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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 1. BACKGROUND

**Presentation on “Development of International Standards for Radiation Protection
and Nuclear Safety”**

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).



Development of international standards for radiation protection and nuclear safety

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IAEA
International Atomic Energy Agency

Outline of presentation

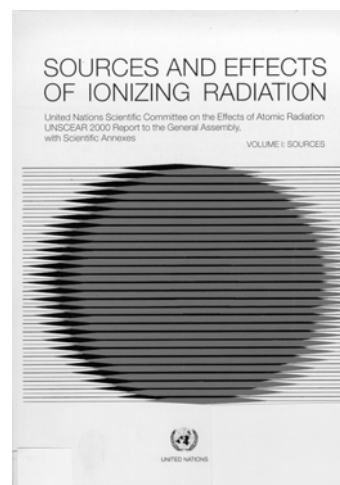
- Background to the development of international standards for radiation protection – the roles of:
 - UNSCEAR (the science),
 - ICRP (protection principles), and
 - IAEA (regulatory formulation)
- IAEA *Safety Standards Series*
 - Safety Fundamentals, Requirements, Guides
 - International acceptance



Quantifying the risk from ionizing radiation

The United Nations Scientific Committee on the Effects of Atomic Radiation – UNSCEAR

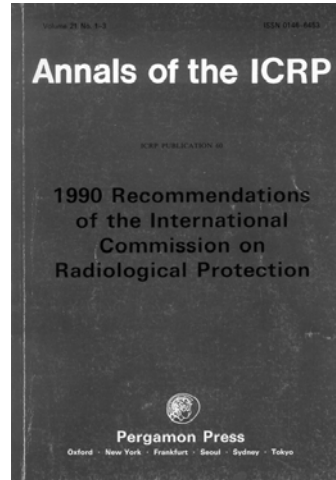
- Like COPUOS, reports to UN General Assembly
- Periodically (~5 years) updates a comprehensive review of scientific studies on the effects of ionizing radiation



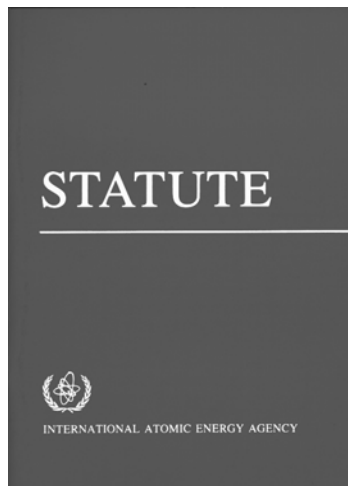
Providing the framework for radiation protection

The International Commission on Radiological Protection – ICRP

- Independent group of specialists
- Appointed by invitation
- Provides fundamental protection philosophy (since 1928)
- Standing of ICRP is based on the quality of its analysis and advice



Role of the IAEA



The IAEA is authorized to:

... establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, standards of safety for protection of health and minimization of danger ...



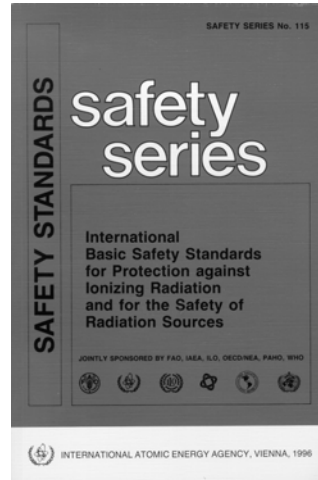
Developing regulatory-style recommendations

The International Atomic Energy Agency publishes the

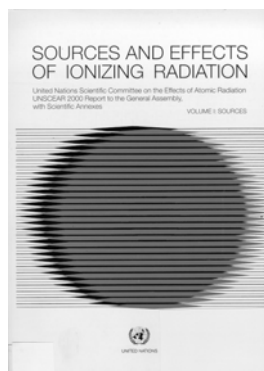
Safety Standards Series

within which:

