ENGINEERING CHANGE NOTICE

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1. ECN 653776

Proj.
ECN

2. ECN Category (mark one) Supplemental ☐ Direct Revision ☒ Change ECN ☐ Temporary ☐ Standby ☐ Supersedeure ☐ Cancel/Void ☐	3. Originator's Name, Organization, MSIN, and Telephone No. Treach Nuxall, SNF CVD, R3-47, 372-3739	4. USQ Required? ☐ Yes ☒ No	5. Date 3/31/99
	6. Project Title/No./Work Order No. Spent Nuclear Fuel Cold Vacuum Drying	7. Bldg./Sys./Fac. No. CVDF	8. Approval Designator Q.S."
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) All Rev 0 SNF-3876, SNF-3877, SNF-3878, SNF-3879, SNF- 3880, SNF-3881, SNF-3882, SNF-3883, SNF-3884, SNF-3886, SNF-3887, SNF-3888, SNF-3890, SNF- 3891, SNF-3892, SNF-3893, SNF-3894, SNF-3895, SNF-3920, SNF-3921, SNF-3922, SNF-3923, SNF- 3924, SNF-3925, SNF-3926, SNF-3927, SNF-3928, SNF-3929, SNF-3930, SNF-3931, SNF-3932, SNF- 3933, SNF-3934, SNF-3935, SNF-3936	10. Related ECN No(s). N/A	11. Related PO No. N/A
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 to meet SEL, Rev. 6.		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 Revision to SEL.			
15. Distribution (include name, MSIN, and no. of copies) <i>see attached distribution</i>		RELEASE STAMP DATE: STA: 4 MAY 06 1999 ID: 2.	

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

A-7900-013-1

653776

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

KROHNE FLOW INDICATOR AND HIGH FLOW ALARM-LOCAL INDICATION AND HIGH FLOW ALARM OF HELIUM FLOW FROM THE SCHe PURGE LINES C AND D TO THE PROCESS VENT

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

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Key Words: Krohne Flow Indicator and High Flow Alarm-Local Indication

Abstract: Krohne Flow Indicator and High Flow Alarm-Local Indication

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Release Approval

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Commercial Grade Item Upgrade Dedication Form

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Title: **KROHNE FLOW INDICATOR AND HIGH FLOW ALARM –
LOCAL INDICATION AND HIGH FLOW ALARM OF HELIUM FLOW
FROM THE SCHe PURGE LINES C & D TO THE PROCESS VENT**

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.: PV-FI/FSH-5*52, -5*72	Specification No.: W-441-P5, Rev. 2	Manufacturer: Krohne	Past P.O. No.: NA
Procurement and/or Model No.: DK 37/MR K200 W/120 VAC Relay W/O Needle Valve	Equipment Supplier (if different from manufacturer): TBD		Equip. Supplier's Part No.: NA

Component Description: **Flow Indicators/alarms FI/FSH-5*52 and -5*72 are located in the process vent lines connected to the 2 psig SCHe purge lines C and D. They monitor the flow from the 2 psig SCHe purge going to the process vent. The switch/alarm is non-safety class GS.**

Section 2b: Qualified Vendor/Supplier Survey

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 5.3.2, 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 5.3.2, proceed to dedicate Item)
 - ☒ NO (go to procedure step 5.3.2, proceed to dedicate Item.)

2. List of Candidate qualified suppliers or ISO 9000 suppliers

company name and type	contact name	phone
NA		

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)
2. Question #2: Is the Item used in applications other than nuclear facilities or activities?
 - ☐ NO (the item is not commercial grade)
 - ☒ YES (continue)

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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 Integrity– Prevents helium leakage from the 2 psig SCHe System.**

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 Mechanisms(s) and the effects on component or system safety function (see worksheet 1):

1. **Fracture of the indicator body or of the piping connection - helium leakage from the 2 psig SCHe System.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes ☐

No ☒

Environmental Condition A

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-2**

NPH Design Req'ts.: **None**

Required Safety Functions: **Pressure Boundary Integrity.**

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.

The flow indicator is pressure boundary Safety Significant (SS).

The switch/alarm electronic output signal is General Service (GS).

Section 6 [reserved]

Section 7 [reserved]

Section 8 References (for Functional Classification)

National Codes/Standards: **IEEE 344,
ISA-S5.1, -S5.4, -S18.1, -S20**

Safety Analysis Report (SAR):
**HNF-SD-SNF-SAR-002,
Rev. 4A**

Drawings: **H-1-82165, Rev. 2
HNF-SD-SNF-SEL-002, Rev. 6
CVDF-SSD-003**

Vendor Manuals/Manufacturer/Supplier Information: **Krohne Product Survey - Variable Area Flowmeters**

Other:

