PROCESS HOOD STAND SUPPORT STEEL

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

Fluor Hanford
P.O. Box 1000
Richland, Washington

SNF-5953
Revision 1

ECN 661411

PROCESS HOOD STAND SUPPORT STEEL

Project No: W-441

Document Type: RPT

Division: SNF

C Van Katwijk
FH

Date Published
June 2000

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

Fluor Hanford
P.O. Box 1000
Richland, Washington

Release Approval

7/13/00
Date

Release Stamp

TRADEMARK DISCLAIMER

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

This report has been reproduced from the best available copy.

Printed in the United States of America

Total Pages: 14

SUF-5953, new 1

Commercial Grade Item Upgrade Dedication Form

SNF-5953, Rev. 1

ECN No. **N/A**

CGI No. **CGI-SNF-D-3-C1-057**

Page 1 of 10

Title: **Process Hood Stand Support Steel**

Section 1 Part Information

Item No.: **N/A**

Manufacturer: **N/A**

Supplier: **N/A**

Mfg. Part/Model No.: **N/A**

Supplier's P/N: **N/A**

Part Description: **N/A**

End Use Description: **N/A**

Section 2a Component Information

Equipment No.:

See attached Section 9

Specification No.:

**SNF-6209, Rev. 0
(W-441-C1)**

Manufacturer:

Various, See Section 9

Past P.O. No.:

N/A

Procurement and/or

Model No.: **See attached Section 9**

Equipment Supplier (if different from manufacturer):

Monarch Machine and Tool

Equip. Supplier's Part No.:

N/A

Component Description: **Structural steel shapes for process hood stand. Wide flange beams and structural square tubing.**

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 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 w/ project CGI Interface Engineer or BTR):
☐ YES (go to #2 below, procedure step 6.3.2, dedicate Item) ☒ NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified suppliers or ISO 9000 suppliers: **N/A**

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

- #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)

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

☐ NO (the item is not commercial grade) ☒ YES (continue)

- #3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the 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 Commercial Grade (CG) 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 CG to be used in a Safety Class application.
☐	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
☐	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
☐	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
☐	Other ('like-for-like', similar, substitution, replacement evaluation)

Commercial Grade Item Upgrade Dedication Form

SNF-5953, Rev. 1

ECN No. **N/A**

CGI No. **CGI-SNF-D-3-C1-057**

Page 2 of 10

Title: **Process Hood Stand Support Steel**

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **Provide supporting structure for the vacuum drying process hood.**

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

B. Part/Component Functional Mode:

Safety Function #1: ☐ Active ☒ Passive

Safety Function #2: ☐ Active ☒ Passive

Safety Function #3: ☐ Active ☐ Passive

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.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Fracture, material fatigue, bolting/weld failure, could result in inadequate support for the process hood.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes ☐

No ☒ **Environmental Condition B**

If yes: Environmental Qualification Requirements

Limiting Environmental Conditions:

Required Safety Functions:

Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:

Yes ☒ No ☐

HNF-PRO-97, Rev. 0, HNF-SD-SNF-SEL-002, Rev. 7

If yes: NPH Design Requirements

Performance Category: **PC-3**

NPH Design Req'ts.: **Seismic Condition C**

Required Safety Functions: **Maintain critical function (hood support) before, during, and after Seismic Event.**

(Flow Path for Tempered Water Refill)

Section 5 Component Functional Classification

X

Safety Class (SC)

General Service

Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **ASTM A 500-93, Purchase order to request manufacturer's certification that the material was manufactured and tested in accordance with this specification. A report of the chemical and tensile test shall be furnished.**

Safety Analysis Report (SAR): **HNF- 3553, Rev. 0a, Annex B**

Drawings: **H-1-83980, Sheets 1-3, HNF-SD-SNF-SEL-002, Rev. 7**

Vendor Manual/Manufacturer/Supplier Information: **Catalog Cut Sheets: Ryerson Stocks and Services, Square Structural Tubing, Carbon Steel; I-Beams; I-Beams - Wide Flange Beams**

