3rd IAEA Steering Committee Meeting on Competence of Human Resources for Regulatory Bodies

Vienna,
28 November – 2 December 2011
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National Reports of the Members of the Steering Committee on Competence of Human Resources
BELGIUM
ABSTRACT

The Belgian nuclear regulatory sector was reorganised in 2008. As defined in the 2010 national report to the IAEA convention on nuclear safety, the Belgian nuclear regulatory body is composed of the Safety Authority FANC and its TSO Bel V. The FANC-Bel V tandem ensures the function of nuclear regulator in Belgium.

A significant effort has taken place since the creation of Bel V in April 2008 for recruiting new people in order to reinforce the resources and expertise of the organisation. Actually, on a total number of about 65 staff members, more than 25 new engineers were hired during the last 3 years resulting in increased training needs.

A structured training approach was adopted on the basis of the IAEA Systematic Approach to Training (SAT). Training programmes were developed for all staff members, and in particular for newcomers, on the basis of the function descriptions and the related needed competencies. Implementation of the training programmes is carried out by different methods depending on the availability of training materials and the adequacy of external courses: self-study, internal training sessions, external courses or on-the-job training.

The training approach is fully incorporated in the Bel V Quality Management System where the role of each key actor is defined: the upper and mid management, the human resources manager, the technical training manager and the coach. In the Bel V practices, the role of the coach is emphasized: he is in charge of the good development of the knowledge, skills and attitudes of its newcomer and of its successful integration in the organisation.

A key element of the initial training of newcomers is the programme of internal training sessions implemented by the technical training manager with the help of experienced experts (mainly from Bel V and FANC) as lecturers. The programme is structured as recommended in the new Systematic Assessment of Regulatory Competencies Needs (SARCoN) guidelines of the IAEA, i.e. with the distribution of training subjects in four quadrants (legal basis & regulatory processes, technical disciplines, regulatory practices, personal & interpersonal effectiveness).

1. Introduction

The safety and reliability of a nuclear installation cannot be achieved solely by the quality of equipment and hardware, but depend also on the competence of all people involved, in particular people from Safety Authorities and Technical Safety Organisations (TSO).

The Belgian nuclear regulatory sector was reorganised in 2008. As defined in the 2010 national report to the IAEA convention on nuclear safety, the Belgian nuclear regulatory body is composed of the Safety Authority FANC and its TSO Bel V. The FANC-Bel V tandem ensures the function of nuclear regulator in Belgium.

A significant effort has taken place since the creation of Bel V in April 2008 for recruiting new people in order to reinforce the resources and expertise of the organisation. Actually, on a total number of about 70 staff members, more than 25 new engineers were hired during the last 3 years resulting in increased training needs in order to bring and maintain the competence of RB/TSO experts to a level commensurate with the state of the art in radiation protection and nuclear safety.

2. Training management

The Upper Management (UM) of Bel V is responsible for the recruitment of new staff members and for ensuring that all personnel involved in safety related work is competent.
Therefore the upper management must initiate a training process in order to provide adequate training and must allocate the necessary resources for training activities. As an example, due to the high number of newcomers, the allocated time dedicated to training was of the order of 20% in 2009 and 18% in 2010 of the total annual work time in Bel V. Other responsibilities of the UM are the establishment of an organisation chart with associated function descriptions and the nomination of a technical training manager (TTM).

The Human Resources Manager (HRM) is responsible for welcoming the new recruits, for working in close collaboration with the TTM for the development of the training system and for developing the qualification requirements for each function. In Bel V, the HRM is the process manager for the processes of the Quality Management System (QMS) related to training (see section 4).

The Technical Training Manager (TTM) is responsible for the development of the training system on the basis of a Systematic Approach to Training (SAT, see section 3) and for organisation and follow up of all training activities on the basis of a global annual training programme. This programme includes in particular the internal classroom training sessions dedicated to the newcomers (see section 5). The TTM should be an experience member of the staff, nuclear safety minded, with management capabilities, organisational skills and a good knowledge of the objectives and activities of Bel V.

A coach/mentor is nominated for each new recruit. The role of the coach is to follow continuously during the trial period (six to nine months) the activities of the newcomer based on daily discussions and weekly reports and to define the initial training programme in collaboration with the TTM and the supervisor. The supervisor takes over the role of the coach beyond the trial period and carries out the yearly evaluation of the newcomer during which the effectiveness of his/her training activities is assessed.

3. Training approach

On the basis of experience gained worldwide, it is agreed that the IAEA SAT (Systematic Approach to Training) is a broad integrated approach emphasizing not only technical knowledge but also skills and attitudes, and is an appropriate methodology to meet the requirements for attaining and maintaining personnel competencies. SAT is an approach that provides a logical progression from the identification of training to achieve these competencies and subsequent evaluation of this training.

According to IAEA, the competence of an individual is his/her ability to put knowledge, skills and attitudes into practice for a given job, knowing that:
- Knowledge represents the theoretical and practical comprehension of a subject;
- Skill is the practical ability to perform a given task;
- Attitude is the feeling, the way of thinking, the perception, the behaviour of a person when performing a task.

A structured training approach is adopted in Bel V on the basis of SAT and consists of five interrelated phases:

4. Analysis of training needs

The training needs depend directly from the educational profile of the trainee and his position in the organisation for which qualification requirements are defined. The training needs are the results of an individual gap analysis, which allows determining the missing competencies of an individual person to fulfil a function or perform a specific job within the organisation.

5. Design of training programmes

Training programmes are developed for all staff members and in particular for newcomers, on the basis of the function descriptions, of the related needed competencies and of the needs resulting from the individual gap analysis.

6. Availability of training courses or materials
In order for a trainee to achieve his/her training objectives, i.e. to be successfully trained on each subject of his/her training programme, adequate training courses and materials must be available. The responsibility to find the best training courses or materials lies with the TTM.

7. Implementation of training
Implementation of the training is totally managed by the TTM, who is in charge of conducting the sequence of training courses and activities to be followed by a trainee, in accordance with his/her individual training programme. The training programmes are implemented by different methods depending on the availability of adequate training courses and/or materials:
- self-study or distant learning,
- internal classroom training sessions,
- external classroom training courses,
- on-the-job training or tutoring,
- conferences, seminars, international workshops.

8. Evaluation of training effectiveness
Continuously during the training process, an evaluation must take place in order to assess the level of knowledge of the trainee and the effectiveness of the training programme. Actually, the real benefits of the training process will be evaluated by assessment of the trainee performance in his/her assigned tasks.

9. Training in Quality Management System
The training approach is fully incorporated in the Bel V Quality Management System (QMS) where the role of each key actor is defined: the upper and mid management, the human resources manager, the technical training manager, the supervisor and the coach.

The subprocesses of the QMS related to training activities are embedded in the main processes A08 (Manage Human Resources) and A07 (Manage expertise):
- A08.02: Define roles and qualification requirements
- A08.04: Organise training
- A07.05: Training of technical staff

As mentioned before, the HRM is the process manager for both processes (A07, A08), therefore the coordination is optimal for the organisation of all kinds of training activities (technical and non technical) and the implementation of the training programmes.

In the Bel V practices, the role of the coach is emphasized and fully reflected in the procedures related to subprocess A07.05: he/she is in charge of the good development of the knowledge, skills and attitudes of the newcomer during his/her trial period and of his/her successful integration in the organisation. One important role of the coach is to advice the UM, in agreement with the supervisor, on the decision to give a definitive contract of employment to a new recruit; this decision is mainly taken on the basis of the following criteria:
- Verify the spirit of synthesis and the writing capacities of notes or reports,
- Verify the sense of organisation and the respect of requested deadlines,
- Verify the adaptability to the type of work of a TSO like Bel V, as well as the ability for team working, in particular with colleagues and supervisors,
- Assess the ability to assimilate new technical matters and to work on its own, without close supervision.

10. Training programmes
Individual training programmes are established for each staff member, in particular for newcomers but also for experienced experts (refreshment training) and for experts who are candidates for an official licence as, so-called, “class I” or “class II” experts, which is delivered by the Scientific Council of the FANC. Such programmes are developed by the
supervisors in agreement with the trainee and are based on individual gap analyses from which the training needs are identified.

Most of the training efforts in Bel V are directed towards the newcomers. An initial training programme of a newcomer includes the following types of training:
- Familiarisation with the practices of work in Bel V (duration of about one month)
- Basic technical training (requested for all technical staff members)
- Specific technical training (specific to the position)
- Non technical training (communication, meeting techniques...)

A key element of the initial training of newcomers, as part of the basic technical training, is the programme of internal classroom training sessions implemented by the TTM with the help of senior experts as lecturers (mainly from Bel V and FANC). The current programme is provided hereafter: it is structured as recommended in the new IAEA Guidelines for Systematic Assessment of Regulatory Competencies Needs (SARCoN), i.e. with the distribution of training subjects in four quadrants:
- legal basis & regulatory processes (Q1),
- technical disciplines (Q2),
- regulatory practices (Q3),
- personal & interpersonal effectiveness (Q4).

23 technically oriented sessions (i.e. for the 3 first quadrants) are planned in this internal training programme, which started in October 2009. 14 sessions have been organised since then and 2 are already planned in the next months. Of course each already given session could be rescheduled, if needed.

For the last quadrant, as it focuses on non technical training, the development of the skills and attitudes of experts through such kind of training is usually outsourced.

A particular case is the training needed for the staff members who are candidates for an official licence as class I or class II experts. There are 3 main conditions to get such a licence:
- University Engineer or University Graduate,
- Basic training at university level in radiation protection of a duration of 120 hours,
- Experience judged to be sufficient in nuclear sciences and radiation protection (RP).

A specific training programme is therefore developed, including not only the RP course, but also advanced training in other subjects related to regulatory control, nuclear safety and reactor technology (if needed).

In addition, for a class I inspector (for NPPs), a specific training on a full scope simulator is foreseen (duration of 4x2weeks).

To be complete, the individual training programmes include on-the-job training (OJT) for all staff members, in particular on-site OJT for future inspectors, and also refreshment training for more experienced people, such as participation to conferences, seminars and international working groups.

One of the roles of the TTM is to ensure a good coordination between all types of training activities: this is done by means of a global annual training programme where all training events are listed with the name of Bel V participants and the date and duration of the event.

11. Conclusions

Bel V is a young organisation, created in April 2008 as a subsidiary of the Belgian Safety Authority FANC. Significant efforts have been undertaken to recruit new experts most of the time without any previous experience in the nuclear & radiation safety fields. Therefore a structured training approach has been developed and implemented for strengthening the competence of the Bel V experts and consequently ensuring the level of expertise required for a TSO. This was a very big challenge for Bel V in the recent years.
It can be stated that the efforts have been successful because most of the newcomers are well integrated in Bel V today and Bel V is recognised as a performant TSO both nationally and internationally; of course, continuous improvements of the training system and practices are needed and the Quality Management System will be used to that goal.
## INTERNAL CLASSROOM TRAINING PROGRAMME

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BULGARIA
By: Ms Vera Sabinova

Information about Bulgarian Nuclear Regulatory Agency staff training

Currently the Bulgarian Nuclear Regulatory Agency (BNRA) employs sixty nine experts. The BNRA management stated by a “Declaration on the policy about the staff qualification” its firm understanding that the continuous development of a highly competent and motivated staff is a key factor for completion of its main mission. A special “Strategy for implementation of the policy” is adopted.

The hiring of the BNRA specialists is made following a selection of the candidates on the basis of the results of a competition. The competition is performed according to a procedure including preparing of three issues in writing and a discussion with the candidate.

The majority portion of the BNRA staff consists of specialists obtaining experience in operation of nuclear installations in the area of radiation protection and sources of ionizing radiation or in the management of spent nuclear fuel and radioactive waste.

In 2008 a PHARE project 2004/016-815.01.03 was completed as a result of which special software was developed for assessment of the BNRA staff training needs. The software was developed based on IAEA-TECDOC-1254 taking into consideration the specifics of the BNRA and accounting for the requirements of Safety Standards Series No.GS-R-1 and the IAEA-TECDOC-525. The code allows development of an individual training plan for every expert on the basis of the required competencies for each position. Currently the work continues with development of training plans and programs and training materials.

The BNRA has established a “Training Centre” which is a modern facility for conducting training.

The training of the BNRA staff includes the following:

- Training by the “Public Administration Institute”. It is done in accordance with the “Civil Servant Act” on the basis of annual training plans;

- Training performed by the BNRA on the basis of a “Plan for staff training”. There is an annual training activities schedule and as an average every two months during the working hours a training is being conducted by the BNRA Training Centre. The lecturers are selected from the staff of the BNRA.

- Training of the personnel by participation in the IAEA and other international institutions training courses and workshops.

- Training for new staff. The training of newly hired personnel is performed in accordance with an individual training program. In case the newly hired personnel have not obtained previous NPP experience the training program have to be developed together with Kozloduy NPP Training Centre and implemented by KNPP Training Centre.
CHILE
The competent authority for nuclear and radiation safety in Chile for nuclear and first category radioactive facilities (1st and 2nd category of the IAEA) is the Chilean Nuclear Energy Commission, which runs the Department of Radiation and Nuclear Safety (here and after DSNR).

This department is responsible for ensuring compliance with national and international requirements regarding technology safety, security and safeguards from the nuclear and radioactive facilities in order to prevent the harmful effects of ionizing radiation on human beings and the environment. To fulfill this mission DSNR authorizes, regulates, supervises, controls and monitors all activities related to peaceful uses of nuclear energy developed in the country.

Regarding human resources management, DSNR follows the guidelines provided by the Human Resources Office of the Chilean Nuclear Energy Commission. In this regard it is noteworthy saying that for all jobs in the institution there has been identified transversal competencies as well as some specific ones. The current policy regarding training establishes that the Heads of Departments are the ones who have the responsibility to identify and / or propose the training for their employees.

From the need of the country to evaluate the nuclear option, and considering the eventual separation of the regulatory function from CCHEN in order to constitute an independent regulatory authority, special emphasis has been placed on systematizing the management of people in DSNR. This department is starting to perform this functions and activities, particularly the ones related to education and training of the employees. The objective is to establish a competence management system (including a nuclear knowledge management system) which allows to attract, train, develop and retain the best elements to perform the functions associated with the regulatory process.

Since one of DSNR’s strategic objective is to have a competency management model, it is now necessary, at this early stage, to deep on previously identified competencies at the institutional level and also to identify and specify those relevant competencies to the regulatory processes. To implement this, the competency model proposed by IAEA-TECDOC 1254, "The Four Quadrant Competency Model" was chosen, which was adapted to the Chilean reality. The measurement of training gaps for these competencies was based on the IAEA text: Guidelines for Systematic Assessment of Regulatory Competence Needs (SARCON).

With this objective we proceeded to design an implementation tool for a pilot self-evaluation knowledge, attitudes and skills of professionals in the Department. While there was a diagnosis of the current levels of competencies, it is estimated that the measurement instrument did not allow to do a detailed diagnostic of the competency domain and gaps related to some quadrants, specially number II: Technical disciplines competencies.

As a result of this process we can say that regarding Quadrant I: Legal basis and Regulatory processes, the 2012 training schedule has included the implementation of internal training in order to cover the gaps identified. This will also become the first step toward the transfer of knowledge as an explicit and formal practice.

To cover the gaps detected in the skills related to Quadrant IV: Personal and Interpersonal Effectiveness, some workshops have been identified and they have been included, together with other additional activities, in 2012 training budget.
Finally, for the second phase, the main focus will be on deepening skills: knowledge, skills and Attitudes (KSA's) associated with the Technical Regulatory disciplines and practices (Quadrant II and III). The methodology considers two basic techniques:

1. Technique Suggested for implementation of a Nuclear Knowledge Management System, which consists in the development of knowledge maps for each of the major regulatory processes and practices.

2. Utilise SAT, Systematic Approach to Training, to guide the entire process, from the identification of the tasks required to perform a job, to the design, development and implementation of the training programme to achieve these competencies, and the subsequent evaluation of this training.
EGYPT
By: Mr Ahmed Awaise

Nuclear regulatory infrastructure in Egypt

(Information note)

• Egypt created the Nuclear Safety Centre (NSC) in 1983 and has regulatory experience in RRs and radiation activities.
• NSC is transferred to National Center of Nuclear Safety and Radiation Control (NCNSSRC) by the Decree of No. 47 of 1991, and is considered as technical arm for the Safety and Safeguard matter.

1. EXISTING NUCLEAR INFRASTRUCTURE IN EGYPT

Egypt has two research reactors which provide more training opportunities.
• ETRR-1 (a 2 MWt Russian-Design, tank-type reactor) and the ETRR-2 (an Argentine supplied 22 MWt pool-type reactor). In particular, as a relatively high-powered research reactor, the ETRR-2 is especially relevant for training power reactor operators.

2. Nuclear Education and Training

It exists in Egypt academic institutions qualified in nuclear science and engineering. 7 universities have significant research and/or teaching experience in relevant nuclear and radiation fields.

It exists also many authorities working in research of nuclear materials and technology such as:
• Atomic Energy Authority (Nuclear Research Centre; National Center for Radiation Research and Technology; National Centre of Nuclear Safety and Radiation Control; RW and Hot labs Centre)
• Nuclear Materials Authority,
• Middle Eastern Regional Radioisotope Center
From Sep 2007 (President Announcement), AEA and NCNSRC make effort to develop a new RB and safety culture appropriate for the human resources to regulate all aspects of siting, construction and operation of NPP including inspection and enforcement capabilities.

- Training program is established to train skilled personnel in relevant areas related to regulatory control of NPP safety.

**Continuous Improvements in Regulatory Competence**

- NCNSRC initiated a multi-faceted program to develop and improve nuclear Regulatory competence for its engineers, scientists and other professionals. It conducted orientation and specialized courses locally for the new engineers. Qualifying some of the higher level courses is a requisite for promotion to higher posts.
- It established contacts with several national universities where NCNSRC personnel attended short courses. Also, personnel attend selected courses offered by the AEA. Generally, NCNSRC shared EAEA training programs (including workshops, symposium, etc.).
- NCNSRC made also arrangements with the regulatory body of several foreign countries to train its persons and to develop their regulatory expertise.

Also technical training, knowledge and capabilities of ENRRA employees shall be conducted through competent interaction with the owner/operator, supplier organizations and consultant.

- ENRRA will build human competency through the technical cooperation program with IAEA.

Egypt have initiated many IAEA TC-Projects since 2000:

EGY/9/035 (2003-2006) Title: Regulatory Inspection Practice for Nuclear Installations in Egypt
EGY/9/038 (2009-2011) Title: Regulatory Control Practice on NPP from Pre-construction to Operation Phase

- Egypt is in the way of establishment a new independent and strengthened Regulatory Body
- Comprehensive Practice Training Program for ERB staff (Local and Abroad) has been initiated.
GERMANY
By: Ms Marianne Jelinski

Information Note on training and qualification of the personnel of the German Regulatory Body

The Federal Republic of Germany is a federal system composed of the Federation and the Federal States ("Länder"). Therefore Germany has a federal structure of its Regulatory Body. The structure of the German Regulatory Body consists of the Top German Regulatory Body (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, BMU), the Federal Office for Radiation Protection (BfS), several Regulatory Bodies of the Länder and of several TSOs (several TÜVs and GRS). On the federal level, the BMU fulfills the tasks and functions of the Federal Regulator, while on the Länder level, it is the Länder Regulators (ministries) that are responsible. The Länder execute the Atomic Energy Act – with some exceptions - on behalf of the Federal Government with reference to the nuclear power plant operators. They are responsible for supervision in the context of licensing and supervision. In this respect, they are subject to federal supervision of lawfulness and appropriateness.

For fulfilling the regulatory activities in the nuclear area, in particular licensing and supervision, adequate education and training of the personnel of the regulatory is necessary. Senior technical experts in nuclear technology are retiring. They are replaced by newcomers who need education and training in nuclear technology. Due to the decentralized federal system for licensing and supervision of nuclear facilities BMU, the several Regulatory Bodies of the Länder, BfS and the TSOs care individually for the qualification and training of their staff. In Germany there are none legal requirements concerning the qualification and training of personnel of the Regulatory Body in contrast to qualification and training of personnel of NPPs.

Qualification and training at GRS

GRS organizes the qualification and training of their internal staff and also conducts seminars for regulators. The training concept of GRS includes:

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A team cooperating with the heads of the divisions and departments is responsible for the qualification and training. Due to retiring the persons responsible for qualification and training have changed, and there still will be changes concerning the trainers. Therefore a reorganizing of the training, in particular of the internal courses, is necessary and being conducted. It is intended to create synergies among the different parts of the training concept, e.g. creating jointly used training material for the trainers. An example of a synergy, already used, is that the seminars for regulators are also used for the training of the internal staff.

The seminars for regulators are conducted by GRS. Depending on the subject of the lecture the lecturers are from GRS, the different regulators, from a different TSO (TÜV) or from the licensees.

GRS conducts successfully a trainee programme for the third time. The lessons learned during the former trainee programmes have been implemented. The trainee programme lasts for one year, offers a wide ranging training and consists of basic, advanced and supplementary courses, training-on-the-job and of external courses. The trainees have to pass exams at midterm and at the end of the trainee year. Another trainee programme is planned for 2012.

The responsibility for the training-on-the-job lies with the heads of the divisions and departments.

In case that the GRS cannot offer effective internal courses for certain subjects and in case that practical experience is necessary, courses at qualified external training centres, as the Simulator Centre or the Power Tech Training Centre, are used.

GRS offers a wide ranging internal training programme which can be used flexibly.
JORDAN
By: Mr. Moayyad Alsabbagh

Jordan Nuclear Regulatory Commission

Brief History (1)

- Jordan Nuclear Regulatory Commission (JNRC) was established in 2007 as a successor to the former Jordan Nuclear Energy Commission, established in 2001.
- JNRC is an effectively independent and adequately empowered Regulatory Body.
- JNRC enjoys administrative and financial independence.

The main goals of the JNRC is to work, in coordination with relevant national and international bodies, on achieving:

- Regulating and monitoring the peaceful use of nuclear energy and ionizing radiation.
- Protecting environment and human health and properties from the hazards of radiation.
- Ensuring the availability of conditions and requirements of nuclear safety and security and radiation protection.

Jordan’s Nuclear Project

- Growing needs for energy and potable water.
- Jordan planned to have a nuclear power program.
- First nuclear power plant is planned for 2018–2020
- Began developing infrastructure to support a national nuclear power program (independent regulatory body)
- Upgrading regulatory/legislative framework; human resources; technical capabilities (New divisions in Jordanian Universities for nuclear science and technology).

Nuclear Applications In Jordan (current)

Currently; nuclear applications in Jordan is limited to the usage of:

- Depleted uranium in the shielding of Ir-192 used in industrial radiography.
- Depleted uranium in the shielding of big radioactive (Co-60) used in medical radiotherapy.
- Environmental water samples containing natural uranium and thorium, check sources.
- etc...

**Nuclear Applications In Jordan (Planned)**

- Sub-critical assembly (under commissioning; Operation license).
- World standard multi-purpose research reactor 5MW upgradable to 10 MW (Under construction, PSAR review)
- Planned nuclear power planet (Technology Selection)

**Developing JNRC**

- Development of the regulatory regime is required by JNRC to accommodate Jordan Nuclear Project.
- Safeguards section established to fulfil IAEA obligations in implementing Safeguards and to create State Systems of Accounting for and Control of Nuclear Material SSAC.
- Physical Protection of nuclear material & facilities.

**JNRC Drafting Regulations, Instructions and guidelines**

- Preparation of the legislative framework for the control of nuclear regulations and safety instructions and guides to control the peaceful use of nuclear energy in Jordan.
- JNRC work closely with EU, WorlyParsons, IAEA in drafting and reviewing regulations for Jordan Nuclear Project.
JNRC Drafting Regulations and Instructions.

IAEA

- Regulations on Extracting, mining and processing of nuclear materials.
- Regulation on the Safety of Research Nuclear Installations.

Worley Parsons

- Regulation on Licensing for Nuclear Facilities
- Regulation on Safety of NPP
- Regulations on Emergency Planning
- Regulations on Radioactive Waste Management

European Commission

- Regulation for radiation protection for Nuclear Materials
- Regulation on Fees for Authorization of Nuclear Activities
- Special Statutory Areas around NPPs
- ... 

JNRC licensing Procedures

- Nuclear Safety and Security Directorate was established (NSSD) in 2008 in JNRC to take over the following tasks:
  - Covering the regulatory issues of nuclear materials and nuclear installations.
  - Ensuring the reliability and availability of the safety and security conditions and requirements for nuclear materials and nuclear installations and facilities.
  - Preparation of a system for inventory and accounting of nuclear materials in Jordan under the safeguards agreement applied by the International Atomic Energy Agency.
Training Policy:

JNRC - NSSD recognizes that its most important asset is its employees. It is committed to develop and enhance the competency level of its entire workforce through appropriate professional training and re-training with the aim to maximize their performance, potential and skills. This will enable the organization to achieve its mission and vision through a well-qualified and trained workforce. By increasing the skills and knowledge of the regulatory staff, the organization will achieve confident and highly qualified staff working as an effective and efficient team.

The training needs identified through training need analysis (TNA), will be met through a variety of in-house training activities, workshops, seminars, external trainings arranged both in local and foreign institutes depending on the nature and extent of the requirements deemed necessary. Following are the highlights of the training policy:

(a) JNRC - NSSD will ensure that its entire staff, performing regulatory activities like preparation of regulations and guides, review and assessment, licensing and inspection etc., is knowledgeable, qualified and well-trained for the job.

(b) JNRC - NSSD will ensure that the competence of the employee is maintained at par with International requirement through regular training.

(c) All employees up to the level of Director will receive training. Similarly all employees are required to impart training to others as a part of their core responsibility.

(d) An individual will not be eligible for performing specific regulatory functions independently unless the concerned person has demonstrated competency.

(e) When an individual has demonstrated competency in a particular area, his/her training record will be updated and he/she will be permitted to carry out jobs for which he/she has qualified.

(f) An individual will be required completion of a specified number of training courses for promotion to next grade. The mandatory courses required for promotion to next positions, are described in section 4.0.

(g) Refresher training will be provided, as needed. Such refresher training courses will be organized for experienced inspectors and reviewers on the basis of need, special circumstances, and the necessity of keeping current changes in technology.

(h) Training for a period of two to three weeks annually will be considered as suitable amount of time for knowledge and skill development of an employee. Participation in IAEA sponsored workshops, seminars, meetings etc. will also be considered as part of systematic training program.
LITHUANIA
By: Mr Rimantas Daubaras

Training of VATESI staff
State Nuclear Power Safety Inspectorate (VATESI)
Republic of Lithuania

VATESI Organisational structure

70 positions, 67 currently occupied
Subjects to training

- Civil servants
- Employees, working under a labor contract

Employees, working under a labor contract, can be divided into two main categories according to job functions:
- Experts (employees, who have a long experience and special knowledge in nuclear safety field);
- Services staff (e.g. driver).

Training of civil servants

Training of civil servants, according to the Law of civil service is divided to:
1. **initial training** i.e. the acquisition of knowledge and the development of skills of civil servants recruited to the career civil service.
   - programmes common to all civil servants;
   - obligatory for career civil servants within the first year of appointment;
2. **improvement of qualifications (in-service training)**, i.e. continuous studies, development of special professional knowledge and improvement of administrative skills and abilities at the initiative of the civil servant or a state or municipal institution or agency during the entire term of office or where seeking promotion in the civil service.

Civil servants, on assuming a post in categories 18-20, shall complete the approved training programmes for civil servants of categories 18-20 within two years after their appointment.

VATESI specialists improve their knowledge and to gain experience in such organizations as the US Nuclear Regulatory Commission (NRC), Radiation and Nuclear Safety Authority of Finland (STUK) and in other offices and organizations.
Also VATESI specialists improve their knowledge in the technologies of various types of reactors both by independently studying the information and by taking part in various seminars and training courses.

**Main fields of improvement of qualifications of civil servants**

Groups improvement of qualification programmes, devoted to improvement of skills in:

- Implementing strategic goals of institution;
- Computers;
- Languages of European Union;
- Management of European Union structural funds;
- Legal knowledge;
- Professional ethics and prevention of corruption;
  - Other fields (e.g. interpersonal communication).
Planning of training

According to the Law of civil service, the plants are approved by the head:
1. for current year (or revised* plan of current year);
2. for next year.
*The plan, which was approved as a next year plan must be revised and then approved as a current year plan, e.g. in 2011 the revised plan and a plan for 2012 were approved.

VATESI also has analogical plans for employees, working under a labor contract.

86 % of employees trained in 2010.

Initial internal training

Internal training:
- additional to training of civil servants;
- all new employees must complete it;
- plan is prepared by an immediate superior and approved by the head of VATESI;
- must be completed during a month;
- ensures a better understanding of the internal work of VATESI, of work of different divisions and faster acquaintance with job responsibilities overall.

Internal training plan includes:
1. all internal documents, which are obligatory for the employee to know according to labor laws;
2. main legal documents, concerning particular position;
3. other topics, obligatory to familiarize with, concerning particular position, e.g. work of VATESI emergency response center;
4. for most of the positions – a duty journey to Ignalina power plant.

Other methods of internal training

1. Lectures by VATESI experts or other specialists on different specific topics:
   - allow to share practical experience;
   - allow to share knowledge, gained during formal training.
2. Self study (information available in internet, information of training courses, shared by other specialists)
3. Working together with more experienced specialists
MALAYSIA
By: Ms. Kendija Koster

3rd Meeting of the Steering Committee on Competence of Human Resources for Regulatory Bodies and Seminar on SARCoN (Systematic Assessment of Regulatory Competence Needs)

28 Nov - 2 Dec 2011
Meeting Room M, 1st Floor, Austria Center Vienna (ACV)

Information note on the current situation and recent developments within Atomic Energy Licensing Board (AELB) (regulatory body for atomic energy in Malaysia) in particular relating to the competence and training area:

1. Inspectors/Assessors Certification Program

The goal of the Certification Program is to provide a high level of knowledge and skills in radiological fundamentals for AELB assessors and inspectors, including high values in understanding of the organization’s mission and vision, besides practicing safety culture and be more strategic in planning.

The three levels of the Certification Program are:

i) To certify as Level 1 Assessor/Inspector

AELB personnel are required to undergo four separate training courses and undergo written examination at the end of each training course. The courses are:

a) General Knowledge on AELB and AELB Core Values
b) Core Competencies
c) Specific Technology on Radiation Application
d) Specific Work Procedures

ii) To certify as Level 2 Lead Assessor/Inspector

AELB personnel should have already been certified in Level 1 as Assessor/Inspector. They will be required to undergo four separate training workshops and undergo an evaluation at the end of each workshop. The workshops are:

a) General Knowledge on AELB and AELB Core Values
b) Core Competencies
c) Specific Technology on Radiation Application
d) Specific Work Procedures with Practical Evaluation

iii) To certify as Level 3 Expert Assessor/Inspector

AELB personnel should have already been certified in Level 2 as Lead Assessor/Inspector. He/She will be required to prepare two dissertations and give two presentations in front of their peers and an evaluation panel in a workshop.

2. Certification of Research Reactor Inspector
The Research Reactor Inspector Certification Program is designed to ensure the development of competency in the four general areas of:

i) Legal Basis and Regulatory Processes
   - Understand AELB's legal basis and the regulatory process.

ii) Technical Expertise
   - Understand the technology and apply concepts, in various technical areas, to allow AELB to carry out its overall responsibilities.

iii) Regulatory Practices
   - Master the techniques and skills needed to collect, analyze, and integrate information using a safety focus to develop a supportable regulatory conclusion.

iv) Personal and Interpersonal Effectiveness
   - Have the personal and interpersonal skills to carry out assigned regulatory activities either individually or as part of a team.

3. Master in Nuclear and Radiation Safety (university collaboration)

All candidates in this programme must follow the curriculum structure which contains 46 credit hours. Students must pass all 46 credit hours to be awarded the Master of Science degree and are subject to the Master and PhD Graduate Studies Act published by Graduate Studies Center by National University of Malaysia (UKM).

Objectives of the programme are:

i) To prepare and to develop competent, skilful and professional human capital in the field of nuclear and radiation safety in line with rapid progress in radiation technology in the industrial sector, medicine and health in the world.

ii) To fulfil a vision of academic excellence in the field of radiation and nuclear safety.

iii) To establish Malaysia as an educational hub of higher learning in the field of radiation and nuclear safety.

4. Master in Nuclear Safety, Security and Safeguards (university collaboration)

The Programme is under development where the curriculum structure contains 46 credit hours. Students must pass all 46 credit hours to be awarded the Master of Science degree and are subject to the Master and PhD Graduate Studies Act published by Graduate Studies Center, UKM.

Prepared by:
Monalija Kostor
Atomic Energy Licensing Board (AELB)
MEXICO
Experience in the Mexican Nuclear Regulatory Body in the Systematic Approach to Training

By Jose Luis Esquivel Torres

To implement its mission, the Nuclear Safety Branch (NSb) of the Mexican Nuclear Regulatory Body (CNSNS) is organized into three Departments:

1. Assessment Department (AD): Licensing, modifications to licenses, and events.
2. Operational Verification Department (OVD): Inspection and auditing.
3. Regulatory Actions Department (RAD): Regulatory framework and Enforcement support.

NSb employs 31 engineers and scientists in areas like Physics, Chemical Engineering, Civil Engineering, and Mechanical Engineering with an average experience of 17 years. Four people are graduated in Physics, 16 are graduated in engineering, 9 own a M. of C. or a M. of Eng. degree, one M. of C. in Management, and 1 PHD in Nuclear Engineering.

In last decade, NSb staff has made efforts to implement the Systematic Approach to Training (SAT) methodology, based on the IAEA TECDOC-1254, to help in the designing of an Annual Training Program (ATP) linked with the organizational task and vision. Though, personnel dedicated to the task have proved to be scarce in number and not qualified enough.

In 2006, NSb established an agreement with a contractor to carry out a competency-based Training Needs Assessment (TNA). The TNA was undertaken to update NSb training program considering the new tendencies in regulation (e.g. the risk-informed and performance-based regulation) to be adopted by the CNSNS. The project consisted mainly of the Tasks and Competences Analysis, followed by the Design of training activities. The potential training activities were enounced only in terms of desired competences to develop.

The product consisted of a database containing the results of the TNA (i.e. Task tables, Competences tables, Training courses tables, Aims of training courses and Certification Cards).

The analysis conducted by the contractor was useful and instructive about the methodology, but did not cover all the positions and it was considered necessary by the staff of NSb to retake the TNA in order to incorporate the missing positions to the study and, at the same time, to adjust some details found in the revision of the First Part.

Although the SAT has not been implemented yet by NSb, the analysis and discussion involved in the revision of the delivered products have resulted in an aware conscious about training and its aims, as a valuable output that has been applied in the management of the training.

The next figure illustrates the tendencies in the compliance of NSb with its Annual Training Program for last six years.
Nuclear Safety Branch Annual Training Program 2011
(Reported Activities / Programed Activities) X 100
Staff Training Issues and Competence Assurance in the National Commission for Nuclear Safety and Safeguards. Current situation and developments

The National Commission of Nuclear Safety and Safeguards, the regulatory organism in Mexico, has about 200 employees, organized in four units, three of them having the substantive technical activities:

- Radiological Safety;
- Nuclear Safety, and
- Technology Regulations and Services

Every unit has its own procedure to diagnose, detect, and determine the training need of its personnel. In a broad way, they recruit persons that fill some requirements, subject to certain guidelines, which are the job descriptions. Nevertheless, the annual training program is prepared mainly by the chief of every person, situation that until now isn't deemed a satisfactory practice.

In order to affront such state of facts, the Training and Dissemination Area was commissioned to perform a Training Needs Assessment since last year.

To perform this task, we developed a strategy that includes questionnaires and interviews and we start from a general scheme about the task and duties that every worker have, according to their own job description. Our goal is to do a Systematic Approach to Training (SAT) according to Tec Doc 1254.

We began with the unit of Technology, Regulation and Services. The one in which Training and Dissemination Area is part. Our results have shown discrepancies between the competencies defined in every job description and the competencies demanded by the work needs. In other words, the staff is undertaking task not coincident with the task that they should be performing according to the job description. This is the principal problem we have faced and it is also why we cannot end our TNA and set a training plan according to our regulatory needs.

Due to the CNSNS is part of a government organization (the Ministry of Energy), we have to adopt some guidelines about the training of the employees, that most of the time don't have relation to our needs as a regulatory body; however, there have been some opportunity areas to execute a better training program in obligatory topics and we start to make some e-learning courses in the Moodle platform. Now these courses let us to understand that they could be a valuable option to train several people in some specific subjects, for example in radiological protection, ethics code assimilation and nuclear safety.
MOROCCO
By: Mr Rachid Barkouch

Information note on the current situation and recent developments within Moroccan Regulatory Body.
National Centre for Nuclear Energy, Science and Technology (CNESTEN)

I- Current situation:
The current legal framework in Morocco makes a separation between nuclear activities and activities involving radiation sources. So, two different Regulatory Authorities exist: Nuclear Safety Authority and Radiation Safety Authority.

• Nuclear Safety Authority:
A decree n°2-94-666 of 7 December 1994, relative to nuclear facilities licensing and supervision designates Ministry of Energy and Mine (MEM) as Nuclear Safety Authority in charge of regulating nuclear installations.

Functions: Authorization, review & assessment, regulations, and inspections of nuclear installations.

Human resources: a small group supported by:
- National Commission of Nuclear Safety (CNSN) consisting of representatives of various ministries and technical experts that assess and give advice on matters of nuclear safety during the licensing process of nuclear installations.
- National Centre for Nuclear Energy, Sciences and Technology (CNESTEN) acting as a Technical Support Organization (TSO).

Experience on licensing nuclear installation: Four Licenses were issued during the licensing process of the first research reactor within the country: Construction license on 1999, Gaseous and liquid discharge license on 2005, Commissioning license on 2006, and Operation license on 2009.

• Radiation Safety Authority:
A decree n°2-97-30 of 28 October 1997, relative to protection against ionizing radiations designates the Ministry of Health through National Centre of Radiation Protection (CNRP) as Radiation Safety Authority in charge of regulating all activities involving radiation sources.


Human resources: ~ 52 personnel (70 % technical stuff).

Infrastructure: Calibration and dosimetry laboratory, environmental monitoring laboratory, Radio toxicology metrology, radiation and contamination measurement instruments, emergency unit.

II- Recent developments:

• Upgrading regulatory framework:
A new law related to nuclear and radiological safety & security drafted in full compliance with the international standards is being now under promulgation process.

The enactment of this new law will result in the establishment of an effective, independent and empowered new Nuclear Regulatory Authority named “Agence de Sûreté et de Sécurité Nucléaires et Radiologiques (ASSNR)”.

The “ASSNR” remit covers nuclear and radiation safety and other aspects such as security and safeguard, etc.

- **Capacity building for the future Nuclear Regulatory Authority “ASSNR”:**

A working group which is a subset of the Nuclear Power and Desalination Committee (PRE NEPIO) is currently working on how the “ASSNR” should be structured, staffed and resourced drawing on the experience of other nuclear countries.

Also, several actions through international cooperation have been undertaken:

- Multilateral cooperation with IAEA and European Commission to upgrade regulatory framework and to strengthen professional capacity of the Nuclear Safety Authority and its Technical Support Organization (CNESTEN).

- Bilateral cooperation with the “Institut de Radioprotection et de Sûreté Nucléaire (IRSN)” to enhance CNESTEN’s capabilities in the field of Safety Assessment.

- Bilateral cooperation with US-Department of Energy (DOE) to strengthen regulatory capabilities of the Nuclear Safety Authority.
PAKISTAN
Competency Development at Pakistan Nuclear Regulatory Authority (PNRA)

Pakistan Nuclear Regulatory Authority (PNRA) was established in 2001 as an independent regulatory body to regulate the country’s nuclear program and radioactive installations. The key responsibilities include authorization, regulatory review and assessment, licensing of nuclear installations, inspection and enforcement, and establishment of safety principles, regulations and guides.

Ageing of existing nuclear workforce and the disappearance of nuclear knowledge has been a great concern worldwide. Therefore right from its establishment, PNRA focused on preservation of nuclear knowledge and ensured that knowledge and skills of the current generation of experienced nuclear professionals are transferred effectively. PNRA established a School for Nuclear and Radiation Safety (SNRS) to develop the new and younger generation with relevant education and skills to replace the ageing nuclear workforce.

In order to provide structured and professional training, training need assessment (TNA) was initially carried out for its employees based on the IAEA four-quadrant competency model given in TECDOC-1254. This study consisted of following steps:

(a) Identification of the desired competency of various directorates

(b) Identification of the existing competency of the regulatory staff

(c) Conducting gap analysis to determine the training modules for personnel working in specific directorates depending on their job responsibilities

(d) Identification of the training needs of every individual

The study was completed in early 2004 based on which a number of training modules for junior, intermediate and senior levels were identified to fill the gaps. The study allowed all staff members of PNRA to go through a structured program of knowledge acquisition consistent with their current job duties as well as their future assignments. The competency development program focused on the education and training as well as coaching and mentoring of staff members both at the School and at the regional offices.
During this TNA study, data of around 40 officers was collected, however, the strength of manpower increased to more than 200 with time, and therefore, there was a need to repeat the study again.

A second TNA was performed during 2009-10 and collected data of over 200 technical officers. SARCoN questionnaire with slight modification was used in this study and gap analysis was carried out. In this study the required competencies for senior, intermediate and junior regulators were identified through Directors and Project Directors of the concerned directorate. Then the questionnaires were distributed amongst technical officers of various experiences and the existing competency level was determined. The required competencies were compared with the existing competencies and gaps were found out. The results of the gap analysis were then used to determine the training needs to fill the competency gaps in various directorates. Figure 1 shows a flow diagram of the mentioned methodology.

Based on these competencies, a number of strategies were identified for each directorate and a comprehensive training plan was devised for all job positions. A total number of 58 in-house training courses were identified. These courses will be conducted at School for Nuclear & Radiation Safety (SNRS). As an example, training courses identified for Center for Nuclear Safety (CNS) are given in Figure 2. Similarly, a number of other specialized courses were identified and will be arranged at the premises of other national & International Organizations.

PNRA has a comprehensive training plan for their employees, especially for the young comers, who join the organization after completing their graduation. This training plan is given in Figure 3.
**Figure 1:** Training Needs Assessment (TNA) Methodology at PNRA

**Figure 2:** Training courses for Center for Nuclear Safety
Figure 2: Training plan for technical staff of PNRA
RUSSIAN FEDERATION
Information note

By: Ms Elena Sokolova

Current situation

within Russian RB (Rostechnadzor) relating to the competence and training area.

Russian Regulatory Body (Rostechnadzor) is responsible for licensing and oversight of nuclear and radiation safety facilities and activities. It has the formal document “HR training and development regulation” (2008) - a kind of the regulatory guidelines on staff professional training, the written HR policy is absent.

This document establishes:
- Forms/kinds of professional trainings (initial trainings, raising the level of skill, retraining, probation period);
- Training preparation procedures (applications, annual planning, budget, competitive base);
- Annual administrative control procedures (responsible officers).

The document doesn’t establish:
- The contents and substance of training programs;
- The necessity of “individual educational trajectory”;
- Training needs assessment procedures;
- Long-term planning for future needs (critical knowledge loss, competency gaps etc.).

The post description (and not the competency model) is using in Rostechnadzor to define the needed level of personnel proficiency for each professional position. So that the HR system takes into account “what is needed” on the first step when making a contract. Post descriptions specify requirements to the basic education and professional experience (including required knowledge of nuclear facility safety issues).
The RF regulatory system (Rostechnadzor) uses about 1,5 thousand professional employees (in the regional Departments, + central offices, + dependent organizations and TSOs). Rostechnadzor takes junior graduates and experienced professionals but preferably the latter. The age span of new recruits varies significantly (aged from 24 to 55 years old).

It takes from several months to 3 years to qualify a new recruit to the RB to perform the regulatory duties. In this qualification period no more than month in a year is allocated to formal training. Roughly training time is split between different training courses in such proportion: formal training courses (external/internal) – 10%, self-study – 30%, on-job training – 50%, other training – 10%.

There are external (RF) organizations providing education and training to Rostechnadzor. These are licensed and certified organizations that are selected through bidding process based on the specific formal procedures. Rostechnadzor uses the licensee training materials related to the specific technology, the IAEA training materials and others.

The cost of the formal training for the Rostechnadzor professional staff is strictly regulated by the government as the cost of state civil service staff training and is now fixed at the level up to 385 USD per person per training course. Cost is the same for the recruits and for refresher trained personnel. Number of Full Time Equivalent trainees is about 1% of the Rostechnadzor regular staff quantity. Regulatory Body staff time is allocated to in house training no more than 2 weeks in a year.
UNITED KINGDOM
OFFICE FOR NUCLEAR REGULATION (ONR)

LEARNING AND DEVELOPMENT OVERVIEW

The Office for Nuclear Regulation (ONR), as part of Great Britain’s Health and Safety Executive (HSE) has a strategic goal ‘To reduce the likelihood of low frequency, high impact catastrophic incidents, whilst ensuring that Great Britain maintains its capabilities in those industries strategically important to the country’s economy and social infrastructure’. ONR’s mission is ‘Securing the protection of people and society from the hazards of the nuclear industry’. ONR is currently transforming itself to become an independent statutory organisation (independent of HSE), whilst maintaining its reputation as a world-leading nuclear regulator.

ONR is presently one of several operational arms of HSE and is responsible for regulation of:

- Civil nuclear power stations
- Nuclear chemical and research sites
- Nuclear facility decommissioning activities
- Aspects of defence related nuclear facilities
- Civil nuclear security
- Transport of radioactive materials
- Operational safeguards, and
- Nuclear research and strategy in Great Britain

It also has oversight of conventional health and safety risks at sites where it regulates nuclear safety.

To achieve the ONR mission and to be an effective, efficient, consistent, open and transparent regulator the organisation embraces a culture of continuous improvement. ONR clearly recognises that it is through the skills, knowledge and experience of its staff that it maintains its efficiency and effectiveness.

ONR is a competence based organisation with identified competences for nuclear safety inspection. These competences are currently being developed and extended out to cover all the work of ONR. ONR’s policy on the training and development of staff is to:

- Provide continuous professional development in organisation, regulatory, technical and behavioural capabilities, and
- Maximise the potential of staff, taking into account business needs and ONR’s aim to provide a worthwhile, challenging and varied career.

The specific competences required for each function and individual are identified in coordination with the line management activity, based on the principles of training needs analysis. The competences are attained through the development of Knowledge, Skills and Attitudes (KSAs), achieved through training, appropriate
mentoring, and operational experience. During the development of the areas of competence the line manager is required to assess whether:

- More development is required
- Whether there has been an adequate attainment of a competence
- Whether the individual has developed their competence to a stage where they are now capable of guiding and mentoring others in their development of competences.

The assessment process is captured through the performance agreement process, with any development needs addressed through a Development Action Plan (DAP).

Training to provide knowledge is available through a number of methods. Primarily it comprises centrally organised workshops and lectures, as part of a defined learning and development curriculum. This training is largely delivered by in-house ONR staff, to ensure that the training is focussed on the operational work of ONR, and is underpinned by sound regulatory knowledge and experience. On-job training is also used to provide tailored training in matters key to a specific function; this is guided by the line manager and facilitated by existing experienced staff to ensure transfer of expertise. Finally, where the knowledge, skills and attitudes are not easily provided from within ONR, the organisation is able to access recognised sources of expertise in the commercial and academic sectors.

21 Nov 2011
VIETNAM
By: Mr Le Chi Dung

**Information note on the current situation and recent developments of human resource within VARANS**

**1. VARANS duties and authorities**

Duties and authorities of VARANS (Vietnam Agency for Radiation and Nuclear Safety) have been specified in the Atomic Energy Law as the followings:

1) develop draft legal documents on radiation and nuclear safety;
2) organise for the notification of radioactive substances, radiation equipments, nuclear material, nuclear equipments, and to license for conducting radiation practices in accordance with its competency;
3) conduct and organise verification on radiation and nuclear safety;
4) carry out checking, inspection; to handle violations against regulations on radiation and nuclear safety; and to suspend radiation practices in accordance with its competency; to recommend to the relevant State competent authority to suspend operation research reactor and nuclear power plant if suspecting there is unsafe factor;
5) organise nuclear control activities in accordance with provisions by laws;
6) take part in emergency response to radiation and nuclear incidents within its competency;
7) establish and maintain the national information system on radiation and nuclear safety;
8) organise and cooperate for professional trainings on radiation and nuclear safety;
9) carry out international cooperation activities in radiation and nuclear safety.

**2. Current situation and recent developments**

**Current situation**

- At present VARANS has 90 persons, but more than 80 of them have been recruited during last 5 years, young and non-experienced;
- Timing of nuclear power project implementation is pressing: site approval in 2012-2013, construction start in 2014-2015, and operation start in 2020-2021;
- Priority in human resource development is given competency for legal document development and nuclear safety assessment.

VARANS is planning to recruit and train 200 staff members including personnel for its own TSO during next 5 years.

**Training**

*With Russia*

- Basic training (15 weeks) on nuclear technology and safety at ROSATOM for 10-20 persons;
- Basic training (5 months) on regulation development at ROSATOM for 3-4 persons.

*With Japan*

- Basic training (10 weeks) at JNES for 15-20 persons;
- Hand-on training (2 weeks) on SAR of the reference reactors for 5-10 persons;
- On-the-job training (2 months) on DSA and PSA at JNES for 2-4 persons;
- Advanced training (1 year) at JNES and follow-up PhD and Master Study at other Japanese institutions for 2-4 persons (Team Leader training).
With other States and IAEA

- Training courses (1 week) on siting, design, safety assessment and other subjects at VARANS;
- PhD and Master Study in the US, France and Korea (Team Leader training).