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COMMITTEE ON THE PEACEFUL USES OF
OUTER SPACE
Scientific and Technical Subcommittee
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Agenda item 8
Use of Nuclear Power Sources in Outer Space

Development of an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable nuclear power source applications in outer space

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

Note by the Secretariat

1. In accordance with the multi-year work plan for the period 2003-2007, adopted at the fortieth session (A/AC.105/804, annex III) and amended at the forty-second session (A/AC.105/848, annex III) of the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space, the Working Group on the Use of Nuclear Power Sources of the Subcommittee prepared, in 2006, the draft report based on the final outline of the objectives, scope and attributes of an international technically based framework of goals and recommendations. The draft report is contained in the document A/AC.105/C.1/L.289.

2. At its forty-fourth session, held in Vienna from 12 to 23 February 2007, the Working Group finalized the draft report and submitted it for consideration of the Subcommittee.

3. The present document contains the final report of the Working Group. The report will be made available as the document A/AC.105/C.1/L.289/Rev.1, in all official languages of the United Nations, after the conclusion of the forty-fourth session of the Subcommittee.

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I. General summary

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 (NPS) applications in outer space (A/AC.105/804, annex III) (hereinafter referred to as "the framework").

2. The objective of the work plan was to establish the objectives, scope and attributes of the framework. The possibility of developing the framework through a flexible partnership with the International Atomic Energy Agency (IAEA) was to be investigated, with a view to benefiting from that organization's relevant expertise and well-established procedures for developing safety standards.

II. Review of multi-year work plan activities

3. The work plan adopted by the Subcommittee in 2003 was amended in 2005 to allow for holding a joint workshop with IAEA in 2006. The activities conducted under the revised work plan are summarized below:

Year	*Activity*
2003	Adopted a schedule of work. Invited national and regional space agencies to present information to the Scientific and Technical Subcommittee in 2004 and 2005 on the content of relevant national (including bilateral or multilateral) space NPS programmes and planned or currently foreseeable applications. Invited national and regional space agencies to present information to the Subcommittee in 2004 on the space applications enabled or significantly enhanced by NPS.
2004	Reviewed information from national and regional space agencies on the content of relevant national (including bilateral and multilateral) space NPS programmes and planned or currently foreseeable applications. Reviewed information from national and regional space agencies on the applications enabled or significantly enhanced by space NPS. Reviewed IAEA-specific processes and mechanisms (including their time frame, resources and administrative requirements) that IAEA could use to participate with the

Year	*Activity*
	Subcommittee in developing space NPS technical safety standards. Prepared a draft outline of the objectives, scope and attributes of an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable space NPS applications. Prepared a draft set of potential implementation options for establishing an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable space NPS applications. Based on its discussions, the Working Group on the Use of Nuclear Power Sources in Outer Space advised the Subcommittee, at its forty-first session, to inform IAEA of the possible options for participation by IAEA, recognizing that additional work was required to further develop and evaluate the options and the specific role of IAEA.
2005	Reviewed information from national and regional space agencies on the content of relevant national (including bilateral and multilateral) space NPS programmes and planned or currently foreseeable applications. Prepared a final outline of the objectives, scope and attributes of an international technically based framework of goals and recommendations for ensuring the safety of planned and currently foreseeable space NPS applications. Prepared for a joint technical workshop with IAEA.
2006	Held a joint technical workshop with IAEA. Prepared a draft report of the joint technical workshop for submission to the Subcommittee and IAEA. Held discussions with IAEA concerning the details of the implementation options. Prepared a draft of the present report.
2007	Prepared the final version of the present report, including the recommended implementation option, a new work plan and a draft document preparation profile.

III. Framework objectives, scope and attributes

A. Objectives

4. The first objective of the work plan for the period 2003-2006 was to establish the objectives, scope and attributes of the framework. This was largely achieved in 2005 and finalized after the discussions at the joint workshop with IAEA in February 2006.

