SEISMIC RESTRAINT CABLE FOR SCHe HELIUM BOTTLES

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Abstract: Seismic Restraint Cable for SCHe Helium Bottles

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Release Approval

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Date

Release Stamp

Approved for Public Release

Commercial Grade Item Upgrade Dedication Form

SNF-4880, Rev. 0

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Section 1 Part Information

Item No.: N/A	Manufacturer:	Supplier:
Mfg. Part/Model No.:	Supplier's P/N:	
Part Description:		
End Use Description:		

Section 2a Component Information

Equipment No.: Seismic Restraint Cables for SCHe supply bottles to the Helium process system.	Specification No.: W-441-P5, Rev. 2; Dwg. H-1-82367 with DCN W-441-HE-446.	Manufacturer: McMaster-Carr	Past P.O. No.: N/A
Manufacturer's Part/Model No.: 30785T5 Dwg. H-1-82367, Item 72 with DCN W-441-HE-446.	Equipment Supplier (if different from manufacturer):		Equip. Supplier's Part No.:

Component Description: **This seismic restraint cable fits the neck of the SCH helium supply bottle to limit bottle motion in the event of a Seismic Event.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue of a qualified NQA1 supplier? (coordinate with project CGI interface Engineer or BTR)
- ☐ YES (go to #2 below)
- ☒ NO (go to procedure step 6.3.2, proceed to dedicate Item.)
- If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI interface Engineer or BTR)
- ☐ YES (go to #2 below, then go to procedure step 6.3.2, proceed to dedicate Item)
- ☒ NO (go to procedure step 6.3.2, proceed to dedicate Item.)

2. List of Candidate qualified suppliers or ISO 9000 suppliers
company name & type	contact name	phone
N/A		

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR):
- NA**

Section 2c CGI Determination

1. Question #1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?
- ☐ YES (the Item is not commercial grade)
- ☒ NO (continue)

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2. Question #2: Is the Item used in applications other than nuclear facilities or activities?

☐ NO (the item is not commercial grade)

☒ YES (continue)

3. Question #3: Is the Item ordered from manufacturer/supplier on the basis or specifications set forth in the published product information (e.g. manufacturer's catalog)?

☐ NO (the Item is not commercial grade)

☒ YES (continue)

☒ **All three criteria have been satisfied. The Item meets the definition of commercial grade.**

Section 2d Reason for Dedication

The above described Item is being Dedicated for use in the application cited for the following reason(s):

☒ Item is being purchased from a non ESL manufacturer supplier as commercial grade to be used in a Safety Class application.

☐ Item is being purchased from a non ESL manufacturer supplier as commercial grade to be used in a Safety Significant application.

☐ Item was purchased from a non ESL manufacturer supplier as commercial grade to be used in a Safety Class application.

☐ Item was purchased from a non ESL manufacturer supplier as commercial grade to be used in a Safety Significant application.

☐ Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **The cable provides a restraint to limit motion of the SCHe helium supply bottle in the event of a Seismic Event.**

2. **Maintain critical function before, during, and after Seismic Event**

3.

B. Part/Component Functional Mode:

Safety Function #1:

☐ Active – Mechanical or Electrical change of state is required to occur for the component to perform its safety function

☒ Passive – Change of state is not required for the component to perform its safety function

Safety Function #2:

☐ Active – Mechanical or Electrical change of state is required to occur for the component to perform its safety function.

☒ Passive – Change of state is not required for the component to perform its safety function

Safety Function #3:

☐ Active – Mechanical or Electrical change of state is required to occur for the component to perform its safety function.

☐ Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

1.

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D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):		
1. Failure of the restraint cable during a Seismic Event could allow bottle displacement which may be in excess of movement experienced during the seismic testing. The effects of this condition on the SCHe supply integrity is not defined and would constitute an unreviewed safety question.		
2. Damage/corrosion of the cable may reduce its strength to withstand the forces associated with the Seismic Event		
Section 4 Environmental & Natural Phenomena Hazard Design		
Environmental Qualification Required: Yes [] No [X]	If yes: Environmental Qualification Requirements Limiting Environmental Conditions: Required Safety Functions: Qualification Period:	
Environmental Condition B		
Natural Phenomena Hazard (NPH) Design Required: Yes [X] No []	If yes: NPH Design Requirements Performance Category: PC-3 NPH Design Req'ts.: Seismic Condition C Required Safety Functions: Maintain critical function before, during, and after Seismic Event.	
HNF-PRO-97, Rev. 0 W-441-P5, Rev. 2 with DCN W-441-HE-446.		
Section 5 Component Functional Classification		
[X] Safety Class (SC) [] General Service (GS) [] Safety Significant (SS)		
If part/component classification is different from host component/system, document basis. N/A		
Section 6 (Reserved)		
Section 7 (Reserved)		
Section 8 References (for Functional Classification)		
National Codes/Standards:	Safety Analysis Report (SAR): HNF-SD-SNF-SAR-002, REV. 4A	Drawings: Dwg. H-1-82367, Item 72 with DCN W-441-HE-446. HNF-SD-SNF-SEL-002, Rev. 6A
Vendor Manual/Manufacturer/Supplier Information: McMaster-Carr Pages 1013 and 1020		
Other: N/A		

