APR 2 1999

Sta. 4

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ENGINEERING DATA TRANSMITTAL

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1. EDT 626257

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								
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Design- ator	(G) Reason for Trans- mittal	(H) Orig- inator Dispo- sition	(I) Receiv- er Dispo- sition
1	SNF-3883		0	Multiview Annulus Liquid Level Gauge/Level Switch Low	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		4. Review		1. Approved		4. Reviewed no/comment		
			2. Release		5. Post-Review		2. Approved w/comment		5. Reviewed w/comment		
			3. Information		6. Dist. (Receipt Acknow. Required)		3. Disapproved 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>								
2	1	Design Authority R. Whitehurst	<i>R. Whitehurst</i>	3/30/99							
2	1	QA T. D. Hays	<i>T. D. Hays</i>	3/30/99							

18. C. Van Katwijk <i>C. Van Katwijk</i> 2-9-99 Signature of EDT Date Originator		19. T. Choho <i>T. Choho</i> 3/30/99 Authorized Representative Date for Receiving Organization		20. <i>R. Whitehurst</i> R. Whitehurst 3/30/99 Design Authority/ Cognizant Manager		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
--	--	--	--	--	--	---	--

Reotemp Pressure Indicator, Local Indication of MCO Pressure

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

EDT/ECN: 626257 UC: 620
Org Code: 2G300 Charge Code: 105559/A000
B&R Code: 39EW40400 Total Pages: 13

Key Words: Pressure Indicator, MCO

Abstract: Reotemp Pressure Indicator, Local Indication of MCO Pressure
CGI-SNF-D-07-P4-008

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Release Approval

3/31/99
Date

Release Stamp

DATE	STA: 4	ID: 58
APR 2 1999		

Approved for Public Release

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Title: **REOTEMP PRESSURE INDICATOR, LOCAL INDICATION OF MCO PRESSURE**

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.: VPS-PI-1*40, PI-1*41	Specification No.: W-441-P4, Rev. 2	Manufacturer: Reotemp	Past P.O. No.: NA
Manufacturer's Part/ Model No.: PR-25-S-1-A-4-P15-D	Equipment Supplier (if different from manufacturer): TBD		Equip. Supplier's Part No.: NA

Component Description: **Pressure indicator, 0-15 psig, 2.5" diameter; provide local indication of MCO pressure.**

Section 2b Qualified Vendor/Supplier Survey

- 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.)
Done 12/21/98
- List of Candidate qualified suppliers or ISO 9000 suppliers
 company name and type contact name phone
Done 12/21/98

NA

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

Section 2c CGI Determination

- 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)
- 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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Title: **REOTEMP PRESSURE INDICATOR, LOCAL INDICATION OF**
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3. Question #3: Is the Item ordered from manufacturer/supplier on the basis or 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**

2. **Non-powered local indication monitoring of MCO pressure for H2 explosion.**

3. **Maintain critical function 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):

1. **NA**

2.

3.

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Title: REOTEMP PRESSURE INDICATOR, LOCAL INDICATION OF
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D. Failure Mechanisms(s) and the effects on component or system safety function (see worksheet 1):

1. **PI process connection break/PI body break - leakage of air/release of MCO contents through the pressure boundary.**2. **Failure in gage movement mechanism resulting in inaccurate or loss of MCO pressure indication.**

3.

4.

5.

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:

Yes []

No [X]

Environmental Condition B

If yes: Environmental Qualification Requirements

Limiting Environmental Conditions:

Required Safety Functions:

Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:

Yes [X]

No []

HNF-PRO-97, Rev. 0**W-441-P4, Rev. 2**

If yes: NPH Design Requirements

Performance Category: **PC-3**NPH Design Req'ts.: **Seismic Condition A**Required Safety Functions: **Pressure Boundary****Integrity; Non-Powered Local Indication****Monitoring of MCO Pressure for H2 Explosion**

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.

Section 6 [reserved]

Section 7 [reserved]

Section 8 References (for Functional Classification)

National Codes/Standards: **IEEE 344,**
IEEE 379, IEEE 603, IEEE 627Safety Analysis Report (SAR):
HNF-SD-SNF-SAR-002, Rev.
4ADrawings: **H-1-82161, Rev. 2**
HNF-SD-SNF-SEL-002, Rev. 4Vendor Manuals/Manufacturer/Supplier Information: **Reotemp Instrument Corporation, Pressure Gauges,**
Series PR

Other:

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Title: **REOTEMP PRESSURE INDICATOR, LOCAL INDICATION OF**
MCO PRESSURE

