APR 01 1999
STA# 4

4 ENGINEERING DATA TRANSMITTAL

Page 1 of 1
1. EDT 626285

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 Desig- Nator	(G) Reason for Trans- mittal	(H) Origina- tor Dispo- sition	(I) Receiv- er Dispo- sition
1	SNF-3936		0	Fike MCO Pressure Safety Element	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								
2	1	Design Authority	J. J. Irwin								
2	1	QA	T. D. Hays	2-18-99							

18. C. Van Katwijk Signature of EDI Originator Date 2-9-99		19. T. Choho Authorized Representative for Receiving Organization Date 2/22/99		20. J. J. Irwin Design Authority/ Cognizant Manager Date 2/11/99		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
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S

Fike MCO Pressure Safety Element

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

EDT/ECN: 626285	UC: 620
Org Code: 2G300	Charge Code: 105559/A000
B&R Code: 39EW40400	Total Pages: 13

Key Words: MCO- Safety Element

Abstract: Fike MCO Pressure Safety element
CGI-SNF-D-30-3-P4-044

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Release Approval

4/1/99

Date

Release Stamp

Approved for Public Release

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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-PSE-1*33	Specification No.: W-441-P4, Rev. 2	Manufacturer: Fike	Past P.O. No.: NA
Manufacturer's Part/ Model No.: HOV-UT, 1", 316SS/TEF/316SS, 30PSI, 150°C, Standard MFG Tolerances, FU-1", 316SS	Equipment Supplier (if different from manufacturer): TBD		Equip. Supplier's Part No.: NA

Component Description: **This pressure safety element is a 1 inch rupture disc used to prevent an overpressure condition in the MCO. The pressure safety element is located at the MCO and discharges to the plant vent.**

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)
[X] NO (go to procedure step 5.3.2, proceed to dedicate item.)
J.F.V. 10/21/98
OK 12/21/98
- List of Candidate qualified suppliers or ISO suppliers
company name and type contact name phone
NA
J.F.V. 10/21/98
OK 12/21/98
- 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)
[X] NO (continue)
- Question #2: Is the Item used in applications other than nuclear facilities or activities?
[] NO (the item is not commercial grade)
[X] 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. Prevents thermal runaway and H2 explosion.

2. Pressure boundary integrity – prevents MCO over pressure.

3. Maintain critical function during and 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 Mechanisms(s) and the effects on component or system safety function (see worksheet 1):

1. **Failure of the disc to rupture at its nominal burst pressure.**2. **Fracture of the disc housing or piping attachment.**3. **Disc ruptures at a lower pressure than its nominal burst pressure.**

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**~~WHC-SD-GN-DGS-3006~~**

If yes: NPH Design Requirements

Performance Category: **PC-3**NPH Design Req'ts.: **Seismic Condition A**Required Safety Functions: **Disc ruptures to relieve overpressure in the MCO. 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:

ASME B31.1, B16 Series

Safety Analysis Report (SAR):

HNF-SD-SNF-SAR-002, Rev. 4ADrawings: **H-1-82165, Rev. 2****HNF-SD-SNF-SEL-002, Rev. 4**
CVDF-SSD-003

Vendor Manuals/Manufacturer/Supplier Information:

