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## CHAPTER 17

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# SPACE NUCLEAR REACTOR INFORMATION

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### A. General Information

This chapter provides guidance for determining if historical records containing DOE NSI, pertaining to civilian space nuclear reactor information (SNRI) are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

SNRI is all classified and sensitive unclassified information concerning the design, arrangement, development, manufacture, testing, operation, administration, training, maintenance and repair of Naval Reactor (NR) civilian space nuclear reactors, including the associated nuclear support facilities.

The Space System is the complete system traveling beyond the Earth's atmosphere, exclusive of the Launch System.

The Launch System is the system comprised of equipment, propellant support subsystems, and related launch facilities that are used in providing thrust to the Space System until it can be independently propelled in space. This includes initial propulsion off the Earth into orbit and/or achieving escape velocity.

The Space Reactor is the collection of hardware consisting of a space nuclear fission reactor, its instrumentation and control system, reactor shielding, and those components in direct contact with reactor coolant, for which NR possesses both legal ownership and technical responsibilities. Through the sustained and controlled fission of special nuclear material, the Space Reactor provides thermal energy for conversion into useful electrical energy.

The Space Nuclear Power Plant (SNPP) is that part of the Space System consisting of

the Space Reactor and other elements of the Space System that affect reactor safety, design, operation, and reliability, for which NR possesses technical oversight responsibilities. Such elements will include additional components or subsystems affecting reactor safety, design, operation, and reliability that are added to the SNPP definition as the development effort matures.

Key enabling information is conceptual and/or specific information which makes it possible or practical to design, fabricate, or deploy a SNPP. The phrase "key enabling" implies that a substantial amount of effort and time could be saved through critical insight gained by a potential adversary. The interpretation of enabling information is integral in the application of the classification guidance provided in this chapter. SNRI is classified if it is key enabling information and will fall into one of two categories: RD or NSI, as follows:

SNRI is RD if it relates to key enabling information toward the design, fabrication, or deployment of SNPP components related to nuclear energy generation. Documents containing RD are not subject to automatic declassification under provisions of the AEA. (Refer to appendix A.)

SNRI is NSI if it pertains primarily to key enabling information toward the design, fabrication or deployment of SNPP components other than components related to nuclear energy generation.

Unclassified Space Nuclear Reactor Information (U-SNRI), although unclassified, is subject to special handling, access, marking requirements, and distribution controls (i.e., export control). All documents containing or believed to contain U-SNRI shall be referred to the Naval Reactors Office for their consideration.

## B. Broad Guidance

The purpose of this chapter is to provide a basis to determine safeguards for information (documents, material, equipment) related to civilian space nuclear reactor work assigned to NR in support of National Aeronautics and Space Administration's (NASA) Project Prometheus. Certain key enabling technologies, engineering concepts, and significant technical developments or trends related to civilian space nuclear reactors supporting Project Prometheus are classified in accordance with CG-SNR-1, *Joint DOE - NASA Classification Guide for Civilian Space Nuclear Reactors to Support NASA Project Prometheus Missions* where necessary to protect national security. Certain key enabling information related to the characteristics and capabilities of civilian space nuclear reactors; their actual design, manufacturing and operation; as well as solutions to key technical challenges are also classified.

**Historical records 25 years or older containing potential DOE/NNSA NSI, pertaining to SNRI not covered by the specific guidance below must be coordinated with the Naval Reactors Office**

to determine if they are classified RD or may contain U-SNRI (sensitive, unclassified information that has controls similar to UCNI). NSI marked documents covered by "U" topics must also be coordinated with the Naval Reactors Office for potential U-SNRI. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

**C. Topics**

**17.0 SPACE NUCLEAR REACTOR INFORMATION (SNRI)**

**NOTE: All Space Nuclear Reactor Information must be referred to NNSA Deputy Administrator for Naval Reactors for declassification review. The declassification event for the topics in this chapter occurs when the information has been officially released by the NNSA Deputy Administrator for Naval Reactors.**

**17.1 General**

**17.1.1 NASA Objectives and Applications**

17.1.1.1 NR cognizant Space Nuclear Power Plant (SNPP) overall technical objectives, and general requirements associated with NASA civilian space exploration applications **U**

17.1.1.2 Identification of certain key enabling specific SNPP design capabilities and attributes, manufacturing processes, testing and operational details, and other items as provided in Topic 17.2 (et seq.) that would aide a foreign national, or non-US Government organization or entity in developing an identical or similar SNPP capability. This includes, but is not limited to, certain key enabling supporting scientific and engineering data, analysis, critical assessments, physical material, and other information and knowledge that would provide or contribute to such an understanding **Retain Classification (potential for RD) [25X6,9; EV]**

17.1.1.3 The fact that specific actions related to or leading to construction of a land-based SNPP prototype, critical facility, and other related facilities associated with NASA civilian applications are being considered or have been done **U**

17.1.1.4 The fact that specific actions related or leading to development, design, delivery, and operational support of a SNPP for NASA civilian space applications are being considered or have been done **U**

**17.1.2 Space Reactor Technology Development and Manufacturing**

17.1.2.1 The fact that specific SNPP contractor, national laboratory or other resources possess certain capabilities and capacities, and can or will manufacture a particular type of SNPP component or subsystem **U**