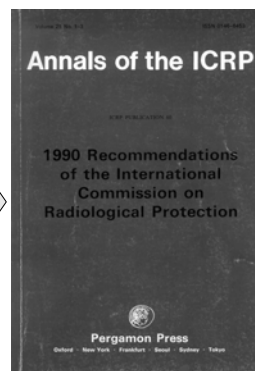
- the Basic Safety Standards (BSS) provides an international benchmark and model for radiation protection regulations



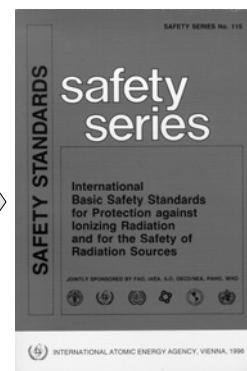
UNSCEAR - ICRP - IAEA



Effects of radiation



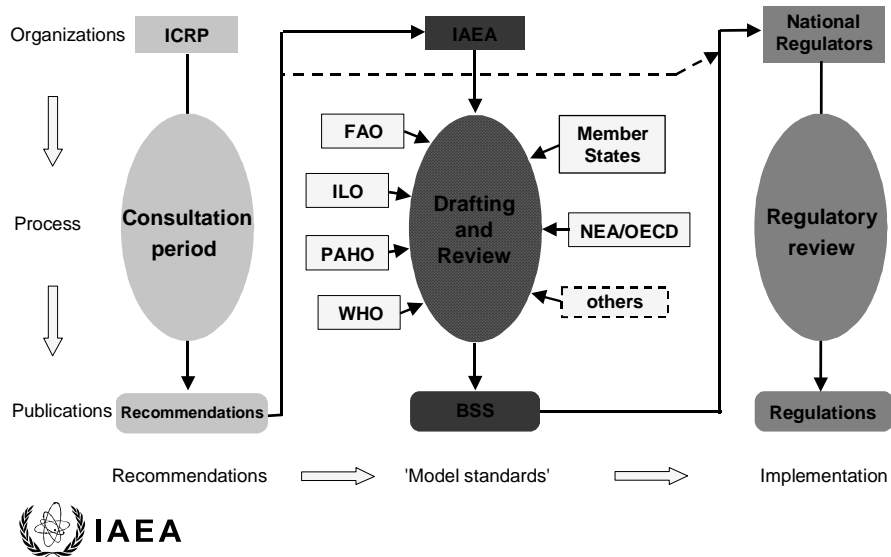
Recommendations for protection



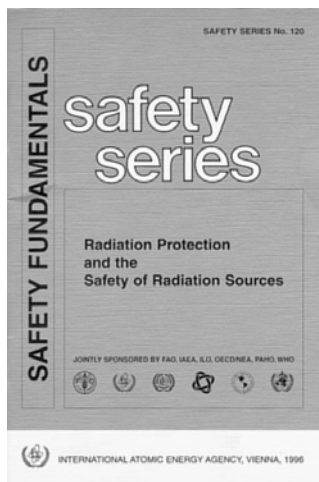
Regulatory style standards



From recommendations to regulations



Safety Fundamentals



Example (SS120)

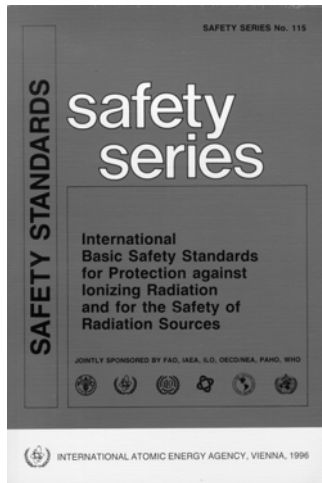
Principle 3:

Optimization of protection

For exposures from any source, except for therapeutic medical exposure, the doses, the number of people exposed and the likelihood of incurring exposures shall all be kept as low as reasonably achievable.



