APR 2 1999
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ENGINEERING DATA TRANSMITTAL

Page 1 of 1
1. EDT 626256

2. To: (Receiving Organization) Distribution		3. From: (Originating Organization)		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				
11. Receiver Remarks: 11A. Design Baseline Document? ☐ Yes ☒ No				10. System/Bldg./Facility: Spent Nuclear Facility				
				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- nator	(G) Reason for Trans- mittal	(H) Origi- nator Dispo- sition	(I) Receiv- er Dispo- sition
1	SNF-3882		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 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	Design Authority R. Whitehurst	<i>R. Whitehurst</i>	3/30/99							
2	1	Designated Engineer C. Van Katwijk	<i>C. Van Katwijk</i>	3/30/99							
2	1	T. D. Hays	<i>T. D. Hays</i>	3/30/99							

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

Multiview Annulus Liquid Level Gauge/Level Switch Low

S

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

EDT/ECN: 626256	UC: 620
Org Code: 2G300	Charge Code: 105559/A000
B&R Code: 39EW40400	Total Pages: 12

Key Words: Liquid Level Gauge/Level Switch

Abstract: Multiview Annulus Liquid Level Gauge/Level Switch Low
CGI-SNF-D-47-P4-007

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[Signature]
Release Approval

3/31/99

Date

Release Stamp

Approved for Public Release

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Title: **MULTIVIEW ANNULUS LIQUID LEVEL GAUGE/LEVEL SWITCH
LOW**

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.:

**TW-LG/LSL-1*24,
1*25**

Specification No.:

W-441-P4, Rev. 2Manufacturer: **Penberthy**Part P.O. No.: **NA**Manufacturer's Part/
Model No.: **Multiview
Liquid Level Meter
With MGS - 314
Switch**Equipment Supplier (if different from manufacturer):
Engineering Equipment, Inc.Equip. Supplier's Part No.:
NAComponent Description: **Multiview Magnetic - Based Cask Annulus Liquid Level Follower Style Gauge
(Inches) With Point Level Control Switch (Low)**

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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LOW**

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. **Provide local cask annulus water level indication (post accident).**

2. **Provide low water level alarm to the SCIC annunciator for operator response to prevent runaway reaction.**

3. **Maintain critical function (annulus water level indication) 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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D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Failure of or stuck follower - loss of reading and alarm.**2. **Failure of low level switch contacts to make or break - loss of alarm to SCIC.**

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-P4, Rev.2**

If yes: NPH Design Requirements

Performance Category: **PC-3**NPH Design Req'ts.: **Seismic Condition A - LG-1 *24, 1*25 only**Required Safety Functions: **Indication; Low Level Alarm (alarm not required for 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:

IEEE 344, IEEE 379, IEEE 603, IEEE 627Safety Analysis Report (SAR): **HNF-SD-SNF-SAR-002, Rev. 4A**Drawings: **H-1-82161, Rev. 2**
HNF-SD-SNF-SEL-002, Rev. 4Vendor Manual/Manufacturer/Supplier Information: **Penberthy Multiview Manual, Application Report 4771**Other: **NA**

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LOW**

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	Per Vendor Manual	1, IN	X	
Model Number	Multiview LL Meter W MGS-314 Switch	1, IN	X	
Process Connection	1" Flange	1, IN	X	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Material - Body/Process Connection	Stainless steel	1, T	X	
Material - Float	Stainless Steel	1, T	X	
Indicator Type/Scale	Follower Type/Scale in % (0-100%)	1, IN	X	
3. Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
Operating Range / Alarm Setpoint	Provide water supply connection to upper/lower gage flanges, fill gage, set low level alarm trip at 50%, test switch at decreasing levels, alarm at 50 +/- 1%.	1, T		X
MGS-314 Contact Rating	Nominal 5 AMP @ 120 VAC, Less Than 0.5 V Drop Across Contacts	1, T		X
Insulation Resistance	Greater Than 10 Megohm Resistance	1, T		X
Enviromental	Note 1			
Seismic Condition A	Note 2	1, T		X
4. Notes and Legend:		Acceptance Method:		
1. For LG-1*25 and LSL-*25 the instrument has BUNA-N O-ring Seals. The BUNA-N is not subject to degradation at 40°F and 60% RH or 115°F and 22% RH and is suitable for Environmental Condition B application.		1. Special Test and Inspection 1, IN for Inspection 1,T for Test		
2. Maintain critical function (provide valid water level indication) after Seismic event. W-441-P4, Rev. 2, Appendix L, page L- 10, provides a seismic testing plan for these components at a (TBD) seismic spectra. After a seismic event, the level gauge follower may need to be reset with a handheld magnet.		2. Commercial Grade Survey		
		3. Source Verification		
		4. Vendor/Item History		