5. The objective of the proposed framework would be to present a set of general guidelines relating to the safety aspects of the launch and operating life cycle of NPS in outer space. The framework would provide high-level guidance and reflect international consensus on the appropriate level of safety that should be achieved for all activities relating to the various phases of the life cycle of NPS in outer space. Such a framework would make recommendations for the safety of activities relating to those phases of the life cycle of NPS 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 NPS applications and national organizational structures. A sound and technically based international safety framework could provide reassurance to governments and the general public worldwide that NPS for use in outer space will be designed, handled and used in a safe manner and could facilitate bilateral and multilateral cooperation on missions utilizing NPS.

B. Scope

6. 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 design of NPS for use in outer space in general, but their detailed application would depend on the particular design and application and the risks posed. Most activities during the development, manufacturing and transportation of NPS 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 those operations could be addressed in the safety framework for NPS applications in outer space.

C. Attributes

7. The safety framework should be general and qualitative in nature, technically valid 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.

IV. General discussion and observations of the Working Group

8. Historically, NPS 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 NPS for use in outer space have included radioisotope (for example, radioisotope thermoelectric generators) and nuclear reactor systems. In addition, small radioisotope heater units have been used to provide local heating of spacecraft components. The presence of radioactive materials or nuclear fuels in space NPS and their consequent potential for harm means that safety is always an inherent part of their design and application.

9. The activities of the members of the Working Group from 2003 through 2006, including the joint workshop with IAEA, allowed them to share:

(a) Views and information between national, regional and international agencies, participating member States and IAEA;

(b) The latest information on ongoing, planned and currently foreseeable NPS applications in space;

(c) The unique design considerations for NPS applications in space;

(d) Information on NPS in relation to space debris;

(e) The scope, attributes and objectives of a space NPS safety framework, most notably the minimum essential elements of such a

framework from the perspective of both radioisotope and reactor applications;

(f) Observations and questions relevant to the implementation options under consideration by the Working Group.

A. Planned and currently foreseeable nuclear power source applications in space

10. According to current knowledge and capabilities, NPS are the only available energy option to power some space missions and significantly enhance others. Some ongoing and foreseeable missions would not be possible without the use of NPS.

11. NPS have been used in space for more than four decades. Nuclear reactors have not been flown for several years and no specific plans exist for using them in the near future. However, reactors are expected to be needed for scientific and exploration missions, specifically for the Moon and Mars. Earth orbital missions requiring high power (e.g. communications, inter-orbital space tugs) are also foreseeable.

12. Radioisotope power systems (including radioisotope heater units) are currently in use and their continued use is planned.

13. Missions to Mars are planned by national, regional and international space agencies that might use space radioisotope power sources (including radioisotope heater units).

14. The environments for space NPS applications (from launch through operation to retirement) are radically different from the environment for terrestrial applications.

15. Nuclear reactors for use in outer space applications are very different from terrestrial reactors in design and operation. The specific environments (both operating and potential accident conditions) create very different safety design and operational criteria.

16. Space mission requirements lead to unique mission-specific designs for space NPS, launch systems and mission operations.

B. Objectives, scope and attributes of a space nuclear power source safety framework

17. A number of reasons were expressed for having an international safety framework for space NPS. These included:

(a) The necessity of having common safety criteria for space missions using NPS;

(b) Providing assurance that space NPS safety was being addressed appropriately;

(c) Providing a common basis for cooperative international space missions using NPS.

18. The view was expressed that such a framework could provide a basis for future, possibly binding, agreements.

19. Common elements deemed essential for an effective safety framework were identified: the framework should be internationally accepted, provide high-level guidance and address both radioisotope power systems and nuclear reactor systems. It should further promote the establishment or use of national safety processes that are credible, reliable and transparent. Such national processes should include both technical and programmatic elements to mitigate risks arising from the use of NPS through all relevant phases of a mission.

C. Implementation options for a space nuclear power source safety framework

20. Two implementation options were considered by the Working Group for establishing a space NPS safety framework, as follows:

(a) A cooperative safety framework development between the Subcommittee and IAEA;

(b) A multilateral safety framework development involving interested national, regional and international agencies, followed by a review to be conducted by the Subcommittee with various levels of IAEA involvement.

