APR 07 1999

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 626279

2. To: (Receiving Organization) Distribution		3. From: (Originating Organization) SNF Project		4. Related EDT No.: N/A	
5. Proj./Prog./Dept./Div.: Spent Nuclear Fuel Project		6. Design Authority/ Design Agent/Cog. Engr.: C. Van Katwijk		7. Purchase Order No.: N/A	
8. Originator Remarks: N/A				9. Equip./Component No.: N/A	
				10. System/Bldg./Facility: Spent Nuclear Facility	
11. Receiver Remarks: 11A. Design Baseline Document? ☐ Yes ☒ No				12. Major Assm. Dwg. No.: N/A	
				13. Permit/Permit Application No.: N/A	
				14. Required Response Date: N/A	

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Desig- nator	Reason for Trans- mittal	Orig- inator Dispo- sition	Receiv- er Dispo- sition
1	SNF-3930		0	Krohne Flow Indicator/Alarm - Local Helium Flow Indication and High Flow Alarm in the SCHe Purge System	Q	2	1	N/A

16. KEY									
Approval Designator (F)		Reason for Transmittal (G)				Disposition (H) & (I)			
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)		1. Approval 2. Release 3. Information		4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)		1. Approved 2. Approved w/comment 3. Disapproved w/comment		4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged	
17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)									
(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature (L) Date (M) MSIN
2	1	Designated Engineer C. Van Katwijk	<i>C. Van Katwijk</i>	4/7/99		3		CVD (BM Brown)	(1) R3-86
2	1	Design Authority R. Whitehurst	<i>R. Whitehurst</i>	4/7/99					
2	1	QA T. D. Hays	<i>T. D. Hays</i>	4/7/99				SNF file	R3-11

18. Signature of EDT Originator <i>C. Van Katwijk</i> 2-9-99		19. T. Choho <i>T. Choho</i> 4/7/99 Authorized Representative Date for Receiving Organization		20. R. Whitehurst <i>R. Whitehurst</i> 4/1/99 Design Authority/ Cognizant Manager Date		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
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Krohne Flow Indicator/Alarm – Local Helium Flow Indication and High Flow Alarm in the SCHe Purge System

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

EDT/ECN: 626279 UC: 620
Org Code: 2G300 Charge Code: 105559/A000
B&R Code: 39EW40400 Total Pages: 13

Key Words: Flow indicator - Alarms

Abstract: Krohne Flow Indicator/Alarm – Local Helium Flow Indication and High Flow Alarm in the SCHe Purge System
CGI-SNF-D-13-P5-034

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Release Approval

4/7/99
Date

Approved for Public Release

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Title: KROHNE FLOW INDICATOR/ALARM - LOCAL HELIUM FLOW
INDICATION AND HIGH FLOW ALARM IN THE SCHe PURGE
SYSTEM

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-
FI/FSH-5*10, 5*29,
5*49, 5*52, 5*69,
5*72, 5*76, 5*77,
5*78, 5*79Specification No.: W-441-
P5, Rev. 2Manufacturer: KrohnePast P.O. No.: NAManufacturer's Part/ Model
No.: DK 37/M R K125
W/120 VAC RELAY
AND W/O NEEDLE
VALVEEquipment Supplier (if different from manufacturer): TBDEquip. Supplier's Part No.:
NA

Component Description: These flow indicators/alarms are located in the 15 psig section of the SCHe supply lines after the 15 psig pressure reducing valves and before the second pressure reducing valves set to 7 and to 2 psig. The flow indicators monitor the flow going to the SCHe purge lines. This design is used for each of the SCHe supply lines (4). The switch/alarm is safety class GS.

Section 2b Qualified Vendor/Supplier Survey

1. Is the Item available from a catalog from a qualified NQA1 or ISO 9000 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.)

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)

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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 of specifications set forth in the manufacturers 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 SCHe System.**

2. **Maintain pressure boundary 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

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Title: **KROHNE FLOW INDICATOR/ALARM - LOCAL HELIUM FLOW INDICATION AND HIGH FLOW ALARM IN THE SCHe PURGE SYSTEM**

C. Host Component Safety Function (if applicable):

1. **NA**

2.

3.

D. Failure Mechanism(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 SCHe System.**

2.

3.

4.

5.

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 B**

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.