Safety Requirements



Example

Safety assessments

Safety assessments ...
...shall be made at different stages, including siting, design, manufacture, construction, assembly, commissioning, operation, maintenance and decommissioning...

Safety Requirements (BSS)

Example

Defence in depth

A multilayer (defence in depth) system of provisions for protection and safety commensurate with the magnitude and likelihood of the potential exposure involved shall be applied to sources such that a failure at one layer is compensated for or corrected by subsequent layers, for the purposes of:

- (a) preventing accidents that may cause exposure;
- (b) ...



Safety Guides



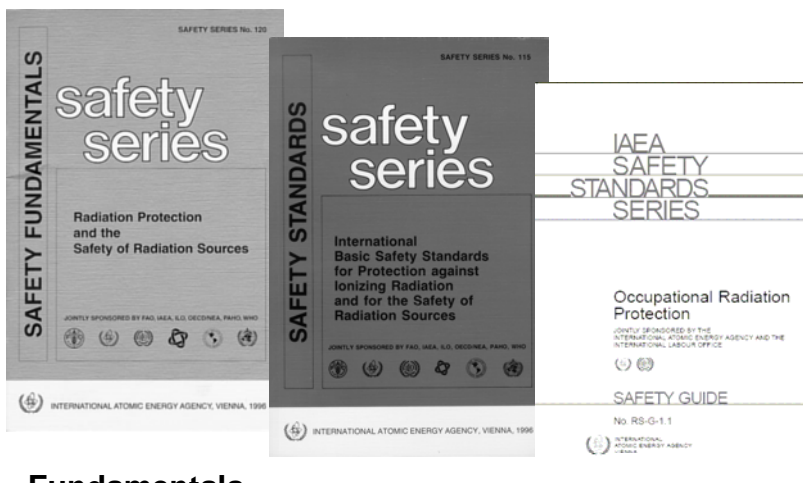
Example

[*Optimization of protection*]

The optimization of protection should be considered at the design stage of equipment and installations, when some degree of flexibility is still available. The use of engineered controls should be examined carefully at this stage in defining the protection options.



Safety Standards Series



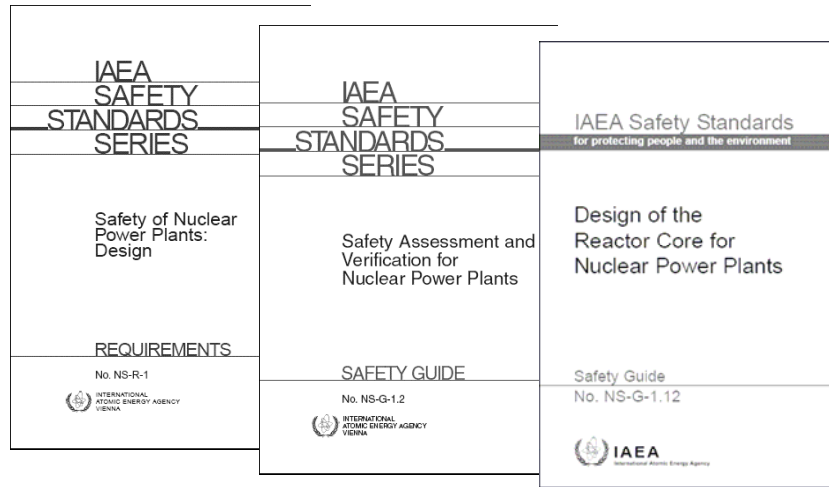
Fundamentals

Requirements

Guides



Nuclear Safety Standards



International acceptance and norms

- Most countries now have in place, or are implementing, national standards for protection and safety that are essentially consistent with the Basic Safety Standards
- 80 IAEA Member States have made a political commitment to the Code of Conduct on the Safety and Security of Radioactive Sources (which '*relies on existing international standards*' and '*notes*' the BSS)



Implications for a safety framework for nuclear power sources in outer space

- What is needed for a safety framework for NPS in space?
- What lessons can be learned from IAEA experience?
- How best to work together to ensure consistency?

