APR 2 1999
Sta-4 58

ENGINEERING DATA TRANSMITTAL

Page 1 of 1
1. EDT 626265

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) Origina- tor Dispo- sition	(I) Receiv- er Dispo- sition
1	SNF-3892		0	MKS Baratron MCO Absolute Pressure Transmitter	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) Rea- son	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Rea- son	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
2	1	Designated Engineer	C. Van Katwijk								
2	1	Design Authority	R. Whitehurst								
2	1	QA	T. D. Hays								

18. C. Van Katwijk Signature of EDT Originator Date 2-9-99	19. T. Choho Authorized Representative Date for Receiving Organization 3/30/99	20. R. Whitehurst Design Authority/ Cognizant Manager Date 3/30/99	21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments
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5

MKS Baratron MCO Absolute Pressure Transmitter

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

EDT/ECN: 626265	UC: 620
Org Code: 2G300	Charge Code: 105559/A000
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Key Words: Absolute Pressure Transmitter - MCO

Abstract: MKS Baratron MCO Absolute Pressure Transmitter
CGI-SNF-D-13-P4-019

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Release Approval

3/31/99

Date

Release Stamp

Approved for Public Release

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Title: **MKS BARATRON MCO ABSOLUTE PRESSURE TRANSMITTER**

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.: He-PT-1*35	Specification No.: W-441-P4 Rev. 2	Manufacturer: MKS Instruments	Past P.O. No.: NA
Manufacturer's Part/ Model No.: MKS Baratron PT 430C A 00100	Equipment Supplier (if different from manufacturer): TBD		Equip. Supplier's Part No.: NA

Component Description: **MKS Baratron high resolution absolute pressure transmitter designed for MCO vacuum processes (100 TORR) using capacitance manometer. Measure and transmit MCO pressure. Electronic output signal is NON-SAFETY (GS).**

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 5.3.2, proceed to dedicate Item)

2. List of Candidate qualified suppliers or ISO 9000 suppliers
company name & 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 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**

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

C. Host Component Safety Function (if applicable):

1. **NA**

2.

3.

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

1. **PT process connection break/PT body break - inleakage of air.**

2. **Inaccurate pressure signal due to damage from pressure outside instrument indicator range.**

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 B**

Required Safety Functions: **Pressure Boundary Integrity**

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, ISA-S5.1, S5.4, S18.1, S20

Safety Analysis Report (SAR):

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

Drawings: **H-1-82161, Rev. 2**

HNF-SD-SNF-SEL-002, Rev. 4

Vendor Manual/Manufacturer/Supplier Information: **MKS Instruments Baratron Absolute Pressure Transmitters 400 Series**

Other:

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Section 9 Critical Characteristics

Critical Characteristics Verification Document: Vendor Specifications; HNF-SD-SNF-SEL-002 Rev. 4	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 Data	Per Vendor Manual	1, IN	X	
Model/Part Number	430C A00100	1, IN	X	
Housing	NEMA 4	1, IN	X	
Process Connection	1/2 - 18 NPT	1, IN	X	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Material, Body	Cast Aluminum	1, T	X	
Material, Process Connection	Stainless Steel	1, T	X	
3. Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Pressure Boundary	Pressure Test at Pressure of 165 Psig (No Leakage) Notes 3 and 4	1, T		X
Repeatability	NA			
Input/Output Voltage/ Operating Range/ Accuracy	NA			
Insulation Resistance	NA			
Environmental	Note 1			
Seismic Condition B	Notes 2 and 4	1, T		X

Notes and Legend:

- The instrument has ceramic electrodes and non-metallic terminal strips. 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.
- Maintain pressure boundary 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. "Confinement" leakage acceptance criteria is $< 10^{-4}$ scc/sec.
- Pressure test at 110% of design accident condition pressure of 150 psig (Destructive Test). Vendor sheet states overpressure limit of 35 psig, consequently this test is considered to be a destructive test.
- Testing (Seismic and pressure boundary) is being performed for PT-1*08 (CGI-SNF-D-07-P4-010). Both instruments are Baratron Series 400 and have identical pressure boundaries. Destructive testing of PT-1*08 will provide verification of the critical characteristics for this component.