Section 9 - 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	PR-25-S-1-A-4-P15-D	1,IN	X	
Manufacturer	Reotemp	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	
Process Connection	Stainless Steel; 1/4" NPT With 1/4" X 1/2" Bushing; Bottom Mounted	1,T 1,IN	X X	
Indicator Range	0-15 psig	1,IN	X	
Dial Diameter	Nominal 2.5 Inches	1,IN	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 2.	1,T		X
Operating Range/Accuracy	0-15 psig; +/- 1.6% of full scale. Expose gauge to vacuum and retest per Note 4.	1,T		X
Environmental	Note 1			
Seismic Condition A	Note 3	1,T		X

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4. Notes and Legend:

1. The pressure 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.
2. Pressure test at 110% of design accident condition pressure of 150 psig. Exposure to test pressure may seriously degrade the readout function. This test is considered to be a destructive test.
3. Maintain critical function after seismic event. W-441-P4, Rev. 2, Appendix L, page L-12, provides a seismic testing plan for these components at a (TBD) seismic spectra.
4. This gauge will be exposed to vacuum during operations (nominal 13 kPa to 20 kPa). The gauge must sustain the vacuum condition without affecting its readout accuracy within the 0-15 psig indication range of the gauge when the process pressure returns to above atmospheric.

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 Reviews and Approvals

Approvals:

Designated Engineer: Edmund K. Krumholz 12/21/98
Design Authority: Richard W. Wheeler 12/21/98
QA Engineer: Tom Davis 12/22/98

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Title: REOTEMP PRESSURE INDICATOR, LOCAL INDICATION OF
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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

- Gauge Movement Mechanism Failure
- Process Connection/Body Break

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CHECKLIST 1

ACCEPTANCE METHOD 1

SPECIAL TEST/INSPECTION VERIFICATION

SECTION 1			
Item Description: Pressure Indicator for MCO Pressure		Equip #: VPS-PI-1*40, PI-1*41	
System #: 07		Model #: PR-25-S-1-A-4-P15-D	
Manufacturer (Address/Phone): Reotemp		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. Material, Body
☒	☒	☐	5. Process Connection
☒	☐	☐	6. Indicator Range
☒	☐	☐	7. Dial Diameter
☐	☒	☐	8. Pressure Boundary Integrity
☐	☒	☐	9. Operating Range/Accuracy
☐	☒	☐	10. Seismic Condition A
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 - Reotemp Instrument Corporation Pressure Gauges, Series PR			
Receipt Inspection Plan / Report #: _____			
References (see Section 7): _____			
Characteristic: Model Number			
Sample Size*: All Items			
Acceptance Criteria: PR-25-S-1-A-4-P15-D			
Receipt Inspection Plan / Report #: _____			
References (see Section 7): _____			

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Title: **REOTEMP PRESSURE INDICATOR, LOCAL INDICATION OF
MCO PRESSURE**Characteristic: **Manufacturer**Sample Size*: **All Items**Acceptance Criteria: **Reotemp**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

Characteristic: **Indicator Range**Sample Size*: **All Items**Acceptance Criteria: **0-15 Psig**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

Characteristic: **Dial Diameter**Sample Size*: **All Items**Acceptance Criteria: **Nominal 2.5 Inches**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

Characteristic: **Process Connection**Sample Size*: **All Items**Acceptance Criteria: **1/4" NPT With 1/4" X 1/2" Bushing; Bottom Mounted**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

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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): _____

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*: **Destructively Test Only One Item**

Actual Test Value:

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

Characteristic for Test: **Operating Range/Accuracy**Acceptance Criteria: **0-15 psig; +/- 1.6% of full scale. Expose gauge to vacuum and retest.**Sample Size*: **Normal Sampling Size**

Actual Test Value:

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

Characteristic for Test: **Seismic Condition A**Acceptance Criteria: **Maintain Critical Function After Seismic Event. W-441-P4, Rev. 2, Appendix L, page L-8, provides a seismic testing plan for these components at a (TBD) seismic spectra.**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				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/DN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Nameplate Data	Per Vendor Manual	X									
Model Number	PR-25-S-1-A-4-P15-D	X									
Manufacturer	Reotemp	X									
Indicator Range	0-15 Psig	X									
Material, Body	Stainless Steel	X									
Process Connection	Stainless Steel; 1/4" NPT With 1/4" X 1/2" Bushing; Bottom Mounted	X									
Dial Diameter	Nominal 2.5 Inches	X									
Pressure Boundary Integrity	No Leakage at Test Pressure of 165 Psig.		X								
Operating Range/Accuracy	0-15 psig; +/- 1.6% of full scale. Expose gauge to vacuum and retest.		X								
Environmental	NA										
Seismic Condition A	Maintain Critical Function		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: _____
Testing Agency QA Engineer: _____	QA Engineer: _____
_____	_____
_____	_____

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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:	