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Committee on the Peaceful Uses of Outer Space
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Item 13 of the provisional agenda*
Use of nuclear power sources in outer space

Draft questionnaire containing a preliminary set of questions to be used to collect information relating to the objectives of the workplan of the Working Group on the Use of Nuclear Power Sources in Outer Space

Working paper prepared by the Chair of the Working Group on the Use of Nuclear Power Sources in Outer Space

1. In accordance with its five-year workplan for 2024–2028,[1] the Working Group on the Use of Nuclear Power Sources in Outer Space has been discussing the use of a questionnaire to achieve the objectives of its workplan.

2. The Working Group, at its meetings during the sixty-first session of the Scientific and Technical Subcommittee, had before it a conference room paper prepared by the Chair of the Working Group containing a preliminary set of questions to be used to collect information relating to the objectives of the workplan of the Working Group (A/AC.105/C.1/2024/CRP.31). At those meetings, the Working Group discussed the draft questionnaire and agreed to hold intersessional meetings on 20 and 21 June 2024, on the margins of the sixty-seventh session of the Committee on the Peaceful Uses of Outer Space, to consider the draft questionnaire further.

3. At those intersessional meetings in June 2024, and at the intersessional meeting held on 14 November 2024, the Chair of the Working Group noted that no further changes had been proposed with respect to the preliminary set of questions as contained in conference room paper A/AC.105/C.1/2024/CRP.31, and proposed that the draft questionnaire be shared with States members of the Committee and international intergovernmental organizations for their input; the questionnaire would then appear as an appendix to the Working Group's report at the sixty-second session of the Scientific and Technical Subcommittee. The responses to the questionnaire would facilitate further discussions of the Working Group, in particular with regard to objective 2 of the workplan; enable the Working Group to collect information about potential future uses of nuclear power sources (NPS); and facilitate its work to

* A/AC.105/C.1/L.418.
[1] A/AC.105/1279, annex III, para. 8, and A/AC.105/1307, annex III, para. 6).

produce a critical analysis of the safety implications of such uses, as per its five-year workplan.

I. Context

4. Space NPS applications have been used in the exploration of space since the dawn of the space age, enabling missions of scientific discovery to destinations across the solar system. NPS applications have opened the solar system to exploration, allowing the observation and understanding of dark, distant planetary bodies that would otherwise be unreachable. Nuclear reactor power sources, for habitation purposes and for the in-space propulsion of and supply of power to spacecraft, may enable faster and more robust crew and cargo missions to the Moon, Mars and beyond, and scientific missions to the outer solar system. The experience gained during many decades of use of NPS applications has led to a good understanding of the risks involved and the lessons learned, which provide context for evolving safety practices.

5. The Committee on the Peaceful Uses of Outer Space, at its sixty-sixth session, held in 2023, endorsed the recommendations of the Subcommittee and the Working Group for a new five-year workplan for the Working Group (A/78/20, para. 150), with the following objectives:

Objective 1. Promote and facilitate the implementation of the Safety Framework for Nuclear Power Source Applications in Outer Space by:

(a) Providing an opportunity for member States and international intergovernmental organizations considering or initiating involvement in space NPS applications to summarize and discuss their plans, progress to date and any challenges faced or foreseen in implementing the Safety Framework;

(b) Providing an opportunity for member States and international intergovernmental organizations with experience in space NPS applications to make presentations on challenges identified under subparagraph (a) above, and on their mission-specific experiences in implementing the guidance contained in the Safety Framework.

Objective 2. Collect and analyse relevant technical information about potential future uses of NPS in outer space, in particular those involving nuclear reactors, by:

(a) Inviting more member States and international intergovernmental organizations, in particular the International Atomic Energy Agency (IAEA), to join the Working Group and share their views, plans and experiences;

(b) Agreeing on appropriate activities for collecting information about potential future uses of NPS in outer space;

(c) Producing a critical analysis of the safety implications of the information shared under subparagraphs (a) and (b) above and presenting this analysis to the Subcommittee.

Objective 3. Discuss within the Working Group the implications of the analysis described in objective 2 with respect to further work of the Working Group and recommend suitable actions to the Subcommittee.

6. Accordingly, in order to achieve those objectives, member States and international intergovernmental organizations are kindly requested to consider answering the set of questions in the next section.

7. For the purposes of the questionnaire, the terms “space nuclear power source” and “space nuclear power source application” are to be understood as defined in the Safety Framework.[2]

8. Similarly, in line with section 3.1 of the Safety Framework, the questions are intended to include space missions involving NPS authorized or approved by Governments and relevant international intergovernmental organizations, independently of whether such missions are conducted by governmental agencies or by non-governmental entities.

II. Questionnaire

Would you consider your country/international intergovernmental organization to be:

(a) A country/an international intergovernmental organization with experience and expertise in the development and use of space nuclear power source (NPS) applications?

(b) A country/an international intergovernmental organization with plans to develop and/or use space NPS applications in the next 10 years?

(c) A country/an international intergovernmental organization with no current plans to develop and/or use space NPS applications in the next 10 years?

If you have selected (a):

1. Have you encountered any difficulties or challenges in implementing the guidance provided in the Safety Framework for Nuclear Power Source Applications in Outer Space?

2. Could you please share information (for example, presentations given at meetings of the Working Group on the Use of Nuclear Power Sources in Outer Space) on your mission-specific experiences in implementing the guidance contained in the Safety Framework?

3. Could you please share information (for example, presentations given at meetings of the Working Group) on future uses of NPS in outer space, in particular, those involving nuclear reactors, and specify any challenges you foresee in the application of the guidance provided in the Safety Framework?

4. Have you identified the need for further guidance?

If you have selected (b):

1. Are you aware that the Safety Framework provides high-level guidance in the form of a model safety framework for achieving the fundamental safety objective of protecting people and the environment in Earth’s biosphere from potential hazards associated with relevant launch, operation and end-of-service phases of space NPS applications?

2. Are you using or do you intend to use the guidance provided in the Safety Framework for your safety framework? If so, are you encountering any difficulties or challenges in implementing that guidance? Could you please share such information (for example, presentations given at meetings of the Working Group)?

3. Could you please share information (for example, presentations given at meetings of the Working Group) on future uses of NPS in outer space, in particular, those involving nuclear reactors, and specify any challenges you foresee in the application of the guidance provided in the Safety Framework?

[2] *Space nuclear power source*: a device that uses radioisotopes or a nuclear reactor for electrical power generation, heating or propulsion in a space application. *Space nuclear power source application*: the overall system (space nuclear power source, spacecraft, launch system, mission design, flight rules etc.) involved in conducting a space mission involving a space nuclear power source.

4. Have you identified the need for further guidance?

If you have selected (c):

1. Are you aware that the Safety Framework provides high-level guidance in the form of a model safety framework for achieving the fundamental safety objective of protecting people and the environment in Earth's biosphere from potential hazards associated with relevant launch, operation and end-of-service phases of space NPS applications?

2. Are you aware that the Safety Framework provides a foundation for the development of national and international intergovernmental safety frameworks while allowing for flexibility in adapting such frameworks to specific space NPS applications and organizational structures?

3. Are you aware that the purpose of implementing the guidance provided by the Safety Framework through national frameworks is to provide assurance to the global public that space NPS applications would be launched and used in a safe manner and could also facilitate bilateral and multilateral cooperation on space missions using NPS?

4. Are you aware that the Safety Framework provides safety guidance covering both programmatic and technical aspects, including the design and application of space NPS, and the relevant launch, operation and end-of-service phases of space NPS applications?