuclear projects, sufficient manpower and competence in the area of review and assessment, including deterministic and probabilistic safety analysis, should be available in NNSD for its decision making. A staff development and training programme should reflect these needs.
	<b>S8</b>	<b>Suggestion:</b> In view of present limited availability of in-country expertise for regulatory review and assessment, NNSD should further broaden exchange of information and technical support with IAEA and countries operating similar reactor types.
	<b>G3</b>	<b>Good Practice:</b> NNSD makes effective and efficient use of support in the area of review and assessment from the country of reactor origin.
	<b>S9</b>	<b>Suggestion:</b> NNSD should consider, as part of the management system, developing an internal guidance document on review and assessment (review plan) aimed at verifying compliance of licensee's submissions with the technical requirements contained in new NNSD regulations and current IAEA Safety Standards.

	<b>R8</b>	<b>Recommendation:</b> NNSD should ensure that an independent verification of the safety assessment for BNPP will be performed by the licensee in due time.
<b>6. INSPECTION AND ENFORCEMENT</b>	<b>S10</b>	<b>Suggestion:</b> In connection with the forthcoming transition of INRA into an independent regulatory authority, INRA/NNSD should reconsider its training policy, as well as the effectiveness of its training programmes, to ensure that the adequate level of competency for discharging its statutory inspection functions is achieved and maintained through sustainable development and effective training of its inspectors.
	<b>G4</b>	<b>Good Practice:</b> INRA/NNSD found an effective temporary solution for the training issue related to the need for improvement of the knowledge and practical skills of inspectors. A training programme was developed within the framework of the IAEA Technical Cooperation programme and implementation of the training has started.
	<b>S11</b>	<b>Suggestion:</b> INRA/NNSD should consider review and further development of its policy and programmes in order to gradually achieve self-sufficiency in fulfilment of its inspection functions during the next stages of the BNPP lifetime so not to fully rely on consultants.
	<b>R9</b>	<b>Recommendation:</b> INRA/NNSD should develop the necessary administrative procedures and guidelines to impose enforcement actions, and should consider ways and means to institute prosecution through the legal process in line with the legal system and enforcement practices in The Islamic Republic of Iran.

<b>7. DEVELOPMENT OF REGULATIONS AND GUIDES</b>	<b>R10</b>	<b>Recommendation:</b> INRA should replace in due time the existing ad hoc set of regulations governing the regulatory process with a comprehensive system of national nuclear safety regulations, and supported by the necessary guides.
	<b>S12</b>	<b>Suggestion:</b> The existing procedure for establishment of regulations, codes and standards should be supplemented to include timely and comprehensive consultations with legal support during drafting of regulations and guides
	<b>S13</b>	<b>Suggestion:</b> INRA should allow all interested parties to have the opportunity to comment on proposed regulations and guides in their draft form.
	<b>G5</b>	<b>Good Practice:</b> A broad scope comparison of IAEA, USNRC and INRA safety regulations and guides has been performed to specify the range of regulations and guides to be developed by INRA for the safety regulation of BNPP.
<b>8. THE MANAGEMENT SYSTEM</b>	<b>S14</b>	<b>Suggestion:</b> INRA should continue efforts to develop internal procedures and guidance regarding how to implement its work, both technical and administrative.
	<b>G6</b>	<b>Good Practice:</b> INRA senior management promotes safety culture with the use of positive incentives (letters of recommendation and/or financial incentives) for demonstrated good performance related to safety.
	<b>S15</b>	<b>Suggestion:</b> INRA senior management should develop and clearly identify to the staff, the individual values and behavioural expectations for the staff as well as values that support INRA's mission of promoting safety.