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Section 9 Critical Characteristics				
Critical Characteristics Verification Document: Vendor Specifications, HNF-SD-SNF-SEL-002, Rev. 6	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Component Number-Procurement and/or Model Number	DK 37/MR K200 W/120 VAC Relay W/O Needle Valve, (Per Procurement Package W-441-P5, Rev. 2, Section G, Design Data Sheet)	1,IN	X	
Nameplate - Manufacturer	Krohne	1,IN	X	
Process Connection	1/4 Inch FNPT (Horizontal Connections)	1,IN	X	
Indicator Range	0.34 - 3.4 SCFM	1,IN	X	
2. Physical Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Material, Body	Stainless Steel (Note 3)	1, IN 1,T	X	
Material, Process Connection	Stainless Steel (Note 3)	1, IN 1,T	X	
3. Performance Critical Characteristics (necessary & sufficient for reasonable assurance that the Item will perform its intended safety function(s))				
Pressure Boundary Integrity	No Leakage at Test Pressure of 165 psig (No Bubbles) Note 2	1,T		X
Environmental	Note 1			
Seismic Condition	None			
4. Notes and Legend:		Acceptance Method:		
1. The flow indicator is not subject to degradation at ambient conditions of 60°F and 40% RH or 75°F and 25% RH and is suitable for Environmental Condition A application. 2. Pressure test at 110% of system design pressure of 150 psig. Exposure to test pressure may seriously degrade the readout function. This test is considered to be 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		

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Section 10 Initial Reviews and Approvals

Approvals:

Designated Engineer: *[Signature]*

Design Authority: *[Signature]* 4/26/99

QA Engineer: *[Signature]* 4/27/99

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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. <u>Failure of Transmitter Body or the Process Connection</u>
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

1. Process Connection/Body Break

2. _____

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CHECKLIST 1
ACCEPTANCE METHOD 1
SPECIAL TEST/INSPECTION VERIFICATION

SECTION 1			
Item Description: Krohne Local Flow Indicator/Alarm – 2 PSIG SCHe System to Process Vent System #: 13		Equip #: PV-FI/FSH-5*52, -5*72 Procurement and/or Model #: DK 37/MR K200 W/120 VAC Relay W/O Needle Valve	
Manufacturer (Address/Phone): Krohne P.O. #		Supplier (Address/Phone):	
SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.			
Insp	Test	Post-Test	
☒	☐	☐	1. Component Number-Procurement and/or Model Number
☒	☐	☐	2. Nameplate - Manufacturer
☒	☐	☐	3. Process Connection
☒	☐	☐	4. Indicator Range
☒	☒	☐	5. Material, Body (Verification may be by either inspection or test)
☒	☒	☐	6. Material, Process Connection (Verification may be by either inspection or test)
☐	☒	☐	7. Pressure Boundary Integrity
SECTION 3 BY INSPECTION			
* See Attachment G of Desk Instruction for Sampling Size			
Characteristic: Component Number-Procurement and/or Model Number Sample Size*: All Items Acceptance Criteria: DK 37/MR K200 W/120 VAC Relay W/O Needle Valve Receipt Inspection Plan / Report #: _____ References (see Section 7): <u>Krohne Product Survey - Variable Area Flowmeters</u>			
Characteristic: Nameplate - Manufacturer Sample Size*: All Items Acceptance Criteria: Krohne Receipt Inspection Plan / Report #: _____ References (see Section 7): _____			

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Characteristic: **Process Connection**

Sample Size*: **All Items**

Acceptance Criteria: **1/4 Inch FNPT (Horizontal Connections)**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

Characteristic: **Indicator Range**

Sample Size*: **All Items**

Acceptance Criteria: **0.34 - 3.4 SCFM**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

Characteristic: **Material, Body**

Sample Size*: **Normal Sampling Size**

Acceptance Criteria: **Stainless Steel**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

Characteristic: **Material, Process Connection**

Sample Size*: **Normal Sampling Size**

Acceptance Criteria: **Stainless Steel**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

SECTION 4 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: **Pressure Boundary Integrity**

Acceptance Criteria: **No Leakage at Test Pressure of 165 psig (No Bubbles)**

Sample Size*: **Destructively Test Only One Item**

Actual Test Value:

Test Plan and Report #: _____ References (see Section 7): _____

**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/TN	Procedure or RR#	Check- list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Component Number- Procurement and/or Model Number	DK 37/MR K200 W/120 VAC Relay W/O Needle Valve, (Per Procurement Package W-441-P5, Rev. 2, Section G, Design Data Sheet	X									
Nameplate - Manufacturer	Krohne	X									
Process Connection	1/4 Inch FNPT (Horizontal Connections)	X									
Indicator Range	0.34 - 3.4 SCFM	X									
Material, Body	Stainless Steel		X								
Material, Process Connection	Stainless Steel		X								
Pressure Boundary Integrity	No Leakage at Test Pressure of 165 psig (No Bubbles)		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: _____	Design Authority: _____ Date _____
Testing Agency QA Engineer: _____	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:	