Acceptance Method:

- 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 Review and Approval

Approvals:

Designated Engineer: Evan Klumpp 12/22/98

Design Authority: Russell Whitehurst 12/21/98

QA Engineer: TD Hays 12/29/98

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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 [] Mode _____	No [X]; If Yes, indicate failure
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	Yes [] Mode _____	No [X]; If Yes, indicate failure
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.	Yes [] Mode _____	No [X]; If Yes, indicate failure
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.	Yes [] Mode _____	No [X]; If Yes, indicate failure
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 [] Mode _____	No [X]; If Yes, indicate failure
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.	Yes [] Mode _____	No [X]; If Yes, indicate failure
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	Yes [] Mode _____	No [X]; If Yes, indicate failure
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.	Yes [] Mode _____	No [X]; If Yes, indicate failure
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.	Yes [] Mode _____	No [X]; If Yes, indicate failure
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.	Yes [] Mode _____	No [X]; If Yes, indicate failure
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 [] Mode _____	No [X]; If Yes, indicate failure
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.	Yes [] Mode _____	No [X]; If Yes, indicate failure

Section 2. Additional Failure Modes Applicable to the Component Under Evaluation

- Process Connection Break**
- Transmitter Body Break**
- Diaphragm Assembly Loss**
- Deformation due to excessive pressure.**
-

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CHECKLIST 1

ACCEPTANCE METHOD 1

SPECIAL TEST/INSPECTION VERIFICATION

SECTION 1

Item Description: **Baratron Absolute Pressure Transmitter**

Equip #: **He-PT-1*35**

Model #: **BARATRON PT 430C A00100**

System #: 13

Manufacturer (Address/Phone):

MKS Instruments

Six Shattuck Road

Andover, MA 01810

(800) 227-8766

P.O. #

Supplier (Address/Phone):

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1

Insp	Test	Post-Test	
☒	☐	☐	1. Nameplate Data
☒	☐	☐	2. Model/Part Number
☒	☐	☐	3. Housing
☒	☐	☐	4. Process Connection
☐	☒	☐	5. Material, Body
☐	☒	☐	6. Material, Process Connection
☐	☒	☐	7. Pressure Boundary
☐	☐	☐	8. Repeatability
☐	☐	☐	9. Input/Output Voltage Operating Range/Accuracy
☐	☐	☐	10. Insulation Resistance
☐	☒	☐	11. 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): **Baratron Absolute Pressure Transmitter 400 Series**

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Title: **MKS BARATRON MCO ABSOLUTE PRESSURE TRANSMITTER**Characteristic: **Model/Part Number**Sample Size*: **All Items**Acceptance Criteria: **430C A00100**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

Characteristic: **Housing**Sample Size*: **All Items**Acceptance Criteria: **NEMA 4**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

Characteristic: **Process Connection**Sample Size*: **All Items**Acceptance Criteria: **1/4 - 18 NPT**

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: **Cast Aluminum**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): _____

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Title: MKS BARATRON MCO ABSOLUTE PRESSURE TRANSMITTERCharacteristic for Test: **Pressure Boundary**Acceptance Criteria: **Pressure Test at Pressure of 165 Psig (No Leakage)**

Sample Size*: **Destructively Test Only One Item. Pressure boundary testing is being performed for PT-1*08 (CGI-SNF-D-07-P4-010). Both instruments are Baratron Series 400 and have identical pressure boundaries. Destructive testing of PT-1*08 will provide verification of the critical characteristics for this component.**

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-P4, Rev. 2, Appendix L, page L-12, provides a seismic testing plan for these components at a (TBD) seismic spectra. "Confinement" leakage acceptance criteria is < 10-4 scc/sec.**

Sample Size*: **Seismic Testing is being performed for PT-1*08 (CGI-SNF-D-07-P4-010). Both instruments are Baratron Series 400 and have identical pressure boundaries. Destructive testing of PT-1*08 will provide verification of the critical characteristics for this component.**

Actual Test Value:

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

Characteristic for Test:

Acceptance Criteria:

Sample Size*:

Actual Test Value:

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

Characteristic:

Acceptance Criteria:

Sample 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/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/Part Number	430C A00100	X									
Housing	NEMA 4	X									
Process Connection	¼ - 18 NPT	X									
Material, Body	Cast Aluminum	X									
Material, Process Connection	Stainless Steel	X									
Pressure Boundary	NA										
Repeatability	NA										
Input/Output Voltage Operating Range/ Accuracy	NA										
Insulation Resistance	NA										
Environmental	NA										
Seismic Condition B	NA										

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