ENGINEERING CHANGE NOTICE

Page 1 of 21. ECN **654031**Proj.
ECN

2. ECN Category (mark one) Supplemental ☐ Direct Revision ☒ Change ECN ☐ Temporary ☐ Standby ☐ Supersedure ☐ Cancel/Void ☐	3. Originator's Name, Organization, MSIN, and Telephone No. TA Nuxall, SNF CVD, R3-86, 372-3739	4. USQ Required? ☐ Yes ☒ No	5. Date 7/22/99
	6. Project Title/No./Work Order No. W-441 Spent Nuclear Fuel Cold Vacuum Drying	7. Bldg./Sys./Fac. No. CVDF	8. Approval Designator SQ
12a. Modification Work ☐ Yes (fill out Blk. 12b) ☒ No (NA Blks. 12b, 12c, 12d)	12b. Work Package No. N/A	12c. Modification Work Complete N/A Design Authority/Cog. Engineer Signature & Date	12d. Restored to Original Condition (Temp. or Standby ECN only) N/A Design Authority/Cog. Engineer Signature & Date
13a. Description of Change Revision in response to RFI HE-031 (Part Model Number Change).			
13b. Design Baseline Document? ☐ Yes ☒ No			
14a. Justification (mark one) Criteria Change ☒ Design Improvement ☐ Environmental ☐ Facility Deactivation ☐ As-Found ☐ Facilitate Const ☐ Const. Error/Omission ☐ Design Error/Omission ☐			
14b. Justification Details RFI HE-031.			
15. Distribution (include name, MSIN, and no. of copies) See Distribution			RELEASE STAMP JUL 30 1999 DATE: HANFORD STA: RELEASE #4 ID: 15

A-7900-013-2 (05/96) GEF095

A-7900-013-3 (05/96) GEF096

MATHESON SCHe PRESSURE REGULATOR (SCHe TANK OUTLET)

Carl Van Katwijk
Numatec Hanford, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: 654031	UC: 620
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Key Words: Matheson SCHe Pressure Regulator

Abstract: Matheson SCHe Pressure Regulator

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Gris Braden
Release Approval

7/30/99

Approved for Public Release

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Title: **MATHESON SCHe PRESSURE REGULATOR (SCHe TANK OUTLET)**

Section 1 Part Information

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

Section 2a Component Information

Equipment No.: SCHe-PCV-5*04, 5*23,5*43, 5*63	Specification No.: W-441-P5, Rev. 2	Manufacturer: Matheson Gas Products	Past P.O. No.: NA
Procurement and/or Model No.: 8-580	Equipment Supplier (if different from manufacturer): TBD		Equip. Supplier's Part No.: NA

Component Description: **Dual Stage Pressure Regulator to Maintain Steady Delivery Pressure Over Wide Range of He Tank Pressure**

Section 2b Commercial Availability of the Item

- 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.)
- List of Candidate qualified suppliers or ISO 9000 suppliers

company name & type	contact name	phone
NA		
- Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR):
NA

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OUTLET)**

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)
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. **Pressure boundary.**
2. **Prevent Thermal Runaway and H2 explosion .**
3. **Maintain critical function before and after seismic event.**

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): **NA**

1.

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

1. **Valve Body/Process Connection break - loss of boundary, air in-leakage.**

2. **Diaphragm/Body Failure - loss of regulating function.**

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

W-441-P5, Rev. 2

If yes: NPH Design Requirements

Performance Category: **PC-3**

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

Required Safety Functions: **Maintain Pressure Boundary, Prevent Thermal Runaway and H2 Explosion, Maintain Critical Function Before and After Seismic Event**

Section 5 Component Functional Classification

☒ Safety Class (SC)

☐ General Service

☐ Safety Significant (SS)

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

Section 6 (Reserved)

Section 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards:

ASME B 31.3

Safety Analysis Report (SAR):

**HNF-SD-SNF-SAR-002,
Rev. 4A**

Drawings:

**H-1-82165, Rev. 2
HNF-SD-SNF-SEL-002, Rev. 6A**

Vendor Manual/Manufacturer/Supplier Information:

Matheson Gases and Equipment, Regulators & Gauges, P. 234.

Other: **NA**

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Section 9 Critical Characteristics

Critical Characteristics Verification Document: Vendor Specifications; 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)				
Nameplate - Manufacturer	Matheson Gas Products	1, IN	X	
Component Number- Procurement and/or Model Number	8-580 , (Per Procurement Package W- 441-P5, Rev. 2, Section G, Design Data Sheet)	1, IN	X	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Body Material	Brass (Note 4)	1, IN 1, T	X	
Outlet Connection	1/4" NPT Male	1, IN	X	
Gauge Range	Delivery Gauge: 0-100 psig Cylinder Gauge: 0-3000 psig	1, IN	X	
Weight	Nominal 7 lbs.	1, IN	X	
3. Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Pressure Boundary	Pressure Test at 3300 psig (No Leakage- No Bubbles) Note 3	1, T		X
Setpoint	Maintain delivery pressure of 25 psig over input pressure range of 100 to 3000 psig	1, T		X
Environmental	Note 1			
Seismic Condition A	Note 2	1, T		X

4. Notes and Legend:

1. These PCVs have neoprene diaphragms. These materials are not subject to degradation at 40°F and 60% RH or 115°F and 22% RH and are suitable for condition B Application.
2. Maintain critical function before 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. Pressure test at 110% component internal pressure of 3000 psig.
4. Material verification acceptance method may be by either inspection or test.