	<b>R11</b>	<b><u>Recommendation:</u></b> INRA should develop ways and means to identify and address the expectations of interested parties in the regulatory process for BNPP.
--	------------	---



**APPENDIX V – REFERENCE MATERIAL PROVIDED BY INRA**

[1]	Vision Statement of INRA, INRA MAP021000/2, 1-mor.1387
[2]	Mission Statement of INRA, INRA MAP021000/3, 1-mor.1387
[3]	Management System Manual, INRA MA0ML01 (2006)
[4]	Description of Function of INRA, INRA MA01D01 (2006)
[5]	Code of Conduct of INRA’S Commission for Decision Making on Licensing, INRA MAWI210-0011, meh.1386
[6]	National Development Plan for INRA, Draft
[7]	Procedure for Corrective/Preventive Actions, INRA QA0PR03 (2006)
[8]	Procedure for Curriculum Administration Procedure and effectiveness, INRA MA2PR01 (2006)
[9]	Procedure of Training Program and Effectiveness Evaluation, INRA MA2W101 (2006)
[10]	Instruction of Committee for Preventive/Corrective Actions, INRA QA0W104 (2006)
[11]	Procedure for Management Self Assessment, INRA QA0PR06 (2006)
[12]	Procedure of Personnel Performance Appraisal, INRA MA2PR03 (2006)
[13]	Procedure for Internal Audit, INRA QA0PR05 (2006)
[14]	Procedure for approach of Produce, change and Documents Control, INRA QA0PR01 (2006)
[15]	Procedure of Establishment of Regulations, Code and Standards, INRANS1PR01 (2006)
[16]	Procedure for Record Control/ Information media, INRA QA0PR02 (2006)
[17]	Procedure for Non-Conformance Control, INRA QA0PR04 (2006)
[18]	Procedure for Nuclear Safety Assessment, INRA NS4PR02 (2006)

## APPENDIX VI – IAEA REFERENCE MATERIAL

- [1] INTERNATIONAL ATOMIC ENERGY AGENCY, Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety, No. GS-R-1, IAEA, Vienna (2000).
- [2] INTERNATIONAL ATOMIC ENERGY AGENCY, Organization and Staffing of the Regulatory Body for Nuclear Facilities, No. GS-G-1.1, IAEA, Vienna (2002).
- [3] INTERNATIONAL ATOMIC ENERGY AGENCY, Review and Assessment of Nuclear Facilities by the Regulatory Body, No. GS-G-1.2, IAEA, Vienna (2002).
- [4] INTERNATIONAL ATOMIC ENERGY AGENCY, Regulatory Inspection of Nuclear Facilities and Enforcement by the Regulatory Body, No. GS-G-1.3, IAEA, Vienna (2002).
- [5] INTERNATIONAL ATOMIC ENERGY AGENCY, Documentation for Use in Regulatory Nuclear Facility, No. GS-G-1.4, IAEA, Vienna (2002).
- [6] INTERNATIONAL ATOMIC ENERGY AGENCY, Application of the Management System for Facilities and Activities, No. GS-G-3.1, IAEA, Vienna (2006).
- [7] INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for Facilities and Activities, No. GS-R-3, IAEA, Vienna (2006).
- [8] INTERNATIONAL ATOMIC ENERGY AGENCY, Safety Assessment for Facilities and Activities, No. GSR Part 4, IAEA, Vienna (2009).
- [9] IRRS Guidelines 2008-06-27
- [10] INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Nuclear Power Plants – Design Safety Requirements, No. NS-R-1, IAEA, Vienna (2000).
- [11] INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Nuclear Power Plants – Operation Safety Requirements, No. NS-R-2, IAEA, Vienna (2000).
- [12] INTERNATIONAL ATOMIC ENERGY AGENCY, Site Evaluation for Nuclear Installations Safety, No. NS-R-3, IAEA, Vienna (2003).
- [13] INTERNATIONAL ATOMIC ENERGY AGENCY, Fundamental Safety Principles, No. SF-1, IAEA, Vienna (2006).
- [14] Draft GSR Part 1– Governmental, Legal and Regulatory Framework for Safety (16 December 2009).

APPENDIX VII –INRA ORGANIZATIONAL CHART

**Organizational Chart of INRA**