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: *C. van Kleeft* 12/21/98

Design Authority: *Regina W. Johnson* 12/21/98

QA Engineer: *JD Dwyer* 12/21/98

12/14/98

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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 [X] Mode Switch Open/Short Circuit - Loss of Alarm	No []; 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 [X] Mode _____	No []; 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 Above	No [X]; If Yes, indicate failure
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	Yes [X] Mode _____	No []; 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 []; If Yes, indicate failure

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

1.	Failure of or Stuck Follower - Loss of Reading/Alarm
2.	
3.	
4.	
5.	

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CHECKLIST 1

ACCEPTANCE METHOD 1

SPECIAL TEST/INSPECTION VERIFICATION

SECTION 1	
Item Description: Annulus Liquid Level Switch	Equip #: TW-LG/LSL-1*24, 1*25
System #: 47	Model #: Multiview LL Meter With MGS-314 Switch
Manufacturer (Address/Phone): Penberthy	Supplier (Address/Phone): Engineering Equipment, Inc.
P.O. #	

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.

Insp	Test	Post-Test	
☒	☐	☐	1. Nameplate
☒	☐	☐	2. Model Number
☒	☐	☐	3. Process Connection
☐	☒	☐	4. Material - Body/Process Connection
☐	☒	☐	5. Material - Float
☒	☐	☐	6. Indicator Type/Scale
☐	☒	☐	7. Operating Range / Alarm Setpoint
☐	☒	☐	8. MGS-314 Contact Rating
☐	☒	☐	9. Insulation Resistance
☐	☒	☐	10. Seismic Condition A

SECTION 3 BY INSPECTION

* See Attachment G of Desk Instruction for Sampling Size

Characteristic: **Nameplate**

Sample Size*: **All Items**

Acceptance Criteria: **Per vendor manual**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

Characteristic: **Model number**

Sample Size*: **All Items**

Acceptance Criteria: **Multiview LL Meter W MGS-314 Switch**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

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Characteristic: **Process Connection**

Sample Size*: **All Items**

Acceptance Criteria: **1" Flange**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

Characteristic: **Indicator Type/Scale**

Sample Size*: **All Items**

Acceptance Criteria: **Follower Type/Scale in % (0-100%)**

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 /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: **Material - Float**

Acceptance Criteria: **Stainless Steel**

Sample Size*: **Normal Sampling Size**

Actual Test Value:

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

Characteristic for Test: **Operating Range / Alarm Setpoint**

Acceptance Criteria: **Provide water supply connection to upper/lower gage flanges, fill gage, set low level alarm trip at 50%, test switch at decreasing levels, alarm at 50 +/- 1%.**

Sample Size*: **Normal Sampling Size**

Actual Test Value:

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

Characteristic for Test: **MGS-314 Contact Rating**

Acceptance Criteria: **Nominal 5 AMP @ 120 VAC, Less Than 0.5 V Drop Across Contacts**

Sample Size*: **Normal Sampling Size**

Actual Test Value:

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

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Title: **MULTIVIEW ANNULUS LIQUID LEVEL GAUGE/LEVEL SWITCH
LOW****Characteristic for Test: Insulation Resistance**Acceptance Criteria: **Greater Than 10 Megohm Resistance**Sample Size*: **Normal Sampling Size**

Actual Test Value:

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

Characteristic for Test: Seismic Condition A

Acceptance Criteria: **1. Maintain critical function (provide valid water level indication) after Seismic event. W-441-P4, Rev. 2, Appendix L, page L-10, provides a seismic testing plan for these components at a (TBD) seismic spectra. After a seismic event, the level gauge follower may need to be reset with a handheld magnet.**

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/N	Procedure or ER#	Check- list ID	Number Tested	Number Failed	Verifying Organization	Printed Name/Signature	Date
Nameplate	Per Vendor Manual	X									
Model Number	Multiview LL Meter W MGS-314 Switch	X									
Process Connection	1" Flange	X									
Material - Body/Process Connection	Stainless Steel	X									
Material - Float	Stainless Steel	X									
Indicator Type/Scale	Follower Type/Scale in % (0-100%)	X									
Operating Range / Alarm Setpoint	Provide water supply connection to upper/lower gage flanges, fill gage, set low level alarm trip at 50%, test switch at decreasing levels, alarm at 50 +/- 1%.		X								
MGS-314 Contact Rating	Nominal 5 AMP @ 120 VAC, Less Than 0.5 V Drop Across Contacts		X								
Insulation Resistance	Greater Than 10 Megohm Resistance		X								
Environmental	NA										
Seismic Condition A	Maintain Critical Function (valid water level indication) After Seismic Event		X								
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<u>LOW</u>	

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: _____ Date _____ Testing Agency QA Engineer: _____ Date _____		BUYER VERIFICATION Design Authority: _____ 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:	