Acceptance Method:

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: *Edmund K. [Signature]* 7/26/99Design Authority: *C.R. [Signature]* 7/26/99QA Engineer: *[Signature]* 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 [X]; If Yes, indicate failure Mode _____
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	Yes []	No [X]; 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 [X]; 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 [X]; 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 [X]; 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 [X]; If Yes, indicate failure Mode _____
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	Yes []	No [X]; 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 [X]; 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 [X]; 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 [X]; 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 [X]; If Yes, indicate failure Mode _____
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.	Yes []	No [X]; If Yes, indicate failure Mode _____

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation

1. **Regulator Body Break**

2. **Diaphragm Break/Failure**

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CHECKLIST 1
ACCEPTANCE METHOD 1
SPECIAL TEST/INSPECTION VERIFICATION

SECTION 1			
Item Description: SCHe Tank Pressure Regulator		Equip #: SCHe-PCV-5*05, 5*23, 5*43, 5*63	
System #: 13		Procurement and/or Model #: 8-580	
Manufacturer (Address/Phone): Matheson Gas Products 8800 Utica Avenue Cucamonga, CA 91730 (909) 987-4611 P.O. #		Supplier (Address/Phone):	
SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.			
Insp	Test	Post-Test	
☒	☐	☐	1. Nameplate - Manufacturer
☒	☐	☐	2. Component Number-Procurement and/or Model Number
☒	☒	☐	3. Body Material (Verification may be by either inspection or test)
☒	☐	☐	4. Outlet Connection
☒	☐	☐	5. Gauge Range
☒	☐	☐	6. Weight
☐	☒	☐	7. Pressure Boundary
☐	☒	☐	8. Setpoint
☐	☒	☐	9. Seismic Condition A
SECTION 3 BY INSPECTION			
* See Attachment H of Desk Instruction for Sampling Size			
Characteristic: Nameplate - Manufacturer			
Sample Size*: All Items			
Acceptance Criteria: Matheson Gas Products			
Receipt Inspection Plan / Report #: _____			
References (see Section 8) _____			
Characteristic: Component Number-Procurement and/or Model Number			
Sample Size*: All Items			
Acceptance Criteria: 8-580 , (Per Procurement Package W-441-P5, Rev. 2, Section G, Design Data Sheet			
Receipt Inspection Plan / Report #: _____			
References (see Section 8): Matheson Vendor Manual, P. 234			

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Title: **MATHESON SCHe PRESSURE REGULATOR (SCHe TANK
OUTLET)**Characteristic: **Outlet Connection**Sample Size*: **All Items**Acceptance Criteria: **1/4" NPT Male**

Receipt Inspection Plan / Report #: _____

References (see Section 8): _____

Characteristic: **Gauge Range**Sample Size*: **All Items**Acceptance Criteria: **Delivery Gauge: 0-100 psig; Cylinder Gauge: 0-3000 psig**

Receipt Inspection Plan / Report #: _____

References (see Section 8): _____

Characteristic: **Weight**Sample Size*: **All Items**Acceptance Criteria: **Nominal 7 lbs.**

Receipt Inspection Plan / Report #: _____

References (see Section 8): _____

Characteristic: **Body Material**Sample Size*: **Normal Sampling Size**Acceptance Criteria: **Brass**

Receipt Inspection Plan / Report #: _____

References (see Section 8): _____

SECTION 4 BY SPECIAL TEST

* See Attachment H 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: **Pressure Boundary**Acceptance Criteria: **Pressure Test at 3300 psig (No Bubbles)**Sample Size*: **Normal Sampling Size**

Actual Test Value:

Test Plan and Report #: _____ References (see Section 8): _____

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<p>Characteristic for Test: Setpoint</p> <p>Acceptance Criteria: Maintain delivery pressure of 25 psig over input pressure range of 100 to 3000 psig. No Pressure increase above setpoint (with zero flow) for 96 hours.</p> <p>Sample Size*: Normal Sampling Size</p> <p>Actual Test Value:</p> <p>Test Plan and Report #: _____ References (see Section 8): _____</p>
<p>Characteristic for Test: Seismic Condition A</p> <p>Acceptance Criteria: Maintain critical function before and after seismic event</p> <p>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.</p> <p>Actual Test Value:</p> <p>Test Plan and Report #: _____ References (see Section 8): _____</p>

**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
Nameplate - Manufacturer	Matheson Gas Products	X									
Component Number- Procurement and/or Model Number	8-580 , (Per Procurement Package W-441-P5, Rev. 2, Section G, Design Data Sheet)	X									
Body Material	Brass	X									
Outlet Connection	¼ " NPT Male	X									
Gauge Range	Delivery Gauge: 0-100 psig; Cylinder Gauge: 0-3000 psig	X									
Weight	Nominal 7 lbs.	X									
Pressure Boundary	Pressure Test at 3300 psig (No Leakage-No Bubbles)		X								
Setpoint	Maintain delivery pressure of 25 psig over input pressure range of 100 to 3000 psig		X								
Seismic Condition A	Maintain Critical Function Before 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:	

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