17.1.2.2 Information pertaining to the security, storage, handling, and transportation of Category I quantities of Special Nuclear Material within or between contractor, national laboratory, and other sites engaged in Space Reactor development and manufacturing **Retain Classification (potential for RD) [25X6,9; EV]**

17.1.3 SNPP Prelaunch Processing Information and Equipment

Retain  
Classification  
(potential for  
RD)  
[25X6,9; EV]

17.1.4 Safety

17.1.4.1 Public and Personnel Safety Information

U

17.1.4.2 Oversight

17.1.4.2.1 The fact that evaluations, examinations, and auditing are conducted on nuclear safety and radiological matters pertaining to the SNPP, prototype, and critical facility under NR cognizance

U

17.1.4.2.2 Information related to corrective actions to resolve emergent problems or deficiencies in SNPP, prototype, or critical facility under NR cognizance, related to safety and radiological controls

Retain  
Classification  
(potential for  
RD)  
[25X6,9; EV]

17.1.4.3 Problems and Deficiencies

17.1.4.3.1 The fact that a formal system exists to monitor and correct problems resulting from deficiencies in SNPP, prototype, or critical facility design, material, or personnel actions

U

17.1.4.3.2 Information related to corrective actions to resolve emergent problems or deficiencies in SNPP, prototype, or critical facility design, material, or personnel actions

Retain  
Classification  
(potential for  
RD)  
[25X6,9; EV]

17.1.5 Administrative Matters

17.1.5.1 Project Status and Schedules – Compilation of schedules and principal events concerning or the status of design, procurement, manufacturing, delivery, assembly, test and launch of SNPP (and associated prototype) related components or systems

U

17.1.5.2 Shipping and Storage

17.1.5.2.1 Information pertaining to the security, storage, handling, and transportation of Space Reactor (and associated prototype) cores

Retain  
Classification  
[25X6,9; EV]

17.1.5.2.2 The number and precise physical location of Space Reactor (and associated prototype) cores in storage

Retain  
Classification  
[25X6,9; EV]

17.1.5.2 3	The precise location of a Space Reactor intended for installation into a NASA space system at a particular physical site	Retain Classification [25X6,9; EV]
17.1.5.2 4	The fact that Space Reactor cores are stored at a manufacturing facility	U
17.1.5.3	Final Disposition of SNPP, prototypes, critical facilities, and related components and subsystems upon completion of service	Retain Classification (potential for RD) [25X6,9; EV]
17.2	SNFP Design and Performance	
17.2.1	Technical Requirements	Retain Classification (potential for RD) [25X6,9; EV]
17.2.2	Power Level	U
17.2.3	Lifetime	U
17.2.4	Schematics and Drawings	
17.2.4.1	Schematic block diagrams providing basic component descriptions, that do not reveal information as classified elsewhere in this chapter	U
17.2.4.2	SNPP component, subsystem, and system level engineering, arrangement, and other drawings that reveal information as classified elsewhere in this guide	Retain Classification (potential for RD) [25X6,9; EV]
17.2.5	Operating Environment	U
17.3	Radiological Shield Design and Fabrication	
17.3.1	Fabrication Standards	Retain Classification [25X6,9; EV]
17.3.2	Development work that reveals commitment to a specific design, resulting in a significant reduction in shielding size or weight	Retain Classification [25X6,9; EV]

17.4 Space Reactor Instrumentation and Control, Fluid and Mechanical Systems

17.4.1 Unique sensors and instruments which are key enabling for space reactor control, including temperature and nuclear instruments

Retain  
Classification  
[25X6,9; EV]

17.4.2 Safety Analysis

17.4.2.1 The fact that a probabilistic safety (risk) assessment (PSA) is conducted for the SNPP

U

17.4.2.2 Results of a PSA

Retain  
Classification  
(potential for  
RD)  
[25X6,9; EV]

17.5 General Design and Design Analysis

17.5.1 Design and analysis procedures specifically developed for the Space Reactor

Retain  
Classification  
(potential for  
RD)  
[25X6,9; EV]

17.5.2 Computer systems and computer programs (including object code, executable code, input and output and programmable devices) used in the Naval Reactors Program

17.5.2.1 Computer programs which reveal or infer information (e.g. design attributes, key enabling features) as safeguarded elsewhere in this chapter

Retain  
Classification  
(potential for  
RD)  
[25X6,9; EV]

17.5.2.2 Methods of verifying or qualifying computer programs are unclassified unless they reveal or infer information (e.g., design attributes, key enabling features) as safeguarded elsewhere in this chapter

Retain  
Classification  
(potential for  
RD)  
[25X6,9; EV]

17.5.2.3 The fact that a computer system is vulnerable to a specific type of virus or similar problem

Retain  
Classification  
[25X6,9; EV]

17.5.2.4 A programmable device and compiler generated outputs that contain SNRI

NOTE: Unclassified if the Information is not easily extractable without significant effort and guesswork as to the source code.

Retain  
Classification  
(potential for  
RD)  
[25X6,9; EV]

17.5.3 Quality Assurance programs or procedures are unclassified unless they reveal information (e.g., design attributes, key enabling features) as safeguarded elsewhere in this chapter

Retain  
Classification  
(potential for  
RD)  
[25X6,9; EV]

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