21. Regarding the above two implementation options, the following general observations and key issues in coordinating the processes of the Subcommittee and IAEA were raised:

(a) General observations and comments included the following:

(i) Comprehensive space NPS safety frameworks exist and are in use in two member States. Some member States have been cooperating recently to develop a plan for a regional space NPS safety framework;

(ii) Terrestrial aspects of space NPS activities fall within the scope of existing IAEA safety standards;

(iii) The IAEA Safety Fundamentals Publication (SF-1) is intended to form the foundation for all other documents in the Safety Standards Series in the categories “Safety Requirements” and “Safety Guides”;

(iv) The IAEA Safety Fundamentals Publication was not developed with space NPS applications in mind. The degree of its potential relevance to developing an international space NPS safety framework would need to be studied;

(v) For all current IAEA safety standards, the Agency has the expertise (either within IAEA or by engaging technical consultants) and resources to provide for the implementation of such standards, including peer reviews, education and training;

(vi) IAEA currently does not have space NPS expertise. In the event it were to participate in the development of a space NPS safety framework, IAEA would need to engage expertise from those with space NPS experience within the space community, including the Working Group;

(vii) If IAEA were to co-sponsor a space NPS safety framework, then IAEA and the Subcommittee would need to agree on arrangements for

maintaining expertise and providing for the implementation of the framework;

(viii) Other implementation options may exist.

(b) Some specific observations pertinent to a cooperative safety framework development between the Subcommittee and IAEA were made, as follows:

(i) The safety standard development process established by IAEA is recognized as providing an effective mechanism for achieving technically sound safety standards that reflect an international consensus;

(ii) Publication of an international space NPS safety framework co-sponsored by IAEA and the Subcommittee would benefit from the international standing and technical competence of both organizations. Such a safety framework would likely be widely recognized and help in the development of national safety frameworks (including standards) for space missions involving NPS;

(iii) A cooperative safety framework development between the Subcommittee and IAEA would require the Subcommittee and IAEA to coordinate their respective document development processes with the objective of co-sponsoring a safety framework for space NPS;

(iv) A cooperative safety framework development between the Subcommittee and IAEA requires further elucidation, including coordination of the work and decision processes of IAEA and the Subcommittee; agreement on the language or languages to be used for conducting a collaborative framework development; provision of resources for supporting the development of a safety framework (interpretation and translation services, publications, meetings, etc.); and the organization and management of the work programme.

(c) Some specific observations pertinent to a multilateral safety framework development were made, as follows:

(i) Three alternative approaches were identified for the participation of IAEA with the Subcommittee in reviewing a safety framework developed by a multilateral group of agencies and experts. In the first approach, the Subcommittee would request IAEA to conduct a technical assessment of the framework to assist the Subcommittee in its consideration of the framework. In the second approach, IAEA would use its review and approval processes, as appropriate, to cooperate with the Subcommittee in conducting a technical assessment of the framework. In the third approach, a technical representative of IAEA would first assist the multilateral group's development of a space NPS safety framework and then support the Subcommittee in the review of the framework. Any successful multilateral safety framework development would require:

a. An IAEA mechanism for endorsing, publishing or supporting any space NPS safety framework developed outside IAEA's existing safety standard development process. IAEA participation in any of the approaches could be noted in an introductory paragraph accompanying either the assessment of a multilateral space NPS safety framework or the actual development and review of such a framework;

b. The safety standard development process established by IAEA could serve as an effective model for use by a multilateral group of national, regional and international agencies and experts on how to achieve a consensual technically sound space NPS safety framework, but the IAEA structure and mechanisms would not be available for this process;

c. IAEA participation in any of the approaches could help to ensure that potential conflicts between a multilaterally developed space NPS safety framework and existing terrestrial nuclear safety standards were identified and avoided or adequately explained;

d. Similar to a cooperative safety framework development between the Subcommittee and IAEA, the multilateral safety framework development also requires agreement on the language or languages to be used for conducting a multilateral framework development and provision of resources for supporting the development of a safety framework (interpretation and translation services, publications, meetings, etc.).