Commercial Grade Item Upgrade Dedication Form

SNF-5953, Rev. 1

ECN No. N/A

CGI No. CGI-SNF-D-3-C1-057

Page 3 of 10

Title: **Process Hood Stand Support Steel**

Section 9 Critical Characteristics				
Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
Wide Flange Beams				
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	Monarch Tool and Machine	1, IN	X	
Component No. – Procurement and /or Part No.	Confirm presence of manufacturer's documentation of material compliance with ASTM A 500-93. Confirm presence of report of the chemical and tensile tests. W10 X 100, W8 X 28	1, IN	X	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Beams, Depth/Flange Width, inches W10 X 100 W8 X 28	Nominal 11.10 / 10.340 Nominal 8.06 / 6.535	1, IN, 1, T	X	
Beams, Web Thickness / Flange Thickness W10 X 100 W8 X 28	Nominal 0.680 / 1.120 Nominal 0.285 / 0.465	1, IN	X	
Wide Flange Beam, Material	A-36 Steel – Refer to Manufacturer's documentation of material and report of chemical tests. (Note 3)	1, IN	X	
Wide Flange Beam, Material	67-83 Rockwell Hardness B or 119-159 Brinnell Hardness	1, T		X
Structural Square Tubing				
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Manufacturer	Monarch Tool and Machine	1, IN	X	
Component No. – Procurement and /or Part No.	Confirm presence of manufacturer's documentation of material compliance with ASTM A 500-93. Confirm presence of report of the chemical and tensile tests. 8 X 8 X 5/8, 6 X 6 X 1/2, 3 X 3 X 5/16	1, IN	X	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Structural Square Tubing, Outside Dimension / Wall Thickness, inches 8 X 8 X 5/8 6 X 6 X 1/2 3 X 3 X 5/16	Nominal 8 / 0.625 Nominal 6 / 0.500 Nominal 3 / 0.312	1, IN	X	
Structural Square Tubing, Material	A-36 Steel – Refer to Manufacturer's documentation of material and report of chemical tests. (Note 3)	1, IN	X	
Structural Square Tubing, Material	67-83 Rockwell Hardness B or 119-159 Brinnell Hardness	1, T		X

6/27/00

Commercial Grade Item Upgrade Dedication Form

SNF-5953, Rev. 1

ECN No. N/A

CGI No. CGI-SNF-D-3-C1-057

Page 4 of 10

Title: Process Hood Stand Support Steel

Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
Wide Flange Beams and Structural Square Tubing				
3. Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Environmental	Note 1			
Seismic Condition A	Note 2	1, A		X
4. Notes and Legend: 1. The components are not subject to degradation from the 40°F or 60% RH or 115°F and 22% RH conditions and are suitable for Environmental Condition B application. 2. Maintain critical function before, during and after Seismic event. 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. The industry sampling practice for destructive test is to test only one item. Seismic Design may be verified by analysis of the installed support system. 3. Material verification acceptance method may be by inspection or test. Rev. 1: Pages 3 -4, 6 - 9: Revised Wide Flange Beam, Material and Structural Square Tubing, Material Crit. Char Acceptance Criteria from "67-83 Rockwell Hardness B" to "67-83 Rockwell Hardness B or 119-159 Brinnell Hardness"		Acceptance Method: 1. Special Test and Inspection 1, IN for Inspection 1, T for Test 1, A for Analysis 2. Commercial Grade Survey 3. Source Verification 4. Vendor/Item History		
Section 10 Initial Review and Approval				
Approvals: Designated Engineer: <u><i>Evan Khoury</i> 7/12/00</u> Design Authority: <u><i>CRNL</i> 6/27/00</u> QA Engineer: <u><i>Jeff Doughty</i> 6/28/00</u>				

6/27/00

Commercial Grade Item Upgrade Dedication Form

SNF-5953, Rev. 1

ECN No. N/A CGI No. CGI-SNF-D-3-C1-057

Page 5 of 10

Title: **Process Hood Stand Support Steel**

WORKSHEET 1

DETERMINATION OF FAILURE MECHANISMS

Section 1			
Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.	X	Fracture or material fatigue-possible loss of structural integrity.
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	X	Deterioration of the structural members resulting in possible decrease of structural integrity.
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.		
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.		
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.	X	Gross distortion would be possible under Seismic forces if material is inadequate.
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.		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		
Section 2 Additional Failure Modes Applicable to the Component Under Evaluation			
1.			

