Safety Policy and Requirements

For Payloads Using the International Space Station

Basic
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National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
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DESCRIPTION OF CHANGES TO

SAFETY POLICY AND REQUIREMENTS FOR PAYLOADS

USING THE INTERNATIONAL SPACE STATION

CHANGE NO.	DESCRIPTION/AUTHORITY	DATE	PAGES AFFECTED
--	Basic issue/AO96058	12/08/95	All
1	Update sections 213.1 and 220.10/R21700-ISS-0002	09/01/00	14,16,16A
2	Update section 102.2/ R21700-ISS-0003	05/18/01	2
3	Add section 223/R21700-ISS-0004	02/01/02	17
4	Update sections 105, 200.4a and 200.4b/R21700-ISS-0005	08/16/02	3,4,5
5	Update sections 105, 202.5, 213.3 and add 202.6/R21700-ISS-0006	01/22/03	3,4,8,8A,14
6	Update sections 105, 208.4a, 212.4/R21700-ISS-0007	03/25/03	4,9,9A,13,14
7	Update sections 104, 105, 212.3 and 216.5/R21700-ISS-0008	07/14/04	3,4,13,15
8	Update sections 202.5 and 212.2/R21700-ISS-0009	09/02/05	7,8,8A,13
9	Update sections 208.4, 208.4a, and renumber 208.4a through 208.4e to 208.4b through 208.4f/R21700-ISS-0011	09/26/07	9,9A,10
10	Update section 208.4f/R21700-ISS-0012	11/14/07	10,10A
11	Update section 208.4b/R21700-ISS-0013	08/27/08	9A

DESCRIPTION OF CHANGES TO

SAFETY POLICY AND REQUIREMENTS FOR PAYLOADS

USING THE INTERNATIONAL SPACE STATION (Concluded)

CHANGE NO.	DESCRIPTION/AUTHORITY	DATE	PAGES AFFECTED
12	Add section 209.1C/R21700-ISS-0015	10/08/08	11,11A

Note: Dates reflect latest signature date of CR's received by PILS.

ADDENDUM SCOPE

This addendum to NSTS 1700.7B has been prepared to expand and modify the existing NSTS 1700.7B requirements such that International Space Station (ISS) payload safety requirements are identified to the ISS payload development organizations.

The addendum is structured such that when it is used in conjunction with a unique Payload Integration Plan (PIP), the payload organization can provide a safe design for both the STS transportation phases and the ISS on-orbit operations. ISS payload which have a direct physical or functional interface with the orbiter or a Space Shuttle carrier in addition to a direct physical/functional interface with ISS carriers or elements must comply with the applicable requirements of the basic NSTS 1700.7B as well as the applicable requirements of this addendum.

ADDENDUM STRUCTURE

This addendum has been structured to take maximum advantage of the familiarity most payload organizations have with safety requirements defined in NSTS 1700.7B, and the safety process defined in NSTS 13830. These documents have been in use for many years with hundreds of major and minor payloads developed and flown on the Space Shuttle. The addendum approach was selected to relate Space Station requirements to the user’s in a form that maintains continuity between the Shuttle and Space Station programs.

This addendum addresses each paragraph of NSTS 1700.7B and defines its applicability. Existing NSTS 1700.7B paragraphs have been identified as 1) Applicable, 2) Applicable with change, 3) Not applicable, or 4) Applicable only when specifically identified in the PIP. Paragraphs in this addendum have been identified as “added” when there is no existing counterpart in NSTS 1700.7B.

