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COMMITTEE ON THE PEACEFUL USES OF  
OUTER SPACE

Scientific and Technical Subcommittee

Forty-third session

Vienna, 20 February - 3 March 2006

**Agenda item 9**

**Use of Nuclear Power Sources in Outer Space**

**JOINT UNITED NATIONS/INTERNATIONAL ATOMIC ENERGY  
AGENCY TECHNICAL WORKSHOP ON THE OBJECTIVES, SCOPE  
AND GENERAL ATTRIBUTES OF A POTENTIAL TECHNICAL SAFETY  
STANDARD FOR NUCLEAR POWER SOURCES IN OUTER SPACE  
(VIENNA, 20-22 FEBRUARY 2006)**

**Session 3. PRESENTATIONS PERTINENT TO OBJECTIVE I.A.**

**Presentation submitted on “An Overview of the IAEA’s Essential Elements of a Safety Framework”**

**Note by the Secretariat**

1. In accordance with paragraph 16 of General Assembly resolution 60/99 of 8 December 2005, the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space will organize, jointly with the International Atomic Energy Agency, a technical workshop on the objectives, scope and general attributes of a potential technical safety standard for nuclear power sources in outer space, to be held in Vienna from 20 to 22 February 2006.
2. The presentation contained in the present conference room paper was prepared for the joint technical workshop in accordance with the indicative schedule of work for the workshop, as agreed by the Working Group on the Use of Nuclear Power Sources in Outer Space during the intersessional meeting held in Vienna from 13 to 15 June 2005 (A/AC.105/L.260).





**International Atomic Energy Agency**

***AN OVERVIEW OF THE IAEA'S ESSENTIAL ELEMENTS  
OF A SAFETY FRAMEWORK***

*M. El-Shanawany  
Head of Safety Assessment Section,  
Division of Nuclear Installation Safety*

***COPUOS / IAEA JOINT TECHNICAL WORKSHOP  
SAFETY FRAMEWORK FOR NUCLEAR POWER SOURCE  
APPLICATIONS IN OUTER SPACE  
20 to 22 FEBRUARY 2006***

## HIGHLIGHTS OF PRESENTATION

- IAEA SAFETY STANDARDS
- ESSENTIAL ELEMENTS OF A SAFETY FRAMEWORK
- CONCLUSIONS

## SAFETY FUNCTIONS OF IAEA

- ➔ **Since its creation in 1957, the IAEA has been performing two safety related functions which are laid down in its Statute (Article III):**
- **Establishing standards of safety for the protection of health against the effects of radiation and as an international benchmarking,**
  - **Providing for the application of these standards to peaceful nuclear activities**

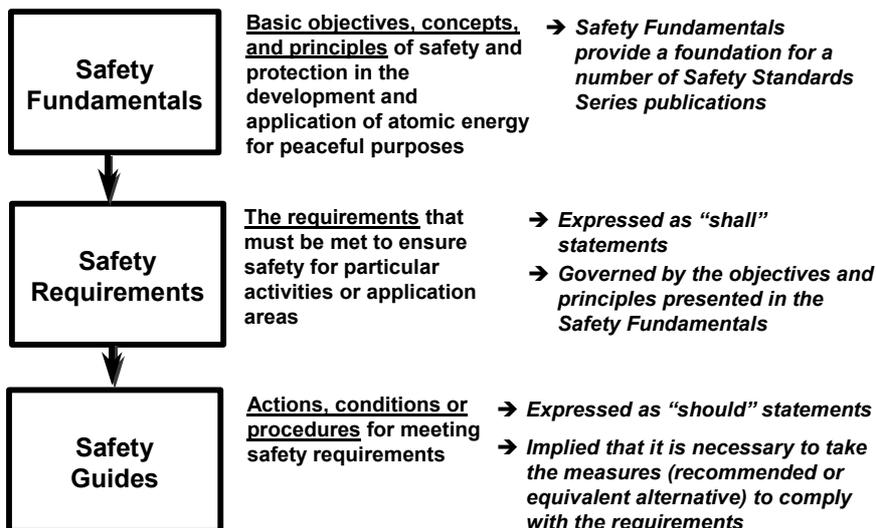
## SAFETY STANDARDS

➔ The Safety Standards (Safety Fundamentals, Safety Requirements and Safety Guides) are used both

- by the Agency in its international operations and

- as an international benchmark, by States in their national nuclear and radiation safety programmes.

