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Use of nuclear power sources in outer space

Draft report of the Working Group on the Use of Nuclear Power Sources in Outer Space

1. At its 555th meeting, on 20 February 2001, the Scientific and Technical Subcommittee re-established its Working Group on the Use of Nuclear Power Sources in Outer Space under the chairmanship of Sam A. Harbison (United Kingdom of Great Britain and Northern Ireland).
2. At the 1st meeting of the Working Group, on 20 February 2001, its Chairman recalled the tasks before the Working Group and the work plan of its deliberations for developing a framework of safety assurance processes and standards for nuclear power sources in outer space (A/AC.105/697 and Corr.1, annex III, appendix), approved by the Scientific and Technical Subcommittee at its thirty-fifth session. In accordance with the work plan, the Working Group in 2001 was to review national and international processes, proposals and standards and national working papers relevant to the launch and peaceful use of nuclear power sources in outer space.
3. The Working Group had before it the following documents: a note by the Secretariat entitled "National research on space debris, safety of space objects with nuclear power sources on board and problems of their collisions with space debris" (A/AC.105/751 and Add.1); a report by the International Atomic Energy Agency (IAEA) entitled "Preliminary review of international documents relevant to the safety of nuclear power sources in outer space" (A/AC.105/754); two working papers submitted by the Russian Federation, entitled "Collisions between nuclear power sources and space debris" (A/AC.105/C.1/L.246) and "National research on safety of space objects carrying nuclear power sources, including information on national procedures for obtaining final authorization to launch such objects" (A/AC.105/C.1/L.247); two working papers submitted by the United Kingdom of

Great Britain and Northern Ireland, entitled “Convention on Nuclear Safety and the Safety Fundamentals of the International Atomic Energy Agency: a common approach to the safety of terrestrial nuclear power sources” (A/AC.105/C.1/L.242) and “Review of international documents on radiation protection of particular relevance to nuclear power sources in outer space” (A/AC.105/C.1/L.245); and a working paper submitted by the United States of America entitled “A database of international documents of potential relevance to nuclear power sources in outer space” (A/AC.105/C.1/L.244).

4. In its deliberations, the Working Group took into account the information provided in two technical presentations made by representatives of the United States to the Scientific and Technical Subcommittee, entitled “International documents of potential relevance to nuclear power sources in outer space” and “Nuclear power source launch approval process in the United States”. At the 3rd meeting of the Working Group, on 21 February 2001, a representative of IAEA provided an overview of the procedures and mechanisms currently utilized by the Agency to prepare and review safety standards for terrestrial nuclear applications.

5. Based upon its consideration of the presentations, reports and working papers mentioned in paragraphs 3 and 4 above, the Working Group discussed and reached preliminary agreement upon a draft outline of the report called for in the work plan (see the annex to the present report). The draft outline would, however, remain subject to further consideration and informal, inter-sessional consultations by delegations and would only be finalized at the commencement of discussions during the thirty-ninth session of the Scientific and Technical Subcommittee.

6. The Working Group noted that the content of the report called for in the work plan would be drawn extensively from the presentations, reports and working papers that had been submitted, and the deliberations that had ensued, during the meetings of the Scientific and Technical Subcommittee and the Working Group in 2000 and 2001.

7. The Working Group agreed that additional materials would still be required in order to complete the report called for in the work plan. It welcomed the offers of the delegations of France, the Russian Federation and the United States and the representative of IAEA to prepare draft texts for consideration in that regard.

8. The Working Group agreed that, depending on the timing of submission of the additional draft texts, it might be both feasible and beneficial to conduct informal consultations among interested members of the Working Group during the forty-fourth session of the Committee on the Peaceful Uses of Outer Space, in 2001, with a view to advancing the development of the report called for in the work plan.

9. The Working Group noted that IAEA had a highly structured process and framework for developing and promulgating terrestrial nuclear safety standards. It also noted that IAEA also had less formal mechanisms for conducting detailed technical reviews, which the Working Group might wish to consider in the future.

10. Some delegations expressed the view that, should the Scientific and Technical Subcommittee decide in the future that further work was required on the Principles Relevant to the Use of Nuclear Power Sources in Outer Space (General Assembly resolution 47/68 of 14 December 1992), careful consideration should be given to the potential advantages of utilizing the relevant expertise of IAEA.

11. The Working Group engaged in a more detailed consideration of the differences between the use of nuclear power sources in outer space and terrestrial nuclear applications, focusing particularly on the following aspects that it had identified in 2000 (A/AC.105/736, annex III, para. 8):

- (a) Nature of the applications;
- (b) Operating environment;
- (c) Nature and autonomy of operation of systems;
- (d) Quantity of the radioactive material;
- (e) Frequency and duration of use;
- (f) Distance to, and the effects of normal operation and potential accidents on, populated areas;
- (g) Complexity and designed reliability of systems;
- (h) Use of passive and/or active systems;
- (i) End of service.

12. The Working Group also discussed the similarities and differences between uses and applicable standards for packaging and transportation of radioactive sources used in terrestrial and space applications.

13. The Working Group recommended that it be reconvened during the thirty-ninth session of the Scientific and Technical Subcommittee.

14. At its 6th meeting, on 23 February 2001, the Working Group adopted the present report.

Annex

Draft outline of the report called for in the work plan

- I. Introduction
 - A. Review of the multi-year work plan
 - B. Reference to existing Principles Relevant to the Use of Nuclear Power Sources in Outer Space
- II. Factors that differentiate nuclear power sources in outer space from terrestrial nuclear applications
 - Highlighting of differences
- III. Existing conventions and procedures that have potential applications to nuclear power sources in outer space
 - A. Focus on technical, as opposed to legal (e.g. liability), conventions and procedures
 - B. Discussion of the varying applicability of the various conventions and procedures
 - 1. Demonstration of where existing international conventions are already being applied
 - 2. Explanation of why other international conventions are not applicable
 - C. Summary of space nuclear power source launch approval processes
- IV. Existing nuclear safety and radiation protection documents potentially relevant to nuclear power sources in outer space
 - A. Identification of international documents (particularly the Safety Series documents of the International Atomic Energy Agency and recommendations of the International Commission on Radiological Protection) that are potentially relevant to the launch and operation of nuclear power sources in outer space

Reference to the relevance matrix in the working paper submitted by the United States of America entitled “A database of international documents of potential relevance to nuclear power sources in outer space” (A/AC.105/C.1/L.244)
 - B. Description of development and agreement processes for nuclear safety and radiation protection standards

- V. Potential future developments relevant to nuclear power sources in outer space
 - A. Input to be provided by interested delegations, particularly with respect to new space nuclear reactor applications and to the use of nuclear power sources on other celestial bodies
 - B. Other considerations involving potential risk to nuclear power sources from space debris [to be coordinated with ongoing debris discussions of the Committee on the Peaceful Uses of Outer Space]
 - VI. Observations

Observations to be submitted by delegations based on a review of reports and presentations made during previous meetings of the Scientific and Technical Subcommittee and its Working Group on the Use of Nuclear Power Sources in Outer Space
 - Annex. List of international documents and recommendations that are of possible relevance to nuclear power sources in outer space
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