Signed by H. R. Brinkley
H. R. Brinkley
Manager, Space Station Program Office

Signed by T. W. Holloway
T. W. Holloway
Manager, Space Shuttle Program

CHAPTER 1: GENERAL

100 Purpose - Applicable with change

Change “Space Transportation System (STS)” to “International Space Station (ISS)”

101 Scope - Applicable with change

Change the “the STS” to “the STS and the ISS”
Change “STS” to “STS/ISS”

101.1 GSE Design and Ground Operations - Applicable

101.2 Flight Rules - Applicable with change

Change “STS mission” to “ISS increment”
Change “STS flight” to “ISS objectives”
Change “STS user” to “ISS user”

102 Responsibility - Applicable

102.1 Payload Organization - Applicable with change

Change “NSTS” to “ISS”

102.2 NSTS - Applicable with change

Change to read as follows:

“102.2 Payload Safety Review Panel (PSRP) and Ground Safety Review Panel (GSRP), and ISS Program”

“The Payload Safety Review Panel (PSRP) and the Ground Safety Review Panel (GSRP) have been assigned the responsibility for conducting safety reviews for ISS payloads. The PSRP will review payloads for safety for all phases of flight operations. The GSRP will review payloads for safety for prelaunch and postlanding operations. The panels will be augmented by ISS representatives and International Partners as required.”

“It is the responsibility of the ISS Program to assure that interaction among mixed payloads, and between payloads and the ISS, does not create a hazard.”

103 Implementation - Applicable with change

Change “NSTS” to “PSRP” in all locations

103.1 Implementation Procedure - Applicable with change

Change “NSTS” to “NSTS/ISS” in all locations other than it’s use in association with “NSTS 13830”

103.2 Interpretations of Requirements - Applicable with change

Add the following sentence to the existing paragraph:

“Each additional addenda to NSTS 18798 will include an update table of contents which will also reflect the applicability of each letter to STS and/or ISS payloads.”

104 Glossary of Terms – Applicable with change

For the waiver definition, change “one mission only” to “one or more missions or increments”

105 Applicable Documents - Applicable with change

Add the following documents:

SSP 30237	Space Station Electromagnetic Emission and Susceptibility Requirements for EMC - Referenced in paragraphs 202.5 and 212.2.
SSP 30425	Space Station Program Natural Environment Definition for Design – Referenced in paragraph 208.4e.
SSP 50005	International Space Station Crew Integration Standard (NASA Standard 3000) - Referenced in paragraph 202.5.
SSP 52005	ISS Payload Flight Equipment Requirements and Guidelines for Safety Critical Structures - Referenced in paragraph 208.1.
SSP 57000	Pressurized Payloads Interface Requirements Document – Referenced in paragraphs 202.6 and 213.1.
SSP 57025	ISS Payload Interface Systems Fault Tolerance Document – Referenced in paragraph 200.4b.

TM 102179	Selection of Wires and Circuit Protective Devices for Orbiter Vehicle Payload Electrical Circuits - Referenced in paragraph 213.1.
	Paragraph deleted
NSTS 21000-IDD-ISS	International Space Station Interface Definition Document – Referenced in paragraphs 202.5, 202.6, 212.3, and 213.3.

106 Figures - Applicable

CHAPTER 2: TECHNICAL REQUIREMENTS

200 General - Applicable

200.1 Design to Tolerate Failures - Applicable

200.1a Critical Hazards - Applicable with change

Change “STS” to “STS/ISS”
Change “Orbiter” to “Orbiter/ISS”

200.1b Catastrophic Hazards - Applicable with change

Change “Orbiter” to “Orbiter/ISS”
Change “STS” to “STS/ISS”

200.2 Design for Minimum Risk - Applicable with change

Change “NSTS” to “NSTS/ISS”

200.3 Environmental Compatibility - Applicable

200.4 ISS Services - Title change only

200.4a Safe Without Services - Applicable when changed to read as follows:

“Payloads shall be designed to maintain fault tolerance or safety margins consistent with the hazard potential, without ground or flight crew intervention, in the event of sudden loss or temporary interruption of Space Station provided services. The payload must remain in a safe state until returned to operation by the ground or flight crew.”

