Standard Information on the Interagency Nuclear Safety Review Board

Circa June 2024

Designed for unrestricted distribution
Introductions

Participating agencies

- U.S. Nuclear Regulatory Commission
- U.S. Department of State
- U.S. Department of Energy
- NASA
- United States Environmental Protection Agency
- U.S. Department of Defense
- U.S. Department of Transportation
The Origins of Interagency Nuclear Safety Review

• 1961 – NSAM 50 – The President should know first
• 1963 – NSAM 235 – ok, not about everything
• 1963 – DoD and AEC work out more formalized interagency review approach...
• 1965 – NSAM 50 (revised)
• 1970 – Updated review approvals procedures for “minor” sources
The Prior “Modern Era”

- 1977 – PD/NSC-25 – *stabilizing and codifying the process*
- 1995 – Revision to PD/NSC-25 – *adoption of using A2 values*
- 1996 – Revision to PD/NSC-25 – *adjusted text regarding OSTP role*

As a snapshot – INSRP in 1995:
- 2 ongoing reviews for NASA: Cassini and Mars Pathfinder
  - E.g., Submitted 280 significant comments for the Cassini Preliminary Safety Analysis Report (SAR)
  - E.g., Submitted 53 significant comments for the Mars Pathfinder Updated SAR
- Empaneled for a DoD TOPAZ II review, but no activity
- Five standing sub-panels – 50 INSRP reviewers on file
- 17 meetings recorded for ongoing reviews


A summary of this information can be found in Section 2.1 of the document at https://ntrs.nasa.gov/citations/20230002528
Nuclear Flight History for RTGs, Reactors, and RHU-only Launches

- Some launches include more than 1 RPS
- Some RTG launches included RHUs
- DoD launches are included, but have not occurred since the late 70s

U.S. Launches

- Early Earth-orbiting Satellite missions
- Mix of Earth-orbiting, lunar, and inter-planetary
- Inter-planetary missions (e.g., Galileo, Ulysses, Cassini, Mars 2020)

Federal Launch Approval Framework

Source: Table 4-1, Nuclear Power Assessment Study, Final Report, 2015
Recent missions: Mars 2020

• Launch Date: July 30, 2020
• Arrival date: Feb. 18, 2021
• Mission: The Mars 2020 "Perseverance" rover is conducting geological assessments of its landing site on Mars; Perseverance is determining the habitability of the environment, searching for signs of ancient Martian life, and assessing natural resources and hazards for future human explorers.

Source: rps.nasa.gov
Recent missions: Mars Science Laboratory

- Launch Date: Nov. 26, 2011
- Arrival date: Aug. 5, 2012
- Mission: NASA's Mars Science Laboratory (MSL) is a large, powerful science rover (Curiosity) designed to study the layered rocks of Gale Crater on the Red Planet. Its main objectives are to try to determine if life ever arose on Mars, to characterize the planet's climate and geology, and to help prepare for human exploration.

Source: rps.nasa.gov
Recent missions: Pluto New Horizons

- **Launch Date:** Jan. 19, 2006
- **Arrival date:** July 2015
- **Mission:** NASA's New Horizons spacecraft made the first close-up study of Pluto and its moons and other icy worlds in the distant Kuiper Belt. The spacecraft has seven scientific instruments to study the atmospheres, surfaces, interiors and intriguing environments of Pluto and its distant neighbors.
And on the horizon?

- INSRB is currently meeting with owners of 2 government missions:
  - DOD’s Demonstration Rocket for Agile Cislunar Operations
  - NASA’s Dragonfly
- Other government and commercial entities have expressed interest in launching space nuclear systems

Recall: Per NSPM-20, INSRB only evaluates Tier II/III government missions, and commercial launches upon the request of the Secretary of Transportation
The New “Modern Era”

- NSPM-20...
  - Introduced tiering – graded approach to authorization
  - Established quantitative Safety Guidelines for 1st time
  - Affirmed the concept of system-specific safety analyses
  - Re-affirmed DOT role as licensing organization for commercial launch of space nuclear systems
  - Created the INSRB (replacing INSRPs)

- Space Policy Directive No. 6 (2020) and Executive Order 13972 (2021) are also germane to space nuclear, but focus largely on programmatic activities
INSRB Formation

“Within 180 days of the date of this memorandum, the NASA Administrator shall establish an Interagency Nuclear Safety Review Board (INSRB). The INSRB shall consist of representatives from the Departments of State, Defense, Energy, and Transportation, the Environmental Protection Agency, NASA, and, as appropriate, the Nuclear Regulatory Commission. Each of these agencies shall designate technically qualified personnel to the INSRB.”

- NSPM-20

- Formed in February 2020
  - No INSRP experience dating back past Mars 2020

- All participants hail from the policy/safety elements of their respective Departments / Agencies

- Remarkable stability
  - 2 departures in 4 years
The INSRB Charter

I. Purpose

II. Governing Council

III. Organizational Structure and Functions

IV. Meetings

V. Functioning of the INSRB

VI. Mission-specific Review Plans

VII. Conflicts of Interest

VIII. Requirements

IX. Funding

X. Revision of This Charter

The INSRB Charter is publicly available at Nuclear Flight Safety (nasa.gov)
The INSRB Playbook (For Trial Use)

- Roles and Responsibilities
- General Conduct of Business
  - Decision making, information security, etc.
- Review and Evaluation Scope
  - Evaluation vs. analysis, review boundaries, etc.
- Review and Evaluation Process
  - Managing interfaces, exit criteria, etc.
- Review and Evaluation Products
  - Information requests, gaps report, safety evaluation report, etc.
- Appendices
  - Subject matter expertise assessment matrix, etc.

The INSRB Playbook is publicly available at Nuclear Flight Safety (nasa.gov)
The INSRB Playbook (2)

- Early engagement (standing Board)
  - Familiarization
  - System safety discussions

- Active review (Review Group)
  - Terms of Review
  - Gap identification
  - Safety Evaluation Report

- Post-authorization engagement
  - Addressing significant system/mission changes
How to Engage the INSRB

• If you are a commercial entity:
  • Engage with the FAA Office of Commercial Space Transportation, via Pre-application discussions, a Payload Review submittal, or a Launch Application submittal

• If you are a governmental entity:
  • Engage with the INSRB member from your agency

• Otherwise:
  • Use open house opportunities