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 Number	HOV-UT, 1", 316SS/TEF/316SS, 30 PSI, 150°C, Standard MFG. Tolerance, FU-1", 316SS	1,IN	X	
Manufacturer	Fike	1,IN	X	
Process Connection	1 Inch NPT	1,IN	X	
2. Physical Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Material, Housing	Stainless Steel	1,T	X	
Material, Process Connection	Stainless Steel	1,T	X	
Material, Rupture Disc	Aluminum	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
Rupture Disc Burst Pressure	Nominal 30 psig	1,T		X
Environmental	Note 1			
Seismic Condition A	Note 2	1,T		X
4. Notes and Legend:		Acceptance Method:		
<p>1. The pressure safety element and rupture disc are not subject to degradation at environmental conditions of 40°F and 60% RH or 115°F and 22% RH and are suitable for Condition B application.</p> <p>2. Maintain critical function during and after Seismic event. W-441-P4-Rev. 2, Appendix L, page L-(later) provides a seismic testing plan for this safety class, Seismic Condition A component at a Seismic Spectra TBD.</p> <p>3. Pressure test at 110% of design accident condition pressure of 150 psig. The rupture disc burst pressure is 30 psig and the disc must be removed and a blank installed for this test.</p>		<p>1. Special Test and Inspection 1,IN for Inspection 1,T for Test</p> <p>2. Commercial Grade Survey</p> <p>3. Source Verification</p> <p>4. Vendor/Item History</p>		

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Section 10 Initial Reviews and Approvals

Approvals:

Designated Engineer: Egon Vltavsky 12/21/98

Design Authority: H. J. Wini 12/18/98

QA Engineer: SO Dayp 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 [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

1. Failure of the disc to rupture at its nominal burst pressure.
2. Fracture of the disc housing or piping attachment.
3. Disc ruptures at a lower pressure than its nominal burst pressure.

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CHECKLIST 1

ACCEPTANCE METHOD 1

SPECIAL TEST/INSPECTION VERIFICATION

SECTION 1			
Item Description: MCO Pressure Safety Element		Equip #: PV- PSE-1*33	
System #: 30-3		Model #: HOV-UT, 1", 316SS/TEF/316SWS, 30 PSI, 150°C, Standard MFG Tolerance, FU-1", 316SS	
Manufacturer (Address/Phone): Fike Company		Supplier (Address/Phone):	
P.O. #			
SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1			
Imp	Test	Post-Test	
☒	☐	☐	1. Nameplate Data
☒	☐	☐	2. Model Number
☒	☐	☐	3. Manufacturer
☒	☐	☐	4. Process Connection
☐	☒	☐	5. Material, Rupture Disc
☐	☒	☐	6. Material, Housing
☐	☒	☐	7. Material, Process Connection
☐	☒	☐	8. Pressure Boundary Integrity
☐	☒	☐	9. Rupture Disc Burst Pressure
☐	☒	☐	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			
Receipt Inspection Plan / Report #: _____			
References (see Section 7): _____			
Characteristic: Model Number			
Sample Size*: All Items			
Acceptance Criteria: HOV-UT, 1", 316SS/TEF/316SS/ 30 PSI, 150°C, Standard MFG Tolerance, FU-1", 316SS-			
Receipt Inspection Plan / Report #: _____			
References (see Section 7): _____			

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Characteristic: **Manufacturer**

Sample Size*: **All Items**

Acceptance Criteria: **Fike**

Receipt Inspection Plan / Report #: _____

References (see Section 7): _____

Characteristic: **Process Connection**

Sample Size*: **All Items**

Acceptance Criteria: **1 Inch 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, Housing**

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: **Material, Rupture Disc**

Acceptance Criteria: **Aluminum**

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 Process Test Pressure of 165 psig**

Sample Size*: **Normal Sampling Size**

Actual Test Value:

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

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Characteristic for Test: **Rupture Disc Burst Pressure**

Acceptance Criteria: **Nominal 30 psig**

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 During and After Seismic Event**

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/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Nameplate Data	Per Vendor Manual	X									
Model Number	HOV-UT, 1", 316SS/TEF/316SS, 30 PSI, 150°C, Standard MFG. Tolerances, FU-1", 316SS	X									
Manufacturer	Fike	X									
Process Connection	1 Inch NPT	X									
Material, Rupture Disc	Aluminum	X									
Material, Housing	Stainless Steel	X									
Material, Process Connection	Stainless Steel	X									
Pressure Boundary Integrity	No Leakage at Test Pressure of 165 psig		X								
Rupture Disc Burst Pressure	Nominal 30 psig		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.

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:	