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Section 9 Critical Characteristics				
Critical Characteristics Verification Document: Dwg. H-1-82367, Item 72 with DCN W-441-HE-446. HNF-SD-SNF-SEL-002, Rev. 6A	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	McMaster-Carr	1, IN	X	
Component Number - Procurement and/or Model Number	30785T5 (Per Procurement Package W-441-P5, Rev. 2, Dwg H-1-82367 with DCN W-441-HE-446, Item 72)	1, IN	X	
Cable Diameter	Nominal 1/4"	1, IN	X	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
End Connections	3/8-24 Threaded Stud One End, Loop with Stainless Steel Swage Fitting on Other End.	1, IN	X	
Material	Stainless Steel Note 3	1, IN 1, T	X	
3. Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Environmental	Note 1			
Seismic Condition C	Note 2	1, T		X
Cable Condition	Cable Free of Kinks or Broken Strands Which Could Affect Load Capacity.	1, IN		X
4. Notes and Legend:		Acceptance Method:		
1. The seismic restraint cable is not subject to degradation from the 40°F and 60% RH or 115°F and 22% RH conditions and is suitable for Environmental Condition B application. 2. Maintain critical function before, during, and after seismic event. W-441-P5, Rev. 2, Appendix I, page I-2, provides a seismic testing plan for these components at a seismic spectra TBD. Equipment that has been shaker-table tested should not be installed in a plant (Ref. IEEE Standard 344-1984, Section 7). Consequently, the seismic test constitutes a destructive test. 3. Material verification acceptance method may be by either inspection or test.		1. Special Test and Inspection 1, IN for Inspection 1, T for Test 2. Commercial Grade Survey 3. Source Verification 4. Vendor/Item History		
Section 10 Initial Review and Approval				
Approvals: Designated Engineer: 7-26-97 Design Authority: 8/2/99 QA Engineer: 7/27/99				

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WORKSHEET 1 DETERMINATION OF FAILURE MECHANISMS/MODES

Section 1

Typical Failure Mechanisms	Definition	Applicable to Component under Evaluation
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.	Yes [☒] No [☐]; If Yes, indicate failure Mode: Failure of the seismic restraint cable may permit bottle movement which may be greater than experienced during the seismic qualification test.
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	Yes [☐] No [☒]; If Yes, indicate failure Mode _____
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.	Yes [☐] No [☒]; If Yes, indicate failure Mode _____
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.	Yes [☐] No [☒]; If Yes, indicate failure Mode _____
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	Yes [☐] No [☒]; If Yes, indicate failure Mode _____
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.	Yes [☐] No [☒]; If Yes, indicate failure Mode _____
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	Yes [☐] No [☒]; If Yes, indicate failure Mode _____
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.	Yes [☐] No [☒]; If Yes, indicate failure Mode _____
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.	Yes [☐] No [☒]; If Yes, indicate failure Mode _____
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.	Yes [☐] No [☒]; If Yes, indicate failure Mode _____
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.	Yes [☐] No [☒]; If Yes, indicate failure Mode _____
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.	Yes [☐] No [☒]; If Yes, indicate failure Mode _____

Section 2. Additional Failure Modes Applicable to the Component Under Evaluation

- Damage to or deterioration of the cable with use that could reduce its strength.**

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CHECKLIST 1
ACCEPTANCE METHOD 1
SPECIAL TEST/INSPECTION VERIFICATION

SECTION 1			
Item Description: Stainless Steel Seismic Restraint Cable For SCHe Helium Bottles.		Equip #: Dwg. H-1-82367, Item 72 with DCN W-441-HE-446.	
System #: 13-2		Model #: 30785T5	
Manufacturer (Address/Phone): McMaster-Carr		Supplier (Address/Phone):	
P.O. #			
SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.			
Insp	Test	Post-Test	
☒	☐	☐	1. Manufacturer
☒	☐	☐	2. Component Number - Procurement and/or Model Number
☒	☐	☐	3. Cable Diameter
☒	☐	☐	4. End Connections
☒	☒	☐	5. Material (Verification may be by either inspection or test)
☒	☐	☐	6. Cable Condition
☐	☒	☐	7. Seismic Condition C
SECTION 3 VERIFIED BY INSPECTION			
* See Attachment G of Desk Instruction for Sampling Size			
Characteristic: Manufacturer			
Sample Size*: All Items			
Acceptance Criteria: McMaster-Carr			
Receipt Inspection Plan / Report #: _____			
References (see Section 8): _____			
Characteristic: Component Number - Procurement and/or Model Number			
Sample Size*: All Items			
Acceptance Criteria: 30785T5			
Receipt Inspection Plan / Report #: _____			
References (see Section 8): McMaster-Carr Pages 1013 and 1020			