D. Discussion with the International Atomic Energy Agency

22. As a result of the Working Group's deliberations and discussions at the joint workshop, several questions were addressed to IAEA, as follows:

(a) Are there any restrictions within the IAEA statute or prior determinations by the Board of Governors that could prevent the Agency from acting in collaboration with the Subcommittee in the common development and support of a safety framework for space NPS? If there are no such restrictions, what would be the proper procedure for the Subcommittee to request IAEA to undertake such an activity?

(b) What other forms of consultancy or review support would IAEA be prepared to provide to the Subcommittee or a multilateral group of national, regional and international agencies and experts in the development of a safety framework for space NPS?

(c) Recognizing that IAEA has not formulated safety standards for space NPS and that specific aspects of an international space NPS safety framework could differ from generally accepted terrestrial practices (e.g. the use of highly enriched fuel in space reactors), would IAEA be prepared to make the necessary policy decisions, resource allocations, possible adjustments to the terms of reference for its safety standards committees and related actions to cooperate with the Subcommittee or a multilateral group in preparation of a space NPS safety framework? What would be realistic time frames for such actions?

23. In response to those questions, IAEA provided the following answers (see A/AC.105/L.264):

(a) In accordance with its Statute, IAEA would be pleased to cooperate with the Subcommittee in the development and support of a safety framework for NPS in outer space. To that end, IAEA was prepared to assign staff from its Secretariat to participate in such activities, in particular to join technical meetings and working groups that the Subcommittee might wish to establish;

(b) IAEA might, in addition, provide independent peer review services. In that event, IAEA would convene a team of international experts and provide a team leader from its Secretariat. The cost of such a review would, however, need to be borne by the Subcommittee;

(c) In relation to the formulation of nuclear safety standards, the current vision and strategy approved by the IAEA Board of Governors in March 2004 did not include NPS in outer space. That matter would however be brought to the attention of the Commission on Safety Standards at its nineteenth meeting, to be held in Vienna on 6 and 7 June 2006[1];

(d) Further to the foregoing, the Secretariat of IAEA would suggest that the focus might be on elaborating a technical safety framework for NPS in outer space prior to establishing the specific safety standard to be associated therewith. In that connection, it was noted that the human and financial resources necessary for the development of safety standards for NPS in outer space were not currently envisaged and therefore would need to be secured, possibly by extrabudgetary contributions from member States. Such modalities could be discussed in the near future.

V. Findings and recommendations of the Working Group

A. Findings

24. The Working Group confirmed and emphasized the need for NPS for several types of space mission and the potential benefit of an international safety framework for the use of NPS in space applications.

25. The Working Group highlighted the special environment for space NPS and the resulting different safety requirements for space and terrestrial NPS applications.

26. The Working Group established the objectives, scope and attributes of an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable space NPS applications.

27. The Working Group investigated implementation options for the framework involving IAEA participation.

28. The Working Group achieved a better understanding of the respective mechanisms of IAEA and the Subcommittee for the making of safety standards and the decision-making process and characterized the advantages, drawbacks and peculiarities of the different implementation options.

B. Recommendations

29. The Working Group recommends that a partnership between the Subcommittee and IAEA should be pursued to develop a space NPS safety framework. It is noted that a number of challenges (as described in chap. IV above) would have to be overcome for successful development of the framework.

[1] That matter was brought to the attention of the Commission on Safety Standards at its twentieth meeting, held in Vienna on 21 and 22 November 2006.

30. In responding to those challenges, it was brought to the attention of the Working Group that the recent experience of the Subcommittee in developing space debris mitigation guidelines might offer two significant lessons relevant to the development of a space NPS safety framework. Firstly, the development of the framework should draw notably on the expertise of member States that have substantial experience in implementing safe applications of space NPS. Secondly, development of the framework can be facilitated by agreement on a set of considerations established at the beginning of the framework development process.