## OVERVIEW OF IAEA SAFETY STANDARDS



## ESSENTIAL ELEMENTS OF SAFETY FRAMEWORK

- **What do we mean by a safety framework for NPS in space?**

**Is it just an equivalent to the Safety Fundamentals?**

**Should it also include some specific requirements ?**

## ESSENTIAL ELEMENTS OF SAFETY FRAMEWORK

- **The IAEA Safety Fundamentals sets out the primary objective and the principles for the protection of people and the environment in all the applications involving potential exposure to ionising radiation.**

**The principles apply to both existing and new applications of nuclear and other technologies that may give rise to radiation exposure.**

## ESSENTIAL ELEMENTS OF SAFETY FRAMEWORK

The following is a summary of some of the fundamental safety principals :

- Safety is fundamental to any activity that may give rise to radiation exposure, and the prime responsibility for safety must rest with the person or organisation responsible for the activity.
- Governments must establish and sustain an effective legal and governmental infrastructure with independent regulatory body.

## ESSENTIAL ELEMENTS OF SAFETY FRAMEWORK

- National authorities have to ensure that arrangements are made for detecting any build up of radioactive substances in the environment, for disposing of radioactive waste and for preparing for interventions, particularly in emergencies.

**Activities must be regulated with a scope and stringency that are commensurate with the magnitude of the risk associated with them.**

## ESSENTIAL ELEMENTS OF SAFETY FRAMEWORK

- Safety measures are to be optimised and accidents are to be prevented.

The optimisation of safety measures is achieved through optimising the design and operation of any particular practice.

All risks arising, whether from normal operation or from abnormal or accident conditions, must be taken into account. The risks are to be kept as low as reasonably achievable bearing in mind economic and social factors.

## ESSENTIAL ELEMENTS OF SAFETY FRAMEWORK

- The overall strategy for achieving the safety objectives is by means of the concept of defence in depth.

Defence in depth in the design and operation of facilities is effected primarily through a combination of several levels of protection, physical barriers, systems to protect the barriers and administrative procedures, which would have to be breached before harm could be caused to people or the environment.

## ESSENTIAL ELEMENTS OF SAFETY FRAMEWORK

**The primary means of preventing accidents is to achieve high quality in the design, construction, operation and decommissioning of facilities, so that deviations from normal operation are as infrequent as possible.**

## ESSENTIAL ELEMENTS OF SAFETY FRAMEWORK

- **Safety must be regularly assessed and lessons must be duly learned from experience and applied.**

**In safety assessment and verification, normal operation and the way failures might occur are subjected to systematic critical analysis and consequences of such failures are identified.**

**Safety assessment demonstrate that the design and operator actions, if called on to maintain safety, are sufficiently robust to fulfil the safety functions required for safety.**

## ESSENTIAL ELEMENTS OF SAFETY FRAMEWORK

- **Management systems that integrates all aspects of managing a facility or activity so that the requirements for safety, quality, health, security and the environment, are established and implemented in a coherent manner**

**Safety assessment demonstrate that the design and operator actions, if called on to maintain safety, are sufficiently robust to fulfil the safety functions required for safety.**

## ESSENTIAL ELEMENTS OF SAFETY FRAMEWORK

- **Arrangements are to be established in advance to mitigate effectively the consequences of any unplanned event that my compromise safety.**

## ESSENTIAL ELEMENTS OF SAFETY FRAMEWORK

- **Arrangements must be made for emergency preparedness and response in the event of loss of control over a radiation hazard, to regain control.**

## CONCLUSIONS (1/2)

- **IAEA Safety Standards provide a common basis for safety considerations, - and a foundation for international "harmonization"**
- **There is general international agreement, as reflected in various IAEA Safety Standards, that both deterministic and probabilistic approaches to safety should be used.**

## CONCLUSIONS (2/2)

- **To assist Member States to take full benefit from Safety Standards applications the IAEA provides international peer review services, training courses and workshops, and publishes a wide range of technical reports.**
- **What do you want to see in a safety framework for NPS in space?**
  - **Fundamental principles only?**
  - **Or some quantitative or procedural requirements also?**
  - **If so, what?**