Commercial Grade Item Upgrade Dedication Form

SNF-5953, Rev. 1

ECN No. N/A

CGI No. CGI-SNF-D-3-C1-057

Page 6 of 10

Title: Process Hood Stand Support Steel

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1			
Item Description: Structural steel shapes for process hood stand. Wide flange beams and structural square tubing.		Equip #: <u>N/A</u>	
System #: <u>30-3</u>		Procurement and/or Part #: <u>See Characteristics in Section 9</u>	
Manufacturer (Address/Phone): <u>Various – See Section 9.</u>		Supplier (Address/Phone): <u>TBD</u>	
SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.			
Insp	Test	Post-Test	
X			1. Manufacturer
X			2. Component Number-Procurement and/or Part Number
X			3. Dimensions (Depth, Width, Length, Thickness)
X			4. Body Material (Verification by inspection of CMTRs)
	X		5. Material - Rockwell Hardness B or Brinnell Hardness
			6. Seismic Condition C (A = Analysis)
SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)			
Wide Flange Beams			
Characteristic: Manufacturer		Sample Size*: 100%	
Acceptance Criteria: Monarch Machine and Tool			
Receipt Inspection Plan / Report #:			
Characteristic: Component Number-Procurement and/or Part Number		Sample Size*: 100%	
Acceptance Criteria: Confirm presence of manufacturer's documentation of material compliance with ASTM A 500-93. Confirm presence of report of the chemical and tensile tests. W10 X 100 and W8 X 28			
Receipt Inspection Plan / Report #:			
Characteristic: Beams, Depth/Flange Width, inches			
Sample Size*: A representative sample of each size of beam			
Acceptance Criteria: W10 X 100 Depth: Nominal 11.10; Flange Width: Nominal 10.340			
W8 X 28 Depth: Nominal 8.06; Flange Width: Nominal 6.535			
Receipt Inspection Plan / Report #:			
Characteristic: Beams, Web Thickness / Flange Thickness			
Sample Size*: A representative sample of each size of beam			
Acceptance Criteria: W10 X 100 Web Thickness: Nominal 0.680; Flange Thickness: 1.120			
W8 X 28 Web Thickness: Nominal 0.285; Flange Thickness: 0.465			
Receipt Inspection Plan / Report #:			
Characteristic: Material		Sample Size*: 100%	
Acceptance Criteria: A-36 Steel – Refer to Manufacturer's documentation of material and report of chemical tests.			
Receipt Inspection Plan / Report #:			

Commercial Grade Item Upgrade Dedication Form

SNF-5953, Rev. 1

ECN No. N/ACGI No. CGI-SNF-D-3-C1-057

Page 7 of 10

Title: **Process Hood Stand Support Steel****Structural Square Tubing**Characteristic: **Manufacturer**Sample Size*: **100%**Acceptance Criteria: **Monarch Machine and Tool**

Receipt Inspection Plan / Report #:

Characteristic: **Component Number-Procurement and/or Part Number**Sample Size*: **100%**Acceptance Criteria: **Confirm presence of manufacturer's documentation of material compliance with ASTM A 500-93.****Confirm presence of report of the chemical and tensile tests. 8 X 8 X 5/8; 6 X 6 X 1/2; 3 X 3 X 5/16**

Receipt Inspection Plan / Report #:

Characteristic: **Outside Dimension / Wall Thickness, inches**Sample Size*: **A representative sample of each size of tubing**Acceptance Criteria: **8 X 8 X 5/8 Outside Dim: Nominal 8; Wall Thickness: Nominal 0.625****6 X 6 X 1/2 Outside Dim: Nominal 6; Wall Thickness: Nominal 0.5000****3 X 3 X 5/16 Outside Dim: Nominal 3; Wall Thickness: Nominal 0.3125**

Receipt Inspection Plan / Report #:

Characteristic: **Material**Sample Size*: **100%**Acceptance Criteria: **A-36 Steel – Refer to Manufacturer's documentation of material and report of chemical tests.**

Receipt Inspection Plan / Report #:

Section 4 By Special Test * See Attachment H, Table H-1 of Desk Instruction for Sampling Size References (See Section 7)

Wide Flange Beams and Structural Square TubingCharacteristic for Test: **Seismic Condition C – All items**Acceptance Criteria: **Maintain critical function before, during and after Seismic event.**Sample Size*: **Sample size is N/A because seismic verification of the installed support system with structural members and fasteners, etc., will be done by analysis. Physical testing is not anticipated.**

Actual Test Value:

Test Plan and Report #:

Characteristic for Test: **Beam Material**Acceptance Criteria: **67-83 Rockwell Hardness B or 119-159 Brinnell Hardness**Sample Size*: **a representative sample of each size of beam.**