31. In recognition of the above, and the success of the February 2006 joint STSC/IAEA Workshop, the Working Group recommends to the Subcommittee the formation of a joint partnership with IAEA to develop a framework that would achieve the objectives, scope and attributes specified in chapter III above, following a schedule and process comparable to that specified in annex I to the present report, and consistent with the following considerations:

(a) The framework would be developed by a partnership between the Subcommittee and IAEA with interested members of the Subcommittee participating in the framework development process, including the establishment of the work plan;

(b) Any guidance document related to the framework development (including an IAEA document preparation profile if used as the vehicle for directing the implementation effort) and any changes to those documents would require approval by the Working Group and the Subcommittee;

(c) The partnership between the Subcommittee and IAEA would operate using the consensus rule;

(d) The Subcommittee and IAEA would not independently take steps that could affect the development of the framework without first consulting each other;

(e) The framework development process would take into consideration United Nations treaties and principles on outer space, and other applicable conventions and international law;

(f) The framework development process would also take into consideration relevant international recommendations (such as those of the International Commission on Radiological Protection);

(g) The framework would be issued as a joint product of the Subcommittee and IAEA;

(h) The development of the framework would take advantage of the safety experience and best practices of member States and international organizations with space NPS applications;

(i) The framework would be in accordance with current best safety policies, processes and procedures (i.e., best practices);

(j) The framework would be developed in such a way that it could be utilized as a guide for national purposes; it would remain voluntary and not legally binding under international law;

(k) Any future modification to the framework would be developed and approved using a joint development process between the Subcommittee and IAEA comparable to the process used to generate the original framework.

Annex I

Representative timeline of Scientific and Technical Subcommittee (STSC), International Atomic Energy Agency (IAEA) and joint STSC/IAEA activities

Date	*Activity of the STSC*	*Activity of Joint STSC/IAEA Experts Group*	*Activity of IAEA*
February 2007	Adopt a schedule of work, complete a draft Document Preparation Profile (DPP), and approve establishment of joint experts group.		
April 2007			Agreement to DPP by Safety Standards Committees (SSCs).
April 2007 to May 2007		Resolve differences between STSC Multi-Year Work Plan and DPP agreed to by IAEA SSCs.	
June 2007			Agreement to DPP by IAEA Commission on Safety Standards (CSS).
June 2007 to February 2008		Resolve differences between the STSC work plan and IAEA DPP. Hold drafting and consultation meetings.	
February 2008	Confirm resolution of any differences between the STSC work plan and IAEA DPP. Review progress on draft Framework with STSC.		
February 2008 to October 2008		Prepare draft Framework.	
November 2008	Submission of draft Framework through the Secretariat to STSC member States for review. Invite member States comments prior to February 2009 STSC meeting.		
February 2009	Approval of draft Framework by STSC.		
April 2009			Agreement to draft Framework by SSCs.
April 2009 to May 2009		Address SSC comments on draft Framework.	
June 2009			Agreement to draft Framework by CSS for

Date	*Activity of the STSC*	*Activity of Joint STSC/IAEA Experts Group*	*Activity of IAEA*
			submission to IAEA Member States for review.
June 2009 to September 2009			IAEA Member States comment on draft Framework.
October 2009			Review by SSCs of IAEA Member States comments.
October 2009 to February 2010		Revise draft Framework by taking into account IAEA and IAEA Member States comments.	
February 2010	STSC approval of final Framework.		
June 2010			Endorsement of the final Framework by the CSS.
3rd Quarter 2010	Joint publication of the Framework.		Joint publication of the Framework.

Annex II

Recommended multi-year work plan

Work plan for developing a safety framework for space nuclear power sources

1. At the forty-fourth session of the Subcommittee, the Working Group on the Use of Nuclear Power Sources in Outer Space recommended that the Subcommittee and IAEA should form a partnership to develop a space nuclear power source (NPS) safety framework. As part of this recommendation, the Working Group prepared both the following work plan and a corresponding draft document preparation profile (IAEA's counterpart to the work plan of the Subcommittee), contained in annex III to the present document. The present work plan outlines the approach and schedule for developing the space NPS safety framework (hereinafter referred to as "the framework").

Approach

2. The Subcommittee and IAEA will form a joint partnership to develop a framework that will achieve the objectives, scope and attributes specified in chapter III of the present report, following a schedule and process comparable to that specified in annex I to the present document.

3. To facilitate timely preparation of draft and final documents for review and discussion by the Subcommittee during its February meeting, the Working Group, in coordination with the Secretariat of the Subcommittee, will organize and hold, as required, intersessional drafting meetings convenient to both Working Group and IAEA participants.