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. 4
CVDF-SSD-003

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

Other:

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Title: **KROHNE FLOW INDICATOR/ALARM – LOCAL HELIUM FLOW
INDICATION AND HIGH FLOW ALARM IN THE SCHe PURGE
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Section B Critical Characteristics				
Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
Verification Document: Vendor Specifications, HNF-SD-SNF-SEL-002, Rev. 4				
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Nameplate Data	Per Vendor Manual	1,IN	X	
Model Number	DK 37/M R K125 W/120 VAC Relay and W/O Needle Valve	1,IN	X	
Manufacturer	Krohne	1,IN	X	
Process Connection	1/4 Inch FNPT (Horizontal Connections)	1,IN	X	
Indicator Range	0.32–3.2 SCFM for FI-5*10, 5*29, 5*49, 5*69. 0.30–3.0 SCFM for FI-5*76, 5*77, 5*78, 5*79	1,IN	X	
2. Physical Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Material, Body	Stainless Steel	1,T	X	
Material, Process Connection	Stainless Steel	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. Note 3.	1,T		X
Environmental	Note 1			
Seismic Condition B	Note 2	1,T		X
4. Notes and Legend:		Acceptance Method:		
<ol style="list-style-type: none"> The flow indicator is not subject to degradation at ambient conditions of 40°F and 60% RH or 115°F and 22% RH and is suitable for Environmental Condition B application. Maintain pressure boundary 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. 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. 		<ol style="list-style-type: none"> Special Test and Inspection 1,IN for Inspection 1,T for Test Commercial Grade Survey Source Verification Vendor/Item History 		

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Section 10 Initial Reviews and Approvals

Approvals:

Designated Engineer: [Signature] 12/21/98

Design Authority: [Signature] 12/21/98

QA Engineer: [Signature] 12/21/98

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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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INDICATION AND HIGH FLOW ALARM IN THE SCHe PURGE
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CHECKLIST 1

ACCEPTANCE METHOD 1

SPECIAL TEST/INSPECTION VERIFICATION

SECTION 1			
Item Description: Krohne Local Flow Indicator/Alarm - 15 Psig Sche System		Equip #: SCHe-FI/FSH-5*10, -5*29, -5*49, -5*52, -5*69, -5*72, -5*76, -5*77, -5*78, -5*79	
System #: 13		Model #: DK 37/M R K125 W/120 VAC Relay and W/O Needle Valve	
Manufacturer (Address/Phone): Krohne		Supplier (Address/Phone):	
P.O. #			
SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1			
Insp	Test	Post-Test	
☒	☐	☐	1. Nameplate Data
☒	☐	☐	2. Model Number
☒	☐	☐	3. Manufacturer
☒	☐	☐	4. Process Connection
☒	☐	☐	5. Indicator Range
☐	☒	☐	6. Material, Body
☐	☒	☐	7. Material, Process Connection
☐	☒	☐	8. Pressure Boundary Integrity
☐	☒	☐	9. Seismic Condition B
SECTION 3 BY INSPECTION			
* See Attachment G of Desk Instruction for Sampling Size			
Characteristic: Nameplate Data			
Sample Size*: All Items			
Acceptance Criteria: Per Vendor Manual			
Receipt Inspection Plan / Report #: _____			
References (see Section 7): Krohne Product Survey - Variable Area Flowmeters			

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Title: **KROHNE FLOW INDICATOR/ALARM - LOCAL HELIUM FLOW INDICATION AND HIGH FLOW ALARM IN THE SCHe PURGE SYSTEM**

Characteristic: **Model Number**

Sample Size*: **All Items**

Acceptance Criteria: **DK 37/M R K125 W/120 VAC Relay and W/O Needle Valve**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

Characteristic: **Manufacturer**

Sample Size*: **All Items**

Acceptance Criteria: **Krohne**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

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: **0.32-3.2 SCFM for FI-5*10, 5*29, 5*49, 5*69. 0.30-3.0 SCFM for FI-5*76, 5*77, 5*78, 5*79**

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: **Material, Body**

Acceptance Criteria: **Stainless Steel**

Sample Size*: **Normal Sampling Size**

Actual Test Value:

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

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Characteristic for Test: **Material, Process Connection**

Acceptance Criteria: **Stainless Steel**

Sample Size*: **Normal Sampling Size**

Actual Test Value:

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

Characteristic for Test: **Pressure Boundary Integrity**

Acceptance Criteria: **No Leakage at Test Pressure of 165 Psig**

Sample Size*: **Normal Sampling Size**

Actual Test Value:

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

Characteristic for Test: **Seismic Condition B**

Acceptance Criteria: **Maintain Pressure Boundary 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.**

Sample Size*: **Normal Sampling Size**

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

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
Nameplate Data	Per Vendor Manual	X									
Model Number	DK 37/M R K125 W/120 VAC Relay and W/O Needle Valve	X									
Manufacturer	Krohne	X									
Process Connection	1/4 Inch FNPT (Horizontal Connections)	X									
Indicator Range	0.32-3.2 SCFM for FI- 5*10, 5*29, 5*49, 5*69, 0.30-3.0 SCFM for FI- 5*76, 5*77, 5*78, 5*79	X									
Material, Body	Stainless Steel	X									
Material, Process Connection	Stainless Steel	X									
Pressure Boundary Integrity	No Leakage at Test Pressure of 165 Psig	X									
Environmental	NA										
Selamic Condition B	Maintain Pressure Boundary	X									

Verification Results

12/15/98

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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:	