200.4b ISS Critical Services (title change only) - Applicable when changed to read as follows:

“When Space Station services are to be utilized to assist in controlling payload hazards, the integrated system must meet the failure tolerance requirements of paragraph 200.1. SSP 57025 specifies the fault tolerance of Space Station-provided payload services which must be used when conducting payload hazard analyses. The payload organization must provide a summary of the hazards being controlled by the Space Station services in the Safety Compliance Data Package, and the individual hazard reports must identify those space station interfaces used to control and/or

monitor those hazards. In addition, the payload organization shall identify, in the payload/SS Interface Control Document (ICD), those space station interfaces used to control and/or monitor the hazards. Those payloads having hazards controlled by ISS-provided services and utilities shall perform post-mate interface verification prior to payload operations having hazard potential."

201 Control of Hazardous Functions - Applicable

201.1 General - Applicable

201.1a Inhibits - Applicable

201.1b Controls - Applicable

201.1c Monitors - Applicable

201.1c(1) Near Real-Time Monitoring - Applicable with change

Change the last sentence to read as follows:

"Local visual indicators shall not be used as the only source of safety monitoring unless the crew is actively engaged in payload operations at the visual indicator location."

201.1c(2) Real-Time Monitoring - Applicable with change

Change "Orbiter failure detection and annunciation system" to "ISS caution and warning system"

Change "switch panel talk back" to "local visual indicators"

201.1c(3) Unpowered Bus Exception - Applicable

201.1d Use of Timers - Applicable with change

Change "Orbiter" to "ISS"

201.1e Computer-Based Control Systems - Applicable

201.1e(1) Active Processing - Applicable

201.1e(2) Control of Inhibits - Applicable

201.2 Functions Resulting in Critical Hazards - Applicable

201.3 Functions Resulting in Catastrophic Hazards - Applicable

202 Specific Catastrophic Hazardous Functions - Applicable

202.1 Solid Propellant Rocket Motors

- through -

202.2d Propellant Leakage

The above paragraphs (202.1 through 202.2d) are not applicable to Space Station payloads unless specifically applied by the PIP.

202.3 Applicable

202.4 Planned Deployment/Extension Functions - Applicable

202.4a Preventing Payload Bay Door Closure - Applicable

202.4b Cannot Withstand Subsequent Loads - Applicable with change

Change “STS” to “STS/ISS”

Delete the last sentence which reads:

“Safing may include deployment, jettison, or provisions to change the configuration of the payload to eliminate the hazard.”

202.4c Added paragraph

202.4c Payload Reconfiguration

Payload equipment shall not be reconfigured, erected, or operated upon in a manner which could present a hazard to the crew, ISS/Orbiter, or which would make it unsuitable for safe return if the item is planned for return.

202.5 RF Transmitters - Applicable when changed to read as follows:

Allowable levels of radiation from ISS payload transmitting antenna systems are defined in NSTS 21000-IDD-ISS paragraph 10.7.3.2.2. These levels define the ISS payload-to-ISS payload, ISS payload-to-Orbiter payload (while in cargo bay), and ISS payload-to-Extravehicular Activity (EVA) limits. ISS payloads with intentional radiation

above the NSTS 21000-IDD-ISS limits will be assessed by the Space Shuttle Program (SSP) and the ISS Electromagnetic Effects Panel (EMEP) for hazardous impact. The Radio Frequency (RF) exceedances will be identified in the payload-unique or mission-unique control document.

Allowable levels of radiation from ISS payload transmitting antenna systems are also defined in ISS-approved Integration Plan (IP) equivalent vehicle interface documents.

202.5a Not applicable

202.5b Not applicable

202.5c Not applicable

202.5d Applicable when changed to read as follows:

For external ISS payload transmitters, three independent inhibits are required whenever the intentional radiation would exceed the NSTS 21000-IDD-ISS limits and is assessed as hazardous by the Joint Technical Working Group (JTWG).

202.5e Not applicable

202.5f **ISS Limitations** - Allowable levels of intentional radiation from ISS payload transmitting antenna systems in their operation locations are limited as follows:

(1) ISS Equipment Limits are defined by the RS03 test limit in SSP 30237

(2) Crew Exposure Limits are defined in SSP 50005 paragraph 5.7.3.2.1(A)

202.5g **Assembly and Transport** - Intentional radiation is not permitted during assembly of transmitting equipment. Intentional radiation is not permitted during transport of transmitting equipment connected to an electrical power source. Radiation during transport for battery-powered transmitters must be approved by the JTWG.

202.6 **Fluid Release from a Pressurized System Inside of a Closed Volume** - Applicable with change

Change “NSTS” 07700 (Volume XIV, Attachment 1, ICD-2-19001, section 10.6.2.3)” to “NSTS 21000-IDD-ISS, paragraph 10.6.2.3.”

Add the following sentences:

”Release of any fluid from a payload pressurized system shall not compromise the structural integrity of any ISS pressurized module. Payloads with pressurized systems must comply with the requirements of SSP 57000, paragraph 3.7.5, or ISS-approved International Partner equivalent.”

203 Retrieval of Payloads - Applicable

203.1 Safing - Applicable

203.2 Substantiating Failure Tolerance - Applicable with change

Change “Orbiter” to “Orbiter/ISS” in two places
Change “NSTS” to “PSRP”

203.3 Monitoring - Applicable

203.4 Certification - Applicable with change

Change “NSTS” to “NSTS/ISSP”
Change “STS” to “STS/ISS”

204 Hazard Detection and Safing - Applicable with change

Change “Orbiter” to “ISS”
Change “NSTS” to “PSRP”

Add the following sentence:

"Flight or ground crew hazard detection and safing actions are not available for ascent and descent flight phases."

205 Contingency Return and Rapid Safing - Applicable with change

Change the paragraph to read as follows:

"The payload design shall not impede emergency IVA egress to the remaining contiguous pressurized volumes. Crew egress time from experiment apparatus shall be less than 30 seconds."

206 Failure Propagation - Applicable

207 Redundancy Separation - Applicable

208 Structures - Applicable

208.1 Structural Design - Applicable with change

Delete "STS" from first sentence
Change on-orbit load safety factor from 1.4 to 1.5 for ISS payloads
Change the third sentence to read as follows:

"Verification of design compliance shall be in accordance with NSTS 14046 and SSP 52005."

208.2 Emergency Landing Loads - Applicable

208.3 Stress Corrosion - Applicable with change

Delete "NSTS" in two places

208.4 Pressure Systems/Pressure Vessels - Applicable

208.4a Pressure Relief Capability - Applicable

208.4b Pressure Vessels - Applicable with change

Add the following sentence:

"The minimum factor of safety for ISS payload pressure vessels is 2.0 x MDP. The vessel design and test program must certify the vessel for all environments and service life."

208.4b(1) Metallic Pressure Vessels - Applicable

208.4b(2) Composite Overwrapped Pressure Vessels (COPVs) - Applicable

208.4c **Dewars** - Applicable with change

Make the following addition to item (5):

"ISS payloads may vent non-hazardous gas into the waste gas system in accordance with the SSP 52000, Payload Interface Definition Documents (IDD's). Payloads using the waste gas system and external payloads shall identify venting requirements in the payload unique Interface Control Document (ICD)."

208.4d **Pressurized Lines, Fittings, and Components** - Applicable with change

Change the safety factor for lines and fittings 1.5 - inch or greater outside diameter from 1.5 to 2.0 for ISS payloads in item (1).

Change "Orbiter" to "Orbiter/ISS" in item (4).

208.4e **Flow Induced Vibrations** - Applicable with change

Delete "to the STS"

208.4f Added paragraph

"208.4f Meteoroid and Debris Protection

"An external payload with pressure vessels, cryogenic carrier, or other hardware that would create a hazard if impacted by meteoroid/debris shall provide meteoroid/debris shielding with sufficient probability to prevent the impact of the critical hardware resulting in a hazard. The Probability of No Penetration (PNP) of the shielding shall be equal or better than the lesser value of 0.9999 or 0.99999^(A*Y) where A is the exposed surface area of the critical hardware in square meters and Y is the number of years exposed. The M/OD shielding shall reduce the risk for damage to the payload that could endanger crew survivability, including initial failure of the payload and secondary effects of the failure, by providing protection that meets or exceeds the PNP requirements.

Sections 8.1 and 8.2 of NASA SSP 30425 specify a summary of the meteoroid environments and the associated shielding/defocusing factors and space debris environment. Section 5.1.5 of SSP 52005 defines the constraining parameters to be applied to these environments, as well as verification criteria for this requirement."

208.5 Sealed Compartments - Applicable with change

Change the paragraph to read as follows:

“208.5 Sealed or Vented Compartments

Payload sealed compartments shall be designed to withstand the maximum pressure differential created by ascent, descent, or on-orbit emergency ISS depressurization or repressurization activity. Vented compartments must size vent flow areas such that structural integrity is maintained at the maximum rate of change of pressure.”

209 Materials - Applicable with change

Change “NSTS” to “NSTS/ISSP” in two places

209.1 Hazardous Materials - Applicable with change

Add the following sentence to the existing paragraph:

“Hazardous materials shall not be released or ejected in or near the ISS, unless such release/ejection has been negotiated with the ISSP.”

209.1a Fluid Systems - Applicable with change

Change “NSTS” to “PSRP”

209.1b Chemical Release - Applicable with change

Change “STS” to “STS/ISS”

209.1c Biological Releases – Any biological material released in the spacecraft habitable volume that would create an immediate or latent biohazard to a crewmember or cause a hazard to vehicle hardware shall be controlled. Containment will be provided by an approved pressure vessel as defined in paragraph 208.4, or the use of independent levels of containment depending on the Biosafety Review Board assessment of the biological material. The payload organization must assure that each level of containment will not leak or erode under the maximum use conditions (i.e., vibration, temperature, pressure, etc.). Documentation of the biological sample’s orgin, usage, and the containment methods must be supplied for review and approval according to JSC-63828.

209.2 Flammable Materials - Applicable with change

Change “STS” to “STS/ISS”

209.2a **Orbiter Cabin** - Not applicable unless the payload is transported or operated in the Orbiter cabin.

209.2b **Other Habitable Areas** - Applicable with change

Add the following two paragraphs to the existing paragraph:

“The ISS worst case operating environment is 15.2 psia with 24.1 percent oxygen for all locations except airlocks. Airlock worst case environment is 10.2 psia with 30 percent oxygen. Payloads are only required to test materials in the worst case airlock environment if they intend to operate in the airlock during EVA preparations.

When flammable materials are used in quantities where the weight or surface area is greater than 0.1 pounds or 10 square inches, respectively, the methods of control of flame propagation must be described in the "flammability assessment report," prepared in accordance with NSTS 22648."

209.2c **Outside Habitable Areas** - Applicable with change

Change "Orbiter cabin" to "pressurized areas"

209.3 **Material Offgassing in Habitable Areas** - Applicable with change

Change "STS" to "STS/ISS"
Change "NSTS" to "ISSP"

210 **Pyrotechnics** - Applicable with change

Change the paragraph to read as follows:

"If premature firing or failure to fire will cause a hazard, the pyrotechnic subsystem and devices shall meet the design and test requirements of MIL-STD-1576."

210.1 **Initiators** - Applicable with change

Change the paragraph to read as follows:

"NASA Standard Initiators (NSI's) are the preferred initiators for all safety critical pyrotechnic functions. Extensive qualification and acceptance test programs are required if other initiators are used."

210.1a **Flight Unit Acceptance Test** - Not applicable

210.1b **Design Configuration** - Not applicable

210.1c **Design Verification** - Not applicable

210.2 **Pyrotechnic Operated Devices** - Applicable

210.2a **Debris Protection** - Applicable with change

Change "the Orbiter" to "in or near the ISS/Orbiter"

210.2b **Must Function Safety Critical Devices** - Applicable with change

Change “NSTS review” to “PSRP review”

210.2c **Electrical Connection** - Applicable with change

Change the paragraph to read as follows:

“Payloads with pyrotechnic devices which if prematurely fired may cause injury to people or damage to property shall be designed such that these devices can be electrically connected after all payload/Space Station electrical interface verification tests have been completed. Ordnance circuitry must be verified safe prior to connection of pyrotechnic devices.”

210.3 **Traceability** - Applicable with change

Change “NSTS” to “PSRP”

211 Destruct Systems - Applicable with change

Change “NSTS” to “PSRP”

212 Radiation - Applicable

212.1 **Ionizing Radiation** - Applicable

212.2 **Emissions and Susceptibility** - ISS payload emissions shall be limited to those levels identified in section 10.7.3 of ICD 2-19001 or section 8.3 of NSTS 21000-IDD-MDK. Payloads with unintentional radiation Electromagnetic Interference (EMI) above the levels identified in ICD-2-19001 or NSTS 21000-IDD-MDK will be assessed by the SSP for hazardous impact. The EMI exceedances will be identified in the payload-unique ICD or an equivalent document. The payload must demonstrate that its safety critical equipment is not susceptible to the electromagnetic environment defined in section 10.7.2 of ICD 2-19001 or section 8.2 of NSTS-21000-IDD-MDK.

212.3 **Lasers** - Applicable with change

Change “STS” to “ISS”

Change “ICD-2-19001” to “NSTS 21000-IDD-ISS”

212.4 Optical Requirements - Applicable

213 Electrical Systems - Applicable

213.1 General - Applicable with change

Change “Orbiter” to “Orbiter/ISS”

Insert the following two sentences between the first and second existing sentences:

“Circuit protective devices and wire sizes shall conform to the requirements of SSP 57000, Pressurized Payload Interface Requirements Document (IRD) or ISS approved International Partner equivalent, at the payload power distribution interface with ISS. For payload power distribution within the payload, circuit protective devices shall be sized such that steady state currents in excess of those allowed by TM 102179 are precluded.”

213.2 Batteries - Applicable with change

Change “STS” to “ISS” in two places
Change “NSTS” to “PSRP”

213.3 Lightning - Applicable with change

Change “NSTS 07700, Volume XIV, Attachment 1 (ICD-2-19001)” to “NSTS 21000-IDD-ISS”.

214 Verification - Applicable

214.1 Mandatory Inspection Points (MIP’s) - Applicable

214.2 Verification Tracking Log - Applicable

215 Hazardous Operations - Applicable

215.1 Hazardous Identification - Applicable with change

Change “STS” to “STS/ISS”

215.2 Exposure to Risk - Applicable with change

Change “STS” to “STS/ISS”

215.3 Access - Applicable

216 Series Payloads and Reflown Hardware - Applicable with change

Change “STS” to “STS/ISS” in two places

216.1 Recertification of Safety - Applicable

216.2 Previous Mission Safety Deficiencies - Applicable with change

Change “NSTS” to “PSRP”

216.3 Limited Life Items - Applicable with change

Change “STS” to “ISS”

216.4 Refurbishment - Applicable

216.5 Safety Waivers and Deviations - Applicable with change

Change “STS flight must be corrected” to “mission(s) or increment(s) must be corrected after expiration of the waiver’s effectivity and prior to reflight.”

217 Extravehicular Activity (EVA) - Applicable with change

Add the following sentence to the existing paragraph:

“All ISS external attached payloads must design to the sharp edge, protrusion and glove temperature requirements of NSTS 07700, Volume XIV, Appendix 7, even if EVA is not planned or anticipated.”

218 Payload Commanding - Applicable

219 Flammable Atmosphere - Applicable if not transported within a pressurized volume

220 Crew Habitable Payloads

- through -

220.9 Pressure Hull

The above paragraphs (220 through 220.9) are not applicable to Space Station payloads.

220.10 Added paragraph

"220.10 Fire Protection"

"Fire protection requirements reflect the operating environment that is of extended duration with low personnel density in the habitable volumes. These requirements are intended to be consistent with the standard operational ISS crew responses where practical using standardized design and operations approaches."

"220.10a Fire Prevention"

"(1) Control of potential fuels, oxidizers and flame propagation shall be accomplished by compliance with the materials control requirements of paragraph 209 above."

"(2) Friction, spontaneous combustion and other identifiable potential ignition sources shall be controlled to not create a fire event. Proper electrical power distribution design in accordance with paragraph 213 above shall be practiced for reduction of potential ignition sources."

"220.10b Fire Event Detection"

"Fire event detection is required to provide timely notification to the crew of a fire event for all potential fire event locations within the payload."

"(1) The preferred means of fire detection shall be by use of an approved ISS rack smoke detector. Implementation of ISS rack smoke detectors includes crew notification of a fire event by activation of a Class I alarm via the ISS C&W system and interruption of power to the affected rack. Subrack payload volumes must exchange air with the rack volume if they are to be considered part of the general rack fire event location covered by the rack smoke detector."

"(2) For potential payload fire event locations not covered by a rack smoke detector, the payload must provide alternate means to assure an

undetected fire event does not occur. When a fire event (or precursor condition) is detected by the alternate means, data shall be provided to the ISS C&W and PCS systems for annunciation of the occurrence of the event and to enable display of its location."

"220.10c Fire Event Suppression"

"The Payload shall include provisions to enable prompt control of fire events, should one occur. Where fire extinguisher access ports are provided, they shall be consistent with the ISS Portable Fire Extinguishers. Provisions shall be included for removal of power and termination of forced airflow when a confirmed event is detected. Where power is removed by an automatic safing device, it shall not be automatically re-applied. Sealed containers which can be shown to preclude replenishment of oxygen and contain combustion effects and products during a fire event may rely on self-extinguishment in lieu of active-suppression."

221 Added paragraph

"221 Electrical Connections"

"The design of electrical connectors shall make it impossible to inadvertently reverse a connection or mate the wrong connectors if a hazardous condition can be created. Payload and on-orbit support equipment wire harnesses and connectors shall be designed such that no blind connections or disconnections must be made during payload installation, operation, removal, or maintenance on-orbit unless the design includes scoop proof connectors or other protective features."

222 Design Features - Added

222.1 Sharp Edges and Corner Protection

"Payload design within a pressurized module shall protect crewmembers from sharp edges, protrusions, etc., during all crew operations. Translation paths and adjacent equipment shall be designed to minimize the possibility of entanglement or injury to crewmembers."

222.2 Added paragraph

"222.2 Touch Temperatures

Payloads within a pressurized module shall be designed such that the crew will not be exposed to excessive high or low surface touch temperatures.”

223 Added paragraph

“223 Hatch Drag-Throughs”

Routing of payload hardlines, cables, or hoses through an open crew egress hatch is not permitted.

CHAPTER 3: SYSTEM PROGRAM REQUIREMENTS

300 General - Applicable

301 Safety Analysis - Applicable with change

Change “NSTS” to “PSRP”

302 Hazard Levels - Applicable

302.1 Critical Hazard - Applicable with change

Change “STS” to “ISS”
Change “Orbiter” to “ISS”

302.2 Catastrophic Hazard - Applicable with change

Change “Orbiter” to “ISS”
Change “STS” to “ISS”

303 Hazard Reduction - Applicable

303.1 Design for Minimum Hazard - Applicable

303.2 Safety Devices - Applicable

303.3 Warning Devices - Applicable

303.4 Special Procedures - Applicable

304 Safety Assessment Reviews and Safety Certification - Applicable with change

Delete “NSTS” in all locations except for its use associated with 13830.

305 Safety Compliance Data - Applicable with changes:

Change “the STS” to “STS and ISS”

Add the following:

“Integrated payload complement safety compliance data packages shall be prepared by the rack integration organization.”

305.1 For GSE and Ground Operations - Applicable with change

Delete “NSTS” in the first sentence

305.2 For Payload Design and Flight Operations - Applicable with change

Change “NSTS flight operator” to “PSRP”

305.3 Past Phase III Compliance - Applicable

306 Mishap/Incident/Mission Failures Investigation and Reporting - Applicable