4. The framework will be developed in a manner consistent with the following set of considerations:

(a) The framework will be developed by a partnership between the Subcommittee and IAEA with interested members of the Subcommittee participating in the framework development process, including the establishment of the work plan;

(b) Any guidance document related to the framework development (including an IAEA document preparation profile if used as the vehicle for directing the implementation effort) and any changes to those documents will require approval by the Working Group and the Subcommittee;

(c) The partnership between the Subcommittee and IAEA will operate using the consensus rule;

(d) The Subcommittee and IAEA will not independently take steps that could affect the development of the framework without first consulting each other;

(e) The framework development process will take into consideration United Nations treaties and principles on outer space, and other applicable conventions and international law;

(f) The framework development process will also take into consideration relevant international recommendations (such as those of the International Commission on Radiological Protection);

(g) The framework will be issued as a joint product of the Subcommittee and IAEA;

(h) The development of the framework will take advantage of the safety experience and best practices of member States and international organizations with space NPS applications;

(i) The framework will be in accordance with current best safety policies, processes and procedures (i.e., best practices);

(j) The framework will be developed in such a way that it could be utilized as a guide for national purposes; it will remain voluntary and not legally binding under international law;

(k) Any future modification to the framework will be developed and approved using a joint development process between the Subcommittee and IAEA comparable to the process used to generate the original framework.

Schedule of work

2007

Adopt a schedule of work and complete a draft document preparation profile for review and approval by IAEA and the Subcommittee. Resolve any differences between the work plan of the Subcommittee and the final IAEA document preparation profile. Initiate framework drafting and consultation meetings.

2008

Hold framework drafting and consultation meetings. Review progress on the draft framework and confirm final version of work plan with the Subcommittee. Prepare draft framework for review by the Subcommittee and IAEA.

2009

The Subcommittee will review the draft framework. Hold framework drafting and consultation meetings to revise the draft framework based on the comments received from member States of, and other entities represented at, the Subcommittee and IAEA. Prepare final framework.

2010

Review and endorsement of final framework by the Subcommittee and IAEA. Publication of the framework.

Annex III

Draft document preparation profile

1. Identification

Document category	Safety Framework[1]
Working identification	To be determined
Proposed title	Safety Framework for Nuclear Power Source Applications in Outer Space
Proposed action	New document (prepared in partnership with UNCOPUOS Scientific and Technical Subcommittee)
Published title/date	To be determined/3rd quarter 2010

2. Objective

2. The objective of the proposed Safety Framework is to present high-level guidance on the safety aspects of all phases of nuclear power source applications in outer space. Such high-level guidance would represent an international consensus on the appropriate level of safety that should be achieved. It would provide a technical foundation for the development of national and multi-national standards and allow flexibility in adapting such standards to specific nuclear power source applications and organizational structures. Conformance with the Safety Framework would provide reassurance to the global public that nuclear power sources in outer space are being, and will be, used in a safe manner and could facilitate bilateral and multilateral cooperation on missions utilizing nuclear power sources.

3. Background

3. Over the last five years, the Scientific and Technical Subcommittee (STSC) of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) (with participation by the IAEA) has been working to establish the objectives, scope and attributes of an international technically based framework for the safety of planned and currently foreseeable space Nuclear Power Source (NPS) applications. The STSC recently completed this effort with a recommendation that the development of the framework be established by means of a joint partnership between the STSC and IAEA. The STSC strongly supported the view that development of such a safety framework would benefit from the IAEA's expertise and well-established procedures for developing safety standards which would complement the expertise of the Subcommittee in outer space matters.

4. In support of its recommendation of a joint partnership with the IAEA to develop this framework, the STSC adopted several "considerations" to facilitate the timely implementation and completion of the partnership's efforts. These considerations include the following:

[1] The proposed document would not be a publication within the IAEA's Safety Standards Series, but is intended to complement the Safety Standards Series by providing high-level guidance that promotes the safe use of nuclear power sources for space applications.