Actual Test Value:

Test Plan and Report #:

Characteristic for Test: **Structural Square Tubing Material**Acceptance Criteria: **67-83 Rockwell Hardness B or 119-159 Brinnell Hardness**Sample Size*: **a representative sample of each size of tubing.**

Actual Test Value:

Test Plan and Report #:

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

Commercial Grade Item Upgrade Dedication Form

SNF-5953, Rev. 1

ECN No. N/A CGI No. CGI-SNF-D-3-C1-057

Page 8 of 10

Title: Process Hood Stand Support Steel

Section 5 Test / Inspection Summary (Acceptance Method 1)											
1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS											
ITEM DESCRIPTION: Wide Flange Beams											
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	Monarch Tool and Machine	X		1, IN							
Component Number-Procurement Number	Confirm presence of manufacturer's documentation of material compliance with ASTM A 500-93. Confirm presence of report of the chemical and tensile tests. W10 X 100 and W8 X 28	X		1, IN							
Depth/Flange Width, inches	W10 X 100 Depth: Nominal 11.10; Flange Width: Nominal 10.340 W8 X 28 Depth: Nominal 8.06; Flange Width: Nominal 5.535	X		1, IN							
Web Thickness / Flange Thickness	W10 X 100: Web Thickness: Nom. 0.680; Flange Thickness: 1.120 W8 X 28: Web Thickness: Nom. 0.285; Flange Thickness: 0.465	X		1, IN							
Material	A-36 Steel - Refer to Manufacturer's documentation of material & chemical tests report.	X		1, IN							
Material	67-83 Rockwell Hardness B or 119-159 Brinnell Hardness		X	1, T							
Seismic Condition C	Maintain Critical Function Before and After Seismic Event.		X	1, A							
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.											
Testing Agency Approval: _____ Date _____						Design Authority: _____ Date _____					
Testing Agency QA Engineer: _____ Date _____						QA Engineer: _____ Date _____					

Commercial Grade Item Upgrade Dedication Form

SNF-5953, Rev. 1

ECN No. N/A CGI No. CGI-SNF-D-3-C1-057

Page 9 of 10

Title: Process Hood Stand Support Steel

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Structural Square Tubing

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/N	Procedure or R/R#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Monarch Tool and Machine	X		1, IN							
Component Number-Procurement Number	Confirm presence of manufacturer's documentation of material compliance with ASTM A 500-93. Confirm presence of report of the chemical and tensile tests. 8 X 8 X 5/8; 6 X 6 X 1/2; 3 X 3 X 5/16	X		1, IN							
Outside Dimension / Wall Thickness, inches	8 X 8 X 5/8 Outside Dim: Nom. 8; Wall Thickness: Nom. 0.625 6 X 6 X 1/2 Outside Dim: Nom. 6; Wall Thickness: Nominal 0.5000 3 X 3 X 5/16 Outside Dim: Nom. 3; Wall Thickness: Nom. 0.3125	X		1, IN							
Material	A-36 Steel – Refer to Manufacturer's documentation of material and chemical test report.	X		1, IN							
Material	67-83 Rockwell Hardness B or 119-159 Brinnell Hardness		X	1, T							
Seismic Condition C	Maintain Critical Function Before and After Seismic Event		X	1, A							

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.

Testing Agency Approval: _____	Date _____	Design Authority: _____	Date _____
Testing Agency QA Engineer: _____	Date _____	QA Engineer: _____	Date _____

Commercial Grade Item Upgrade Dedication Form

SNF-5953, Rev. 1

ECN No. N/ACGI No. CGI-SNF-D-3-C1-057

Page 10 of 10

Title: **Process Hood Stand Support Steel****Section 6 Contacts / Phone Numbers**

Title	Name	Phone
Design Authority		
QA		
QC		
Cog - Engineer		
CGI Engineer	Larry Price	372-8770
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	
X	Other: : Catalog Cut Sheets: Ryerson Stocks and Services, Square Structural Tubing, Carbon Steel; I-Beams; I-Beams – Wide Flange Beams	All
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:	

DISTRIBUTION SHEET

To
Distribution

From
SNF-CVD

Page 1 of 1

Project Title/Work Order _____

Date 7/13/00

W-441, CGI Package P4-004 and C1-057

EDT No. NA

ECN No. 661411

[illegible]