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<p>Characteristic: Cable Diameter</p> <p>Sample Size*: All Items</p> <p>Acceptance Criteria: Nominal 1/4"</p> <p>Receipt Inspection Plan / Report #: _____</p> <p>References (see Section 8): _____</p>
<p>Characteristic: End Connections</p> <p>Sample Size*: All Items</p> <p>Acceptance Criteria: 3/8-24 Threaded Stud One End, Loop with Stainless Steel Swage Fitting on Other End.</p> <p>Receipt Inspection Plan / Report #: _____</p> <p>References (see Section 8): _____</p>
<p>Characteristic: Material</p> <p>Sample Size*: Normal Sampling Size</p> <p>Acceptance Criteria: Stainless Steel</p> <p>Receipt Inspection Plan / Report #: _____</p> <p>References (see Section 8): _____</p>
<p>Characteristic: Cable Condition</p> <p>Sample Size*: All Items</p> <p>Acceptance Criteria: Cable Free of Kinks or Broken Strands Which Could Affect Load Capacity.</p> <p>Receipt Inspection Plan / Report #: _____</p> <p>References (see Section 8): _____</p>

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SECTION 4 VERIFIED BY SPECIAL TEST	
* See Attachment G of Desk Instruction for Sampling Size	
Test To Be Performed by: ☐ Purchaser ☐ Supplier/Manufacturer** ☐ Other	Number of Items to be Tested: Test/Inspection Location:
Characteristic for Test: Seismic Condition C Acceptance Criteria: Maintain Critical Function Before, During, and After Seismic Event Sample Size*: W-441-P5, Rev. 2, Appendix I, page I-2, provides the seismic testing plan for these components. The seismic testing is conducted for one complete panel with the components assembled on the panel and tested as a complete assembly. The test seismically qualifies the entire assembly, including mountings, piping, and components. The number of components tested is dictated by the panel assembly design. Actual Test Value: Test Plan and Report #: _____ References (see Section 8): _____	

** If Supplier/Manufacturer or Other, Refer to CGI Checklist-2 for Support Information

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SECTION 5 TEST / INSPECTION SUMMARY (Acceptance Method 1)											
1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS , THEIR VERIFICATION METHODS, AND RESULTS											
ITEM DESCRIPTION:											
Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T IN	Procedure or RR#	Check- list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	McMaster-Carr	X									
Component Number - Procurement and/or Model Number	30785T5	X									
Cable Diameter	Nominal 1/4"	X									
End Connections	3/8-24 Threaded Stud One End, Loop with Stainless Steel Swage Fitting on Other End.	X									
Material	Stainless Steel	X									
Cable Condition	Cable Free of Kinks or Broken Strands Which Could Affect Load Capacity.		X								
Seismic Condition C	Maintain Critical Function Before, During, and After Seismic Event.		X								

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2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS	
Critical Characteristic	Disposition
3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.	
BUYER VERIFICATION	
Testing Agency Approval: _____ Date _____	Design Authority: _____ Date _____
Testing Agency QA Engineer: _____ Date _____	QA Engineer: _____ Date _____

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SECTION 6 CONTACTS / PHONE NUMBERS	
Name	Phone
Design Authority	()
QA	()
QC	()
Cog - Engineer	()
CGI Engineer	()
Procurement Engineer	()
Other	()
SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST	
Initial Procurement Documents	For Critical Characteristics
☐ Drawings:	
☐ Manuals (specify type & number):	
☐ Design Calculations	
☐ Installation Instructions	
☐ Operation Instructions	
☐ Calibration Instructions	
☐ Manufacturer's Recommended Spare Parts List	
☐ Other:	
Procurement Documents	
☐ Certificate of Conformance/Compliance	
☐ Seismic Qualification Certificate	
☐ Environmental Qualification Certificate	
☐ Test Report (s):	
☐ Inspection Report (s):	
☐ CMTRs for ASME Pressure Retaining Materials	
☐ Valve Seat Leakage Report	
☐ Weld Records	
☐ Material Traceability Record	
☐ Other:	

[illegible]