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ILLINOIS POWER COMPANY

CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

August 21, 1985

Docket No. 50-461

Director of Nuclear Reactor Regulation
Attn: Mr. W. R. Butler, Chief
Licensing Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Clinton Power Station Unit 1
SER Outstanding Issue #7iii
Pump and Valve Operability Review (PVOR)

Dear Mr. Butler:

Please find attached for your Staff's review, the long form information required for the upcoming PVOR audit, scheduled for August 27-30, 1985. This information is being submitted to you in the format transmitted to Illinois Power Company (IP) November 28, 1984, for the equipment selected and given to IP on August 2, 1985.

It is IP's understanding that from this list, eight items will be selected by August 23, 1985, for the audit. Also, two surprise items will be selected at the same time. If you have any questions regarding this information, please contact me as soon as possible.

Sincerely yours,

F. A. Spangenberg
Director - Nuclear Licensing
and Configuration
Nuclear Station Engineering

JLP/kaf

Attachment

cc: B. L. Siegel, NRC Clinton Licensing Project Manager
NRC Resident Office
Regional Administrator, Region III, USNRC
Illinois Department of Nuclear Safety

Encls to: A. Lee - 1
J. Lombardo - 2 EQB PM

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E PDR

PROJECT NAME: CLINTON-1	PROJECT NO.: 4536-32	FILE NO.: CQD- 020721 Revision: 00

Docket No.: 50-461

☒ BWR ☐ PWR

☒ BOP ☐ NSSS

☒ SAFETY-RELATED ☐ NON-SAFETY RELATED

Reviewed By: [signature] Date: 8-9-85

Review Approved By: [signature] Date: 8/9/85

NSSS Supplier: GENERAL ELECTRIC

Spec. No: K-2864 Title: CONTROL VALVES

Vendor/Manufacturer: FISHER CONTROLS / SAME

Qualification Report No., Title, Revision, and Date (Plus other vendor information)

1) REPORT * FQP-16-2 REV. B DATE 8-5-81 - SEISMIC QUALIFICATION OF FISHER CONTROL VALVE (SQ-CL056)

I. CONCLUSION OF REVIEW

☒ Accepted ☐ Rejected

Comments:

II. GENERAL COMPONENT INFORMATION

The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

1. Supplier: ☐ NSSS ☒ BOP
2. Location: a. Building/Room: AUX. BLDG / ROOM NOT AVAIL.
   b. Elevation: 755'-0"
   c. System: REACTOR WATER CLEAN-UP
3. Component number on in-house drawings: 1G33-F041

Note: If component is a ☐ Pump, complete item II.4. If component is a ☒ Valve, complete item II.5.

Form MAS-CQD-2.10 Approved by: [signature] Dept. Mgr
Rev. Orig (11-11-82)

THIS STANDARD IS TO BE USED FOR ACTIVE PUMPS AND VALVES WHEN REQUESTED BY THE NRC	MECHANICAL DEPARTMENT STANDARD CHECKLIST FOR ACTIVE PUMP AND VALVE OPERABILITY ASSURANCE REVIEW
FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY	SARGENT & LUNDY ENGINEERS

4. General Pump Data

a. Pump

Name _____
Mfg. _____
Model _____
Serial No.: _____
Type _____
Size _____
Weight _____
Mounting Method _____
Required bhp _____

Parameter	Design	Operating
Pressure		
Temperature		
Flow		N/A
Head		

Required NPSH at maximum flow _____
Available NPSH _____
Operating Speed _____
Critical Speed _____

b. Prime-mover

Name _____
Mfg _____
Model _____
Serial No.: _____
Type _____
Size _____
Weight _____
Mounting Method _____
hp _____

Power requirements: (include normal, maximum and minimum).

Electrical _____
_____
_____
Other _____
_____

If MOTOR, list:

Duty cycle _____
Stall current _____
Class of insulation _____
_____

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the pump assembly operational (e.g., coupling, lubricating oil system, etc.):

_____
_____
_____

List control signal inputs: _____
_____
_____
_____

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PROJECT NO.: 4536-32 | FILE NO.: CQD- 02072 Revision: 00

5. General Valve Data

a. Valve		b. Actuator (if not an integral unit)	
Name	RWCU BLOWDOWN WARMING BYPASS	Name	PNEUMATIC OPERATOR
Mfg.	FISHER CONTROL	Mfg.	FISHER CONTROLS
Model	DIAPHRAGM ACTUATED CONTROL VALVE	Model	NOT AVAIL.
Serial No.:	7345295	Serial No.:	NOT AVAIL.
Type	GLOBE	Type	657 ES
Size	1"-600	Size	40
Weight	71.4 LBS	Weight	68.6 LBS.
Mounting Method	SOCKET WELDED TO PIPE	Mounting Method	BOLTED TO VALVE YOKE
Required Torque	NOT AVAIL.	Torque	NOT AVAIL.

Parameter	Design	Operating
* Pressure	1200 PSI	1100 PSI
Temperature	120°F	120°F
Flow	8.0 GPM	8.0 GPM
Max^A ΔP across valve (shutoff)	1200 PSIG	
Closing time @ max. ΔP	MANUFACTURER'S ~~STANDARD~~	
Opening time @ max. ΔP		

Power requirements for functional accessories, (if any) –

Power requirements: (include normal, maximum and minimum).

Electrical –

Other: ☒ Pneumatic ☐ Hydraulic

List functional accessories, i.e., those subcomponents ~~not~~ supplied by the manufacturer that are required to make the valve assembly operational (e.g., limit switches, etc.):

2 NAMCO LIMIT SWITCH TYPE EA 180-31302
1 ASCO SOLENOID VALVE NO. 206-832-3U
1 PRESSURE REGULATOR - FISHER CONTROLS TYPE 67FR-237

List control signal inputs: This valve is normally closed and is operated remote manually using control switch 1633A-S013. No provision for automatic operation

Ref: E02-1RT99 sheet 3

* INFORMATIONS ARE TAKEN FROM DATA SHEET CV010 & VENDOR DRAWING 36A3641 REV. C

Form MAS-CQD-2 10
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PROJECT NO.: 4536-32 | FILE NO.: CQD- 020721 Revision: 00

III. FUNCTION

1. Briefly describe component's normal and safety functions: There is no safety Function for this valve (see GE Doc. 283X250 AC, R/24). Normal Function is to open by-pass around DUMP-to-Condenser Isolation valve 1G33-F046. The by-pass line is used to warm-up drain line to condenser. The line is used during warm up and not stand-by periods of reactor operation

2. The component's normal state is: ☐ Operating ☒ Standby

3. Safety function:

a. ☐ Emergