

**IAEA  
INTERNATIONAL SEISMIC SAFETY CENTRE  
(ISSC)**

**“REGIONAL TRAINING COURSE  
ON SITE SELECTION AND  
EVALUATION OF NUCLEAR  
INSTALLATIONS”**

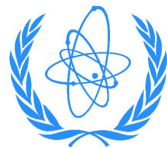
**14-18 March 2011**

**Bariloche, ARGENTINA**

**Instituto Balseiro**

***Comision Nacional de Energia Atomica de Argentina***

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**INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)**

**INTERNATIONAL SEISMIC SAFETY CENTRE (ISSC)**

## **“Regional Training Course on Site Selection and Evaluation of Nuclear Installations”**

**Hosted by**

*Comision Nacional de Energia Atomica República de Argentina*

**14-18 March 2011**

### **INFORMATION SHEET**

#### **Background:**

The selection and the evaluation of a site for a nuclear power plant are crucial parts of establishing a first nuclear power plant programme in a country and it can significantly affect the costs, public acceptance and safety of the installation during its complete lifecycle.

The outcome of this task of the programme, at its initial stages, may even affect seriously the final success of the programme. Poor planning and execution, lack of information and knowledge on applicable international safety standards and recognized practices have led in the past to faulty decision making and major delays either at the construction or at the operational stages of a nuclear power plant project.

It has been seen in many examples in Member States that faulty decisions in the site selection stage may also require major resource commitments at a much later phase of the project. The IAEA has been involved in many projects where the site related design parameters were changed during the plant operation stage and, consequently, re-evaluation and upgrades were required to be performed on existing plants, with costly shutdown periods.

Site selection is a multi-faceted process where safety considerations largely dominate and provides two distinct levels of defence in depth:

- The first level in site selection is preventive and aims at decreasing the exposure to external hazards. It involves a comprehensive process of screening out sites where hazards are too important and a proper determination of design basis for possible sites is done.
- The second level is mitigative and aims at decreasing the impact on the environment. It involves the selection of a site with good dispersion characteristics of radionuclides in the air and water and also a favourable terrain and infrastructure for the implementation of an emergency plan in case of an accident.

Considering all that, the IAEA strongly recommends that the site selection process be guided by a clearly established set of criteria or regulatory requirements from the very beginning. This is of particular importance for those aspects that can exclude sites due to unacceptable conditions. On the other hand, a global balance has to be established between the characteristics of a site on the one hand, and specific design features, site protection measures and administrative procedures on the other hand, in order to obtain an acceptable solution. IAEA safety standards provide a strong basis to establish such a balance and for site selection in general.

Other important element to be considered is the need for adequate support for performing this task at the initial stages of the first nuclear power plant project to the institutions involved on it. At the first phases of such programme, usually, the nuclear project organization lacks expertise in the site related topics, in one hand, while on the other hand, the national specialized institutions with such expertise lack experience in nuclear power projects.

Because of this, a balance is needed to equip the nuclear project team with sufficient knowledge to be an 'intelligent customer' on the subject. On the other hand, it is necessary to provide adequate training to those specialized institutions before they start their contractual work in relation to the site selection tasks.

The IAEA has a complete and comprehensive set of safety standards (requirements and guides) dealing with all site related aspects. This set of safety standards was developed since the 70s and has been revised periodically accounting from developments on the practice and the methodologies, as well as from the experience and lessons learned from the occurrence of strong natural events in a continuous improvement process. Besides that, the well recognized IAEA Site and Seismic Safety Review Services were provided to more than 50 Member States during the last 30 years, in more than 250 missions, assisting in the review of more than 40 nuclear installations sites around the world, collecting and sharing facts and findings and providing recommendations on how to resolve the issues found.

At the IAEA, the International Seismic Safety Centre (ISSC) at the Nuclear Installation Safety Division of the Nuclear Safety and Security Department is in charge to deal with this area, developing the related safety standards, organizing and conducting the related safety review services which include also all capacity building activities (training courses, workshops, experts meetings, dissemination of databases, etc.).

In conclusion, there is an increasing need from many Member States starting their first nuclear power plant programmes to initiate activities on selecting an adequate suitable site for locating the nuclear installation and, at that time, to avoid mistakes that should be costly resolved at later stages.

As a response to that need and taking into account the necessity of common understandings on the complexities involved in the problem to be resolved, on the new approaches and ideas to be used, on the requirements and challenges to be faced, it is proposed to conduct, first, capacity building activities in the form of regional workshops, in different regions of the world, aimed to make aware and to train experts of those countries on all related aspects of the site selection and site evaluation for nuclear installations and to identify what, how and when to do what shall be done well.

In this context, the Comisión Nacional de Energía Atómica de Argentina (CNEA) -as participant to the ISSC extra-budgetary project on seismic safety- has offered to host this regional course for experts of Latin America countries interested on or involved on activities embarking for implementing their first nuclear power plant programme. Through one week course and discussion, the meeting will offer the opportunity to experts from Latin America countries to receive updated information on the subjects and to learn how to define the required actions for performing the specific tasks.

Members of the Scientific Committee of ISSC who are related to the topics to be presented will be invited to the meeting as keynote lecturers to provide valuable and updated information on related fields.

### **Purposes of the course and framework:**

The purposes of the training course are (i) to train representatives from countries embarking on their first nuclear programme on topics related to site selection and evaluation and on the current suite of IAEA safety standards on these topics; (ii) to disseminate the lessons learned from recent strong natural events and to discuss their impact on the revisions to the safety standards; and (iii) to assist with the identification of actions to be undertaken by each country at the start of their nuclear programme.

This training course is organized within the framework of the Component 1 – Enhancing the seismic safety of Nuclear Installations of the EC-IAEA Agreement on cooperation in the field of nuclear safety-2009 Package – NIS Part. It corresponds to Task 4 in relation to capacity building activities for newcomer countries.

**Venue:** **Argentina, Bariloche**  
Instituto Balseiro - Centro Atómico Bariloche  
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Email: [IAEA-2010@cab.cnea.gov.ar](mailto:IAEA-2010@cab.cnea.gov.ar)

**Date:** **14-18 March 2011**

**Main topics:**

- Site selection and evaluation process for nuclear power plants, safety and non-safety related aspects: with emphasis on site survey, and site selection and assessment stages. Exclusionary and ranking criteria. Details of the process: work plan, scheduling and interfaces.
- Site selection and evaluation criteria in relation to external hazards: (i) seismic hazards, (ii) meteorological and hydrological hazards, (iii) volcanic hazards, and (iv) human induced hazards (aircraft crash, explosions, toxic releases). Geotechnical aspects and soil instability hazards. Determination of related design bases.
- Site selection and evaluation criteria in relation to: (i) site characteristics for dispersion in air, soil and water (surface and underground), (ii) population density and distribution, (iii) feasibility of implementation of emergency plans.
- Monitoring and Management System.
- Non-safety related aspects: site development, infrastructure needs, grid connection, etc.

**Language:** **English (no simultaneous translation will be provided)**

**Workshop Contact Persons and Lecturers:**

**CNEA:**

Training Course Director: Mr. Jose Luis Freijo, CNEA [freijo@cnea.gov.ar](mailto:freijo@cnea.gov.ar)

Training Course Organizer: Ms. Patricia Rasmussen [patricia.rasmussen@ib.edu.ar](mailto:patricia.rasmussen@ib.edu.ar)

**IAEA:**

Scientific Secretary: Mr. Sujit Samaddar, Head of ISSC/NSNI [s.samaddar@iaea.org](mailto:s.samaddar@iaea.org)

Contact Point: Mr. Shin Morita, IAEA/ISSC [S.Morita@iaea.org](mailto:S.Morita@iaea.org)

**IAEA Experts Team:**

Mr. Sujit Samaddar, Head of IAEA/ISSC, Team Leader (SS)  
Mr. Antonio R. Godoy, IAEA/NSNI/ISSC (ARG)  
Mr. Chuck Connor, USA (CC)  
Mr. Robert Harvey, USA, NRC (RH)  
Mr. Karl-Heinz Lehman, GERMANY (KHL)  
Mr. Jorge Riera, BRAZIL (JR)  
Mr. Jose Sanchez Cabanero, SPAIN (JSC)  
Mr. Rodolfo Saragoni Huerta, CHLE (RSH)  
Mr. Ramon Secanell Gallart, SPAIN (RSG)  
Mr. Francois Schindele, FRANCE (FS)  
Ms. Tomas Katona, HUNGARY (TK)

## Participants from Latin America countries:

It is expected the active participation of experts from Latin America countries from institutions dealing with the implementation of nuclear power plant programmes, at (i) high level planning management and at (ii) the specific groups dealing with the site selection and evaluation tasks, from the managerial to specialized technical levels.

The participants from Member States of the region will present their case studies, the status of development of their plans in relation to site selection and evaluation for the nuclear power plant project, and the specific issues to be resolved for getting the site approval permit.

## PROGRAMME (TO BE ADJUSTED)

### Structure of the Programme:

	Day 1	Day 2	Day 3	Day 4	Day 5
0830-1030	Session 1	Session 5	Session 9	Session 13	Session 17
1030-1100	Coffee break				
1100-1300	Session 2	Session 6	Session 10	Session 14	Session 18
1300-1400	Lunch break				
1400-1600	Session 3	Session 7	Session 11	Session 15	Session 19
1600-1630	Coffee break				
1630-1800	Session 4	Session 8	Session 12	Session 16	Session 20

### DAY 1 MONDAY:

#### **Session 1: OPENING SESSION**

08:30 – 09:00 Registration

09:00 – 09:30 Welcome & Opening Ceremony

Opening remarks (CNEA, IAEA, IB)

Aims and objectives of the Training Course, (SS)

Introduction of Participants

Orientation information

09:30 – 10:30 Lecture 1: IAEA - Global Nuclear Safety Regime and IAEA Safety Standards (SS)

10:30 – 11:00: Coffee break

#### **Session 2: SITE SELECTION AND EVALUATION – METHODOLOGICAL APPROACH**

11:00 – 13:00 Lecture 2: An integrated approach for site selection and evaluation for a NPP project - Site Selection Process – IAEA Safety Guide 50-SG-S9 (DS433), Licensing Process and the Phases of Site Selection (DS424). (ARG)

13:00 – 14:00: Lunch break

**Session 3: SITE SELECTION AND EVALUATION - SAFETY REQUIREMENTS**

14:00 – 16:00 Lecture 3: IAEA Safety Requirements for Site Evaluation of Nuclear Installations – NS-R-3, (ARG)

16:00 – 16:30: Coffee break

**Session 4: COUNTRY EXPERIENCES – PLENARY DISCUSSIONS**

16:30 – 17:00 Country Presentation 1

17:00-18:00 Discussions – Panel session – (Moderator: SS)

**DAY 2 TUESDAY:**

**Session 5: EXTERNAL EVENTS - SEISMIC HAZARDS**

08:30 – 09:30 Lecture 4: IAEA Safety Guide on Seismic Hazards in Evaluation for Nuclear Installations – SSG-9, (ARG).

09:30 – 10:30 Lecture 5: Collection and interpretation of geological, geophysical and geotechnical data –Geological Database - SSG-9, (JSC).

10:30 – 11:00: Coffee break

**Session 6: EXTERNAL EVENTS - SEISMIC HAZARDS**

11:00 – 13:00 Lecture 6: Collection and interpretation of seismological data – Seismological Database, SSG-9, (RS)

12:00-13:00 Lecture 7: Seismotectonic model – Integration of geological and seismological databases- Potential for fault displacement at site, SSG-9, (JSC)

13:00 – 14:00: Lunch break

**Session 7: EXTERNAL EVENTS - SEISMIC HAZARDS**

14:00 – 16:00 Lecture 8: Seismic hazard assessment – Deterministic and Probabilistic Approaches – Uncertainties treatment, SSG-9, (RSG)

16:00 – 16:30: Coffee break

**Session 8: COUNTRY EXPERIENCES – PLENARY DISCUSSIONS**

16:30 - 17:30 Lecture 9: Seismic risk in Latin America, (RSH)

17:30 - 18:00 Discussions – Panel session – (Moderator: SM)

**DAY 3 WEDNESDAY:**

**Session 9: EXTERNAL EVENTS - VOLCANIC HAZARDS**

08:30 – 10:30 Lecture 10: IAEA Safety Guide (Draft) on Volcanic Hazards in Site Evaluation for Nuclear Installations (DS405), (ARG and CC).

10:30 – 11:00: Coffee break

**Session 10: EXTERNAL EVENTS – METEOROLOGICAL HAZARDS**

11:00 – 13:00 Lecture 11: IAEA Safety Guide (Draft) on Meteorological Hazards in Site Evaluation for Nuclear Installations (DS417) – (RH)

13:00 – 14:00: Lunch break

**Session 11: EXTERNAL EVENTS – HYDROLOGICAL HAZARDS (FLOODS)**

14:00 – 14:46 Lecture 12: IAEA Safety Guide (Draft) on Hydrological Hazards in Site Evaluation for Nuclear Installations (DS417) – (ARG and FS)

14:45 – 16:00 Lecture 13: Tsunamis – Tsunami Hazard Assessment – Warning and Notification Systems, (FS)

16:00 – 16:30: Coffee break

**Session 12: COUNTRY EXPERIENCES – PLENARY DISCUSSIONS**

16:30 – 17:30 Country Presentation 4 –

Country Presentation 5 -

Country Presentation 6 –

17:30-18:00 Discussions – Panel session – (Moderator: SM)

**DAY 4 THURSDAY:**

**Session 13: EXTERNAL EVENTS – HUMAN INDUCED HAZARDS**

08:30 – 09:30 Lecture 14: IAEA Safety Guide on Human induced hazards in site evaluation for nuclear power plants (NS-G-3.1), (ARG)

09:30 – 10:30 Lecture 15: Aircraft crash – Methodology and current criteria, (JR)

10:30 – 11:00: Coffee break

**Session 14: POTENTIAL EFFECTS OF NUCLEAR INSTALLATIONS IN THE REGION**

11:00 – 13:00 Lecture 16: Dispersion in air, NS-G-3.2, Environmental considerations, (RH)

13:00 – 14:00: Lunch break

**Session 15: POTENTIAL EFFECTS OF NUCLEAR INSTALLATIONS IN THE REGION**

14:00 – 15:30 Lecture 17: Dispersion in water, NS-G-3.2, Environmental considerations, (KHL and JSC)

15:30 – 16:30 Lecture 18: Geotechnical aspects and foundation safety, NS-G-3.6, (SM)

16:00 – 16:30: Coffee break

**Session 16: COUNTRY EXPERIENCES – PLENARY DISCUSSIONS**

16:30 – 17:30 Country Presentation 7 – Hungary: Site Selection Programme (TK)

Country Presentation 8 -

Country Presentation 9 –

17:30-18:30 Discussions – Panel session – (Moderator: SM)

19:00 Social event (CAB Quincho)

**DAY 5 FRIDAY:**

**Session 17: CONSIDERATIONS OF POPULATION AND EMERGENCY PLANNING - ENVIRONMENTAL IMPACT ASSESSMENT**

08:30 – 09:30 Lecture 18: Population considerations, Radiological Impact and Demonstration of the feasibility of emergency plan (KHL)

09:30 – 10:30 Lecture 19: Environmental radiological impact assessment-Case Study in Hungary (TK)

10:30 – 11:00: Coffee break

**Session 18: NON-SAFETY RELATED FACTORS - SITE SELECTION CRITERIA - PROJECT MANAGEMENT**

11:00 – 13:00 Lecture 20: Site selection criteria – Comparison and Ranking Criteria – Non-safety related factors: engineering, construction, socio-economic and environmental considerations. (TK)

13:00 – 14:00: Lunch break

**Session 19:**

14:00 – 15:30 Lecture 21: Project Management, Field experiences and lessons learned in preparation and development of the site for a nuclear power plant project. (TK)

15:30-16:00: Coffee break

**Session 20: CLOSING SESSION**

16:00 – 17:00 Conclusions-Action plan-  
Closing Remarks (CNEA, IAEA, IB)