



# General Assembly

Distr.: Limited  
15 March 2004

Original: English

---

**Committee on the Peaceful  
Uses of Outer Space**  
Forty-seventh session  
Vienna, 2-11 June 2004

## **Proposed outline of objectives, scope and attributes for an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable nuclear power source applications in outer space**

### **Note by the Secretariat**

1. The annex to the present document was prepared by the United States of America and submitted to the Working Group on the Use of Nuclear Power Sources in Outer Space of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space at its forty-first session, held from 16 to 27 February 2004, for its consideration.
2. The text sets out an outline of the objectives, scope and attributes proposed for an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable nuclear power source applications in outer space. The present document is being issued as a working document to assist the Working Group in preparing for its informal meeting, to be held from 7 to 8 June 2004 (and from 9 to 11 June 2004, if necessary), during the forty-seventh session of the Committee on the Peaceful Uses of Outer Space.



## **Annex**

# **Proposed outline of objectives, scope and attributes for an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable nuclear power source applications in outer space**

## **I. Introduction**

1. At its fortieth session in 2003, the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space adopted a work plan for the period 2003-2006 for developing an international technically based framework of goals and recommendations for the safety of nuclear power source applications in outer space, as contained in the report of the Subcommittee (A/AC.105/804, annex III). One element of the work plan, item (d) for the year 2004, identified the need to prepare a draft outline of the objectives, scope and attributes for an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable space nuclear power source applications.
2. The present paper was submitted to the Scientific and Technical Subcommittee at its forty-first session, held in Vienna from 16 to 27 February 2004, as a proposed outline for consideration in response to that element of the work plan.

## **II. Background**

3. Historically, nuclear power sources for use in outer space have been developed and used in spacecraft applications where unique mission requirements and constraints on electrical power and component heating precluded the use of non-nuclear power sources. Such missions have included interplanetary missions to the outer limits of the solar system, for which solar panels were not suitable as a source of electrical power owing to the long duration of the mission at great distances from the Sun. The designs of nuclear power sources for use in outer space have included radioisotope (for example, radioisotope thermoelectric generators) and fission reactor systems. In addition, small radioisotope heater units have been used to provide local heating of spacecraft components. Due to the presence of radioactive materials in nuclear power sources used in space, safety is an inherent part of their design and application.

## **III. Objectives**

4. The objective of an international technically based framework of goals and recommendations for the safe use of nuclear power source applications in outer space is to present the basic concepts underlying a set of guidelines relating to the safety aspects of the launch and operation of nuclear power sources for use in outer space. The document outlining such goals and recommendations would provide high-level guidance and be in the form of an international safety framework. Compliance with the framework would be voluntary. Such a framework would make

recommendations for activities relating to relevant phases of the life cycle of a nuclear power source in outer space. It would provide a technical foundation for the development of national standards and allow national programmes flexibility in adapting such standards to specific nuclear power source applications and national organizational structures. A sound and technically based international safety framework could facilitate bilateral and multilateral cooperation on missions utilizing nuclear power sources in outer space.

#### **IV. Scope**

5. The framework would address practices that could be implemented during the design, launch, operation and other relevant phases of the life cycle of a nuclear power source in outer space to promote its safe use. Guidelines would be established for the designs of nuclear power sources for use in outer space in general, but their detailed application would depend on the particular design and application and the risks posed by them. Most activities during the development, manufacturing, and transportation of nuclear power sources for use in outer space would be adequately addressed in national and international standards relating to ground-based nuclear installations and activities. Unique considerations relating to these operations could be addressed in the safety framework for nuclear power source applications in outer space.

#### **V. Attributes**

6. The safety framework should be general and qualitative in nature, technically accurate and relatively independent of evolving technology. The guidelines set forth in the framework should reflect broad international consensus. The framework would be intended for those who make decisions relating to the use of nuclear power sources in outer space but who may not be specialists in nuclear science and technology.

7. Consideration could be given to modelling the framework on the format and structure of the International Atomic Energy Agency Safety Fundamentals publication entitled “The safety of nuclear installations”.<sup>a</sup>

#### *Notes*

<sup>a</sup> “The safety of nuclear installations: a safety fundamental”, International Atomic Energy Agency Safety Series No. 110 (STI/PUB/938) (1993).

---