(a) The framework will be developed by a partnership between STSC and IAEA with interested members of STSC participating in the framework development process, including the establishment of the work plan;

(b) Any guidance document related to the framework development (including an IAEA document preparation profile if used as the vehicle for directing the implementation effort) and any changes to those documents will require approval by the Working Group[2] and STSC;

(c) The partnership between STSC and IAEA will operate using the consensus rule;

(d) STSC and IAEA will not independently take steps that could affect the development of the framework without first consulting each other;

(e) The framework development process will take into consideration United Nations treaties and principles on outer space, and other applicable conventions and international law;

(f) The framework development process will also take into consideration relevant international recommendations (such as those of the International Commission on Radiological Protection);

(g) The framework will be issued as a joint product of STSC and IAEA;

(h) The development of the framework will take advantage of the safety experience and best practices of member States and international organizations with space NPS applications;

(i) The framework will be in accordance with current best safety policies, processes and procedures (i.e., best practices);

(j) The framework will be developed in such a way that it could be utilized as a guide for national purposes; it will remain voluntary and not legally binding under international law;

(k) Any future modification to the framework will be developed and approved using a joint development process between STSC and IAEA comparable to the process used to generate the original framework.

4. Interfaces

5. Most activities during the development, manufacture and transport of nuclear power sources for use in outer space are adequately addressed in existing IAEA standards relating to terrestrial nuclear installations and activities. The Safety Framework will deal with matters not covered by existing IAEA safety standards and will address the design, launch, operation and other relevant phases of the life of a nuclear power source in outer space.

6. For the implementation of the STSC/IAEA partnership and the development of the draft texts of the Safety Framework, the STSC will function in the manner of a safety standards committee. The STSC will approve the draft DPP and the draft framework prior to its presentation to the IAEA. IAEA staff will coordinate closely with the STSC and relevant IAEA Committees to assure that any real or perceived conflicts between the new

[2] The Working Group referred to is the Working Group on the Use of Nuclear Power Sources in Outer Space of the STSC

Safety Framework and existing IAEA standards for terrestrial activities are adequately explained and qualified such that the final text of the Safety Framework has no impact on existing IAEA terrestrial standards.

5. Overview

7. The Safety Framework is intended for those who make decisions relating to the use of nuclear power sources in outer space. Its high-level guidance will reflect broad international consensus, be general and qualitative in nature, technically valid and relatively independent of evolving technology. The Safety Framework will address 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. High-level guidance will be established for the designs of nuclear power sources for use in outer space in general, but its detailed application will depend on the particular design and application and the risks posed.

6. Production

8. Production would follow the following schedule:

A. [Approval of draft DPP by the STSC – February 2007][3]

B. Agreement to DPP by IAEA safety standards committees (SSCs) – April 2007

C. Joint STSC/IAEA experts group resolves differences between STSC Multi-Year Work Plan and DPP agreed to by IAEA SSCs – April to June 2007

D. Agreement to the DPP by the Commission on Safety Standards (CSS) – June 2007

E. Joint STSC/IAEA experts group resolves differences between STSC Multi-Year Work Plan and DPP agreed to by CSS – June to November 2007

F. Joint STSC/IAEA experts group development of safety framework: (drafting and consultant meetings) – June 2007 to February 2009

G. [Approval of modifications (if any) to Multi-Year Work Plan – February 2008]

H. [STSC approval of draft Safety Framework – February 2009]

I. Agreement to draft Safety Framework by IAEA SSCs – April 2009

J. Joint STSC/IAEA experts group addresses SSC comments on draft Safety Framework – April to June 2009

K. Agreement to draft Safety Framework by CSS for submission to IAEA Member States for comments – June 2009

L. IAEA Member State comments – June 2009 to September 2009

M. Review of IAEA Member States comments by SSCs – October 2009

[3] Activities in italics are for STSC consideration only and are included for consistency with the representative timeline in Annex I.

N. STSC/IAEA experts group revision of draft Safety Framework by taking into account IAEA and Member State comments – October 2009 to February 2010

O. [STSC approval of final Safety Framework – February 2010]

P. Endorsement of the final Safety Framework by the IAEA – June 2010

Q. Target publication date – third quarter 2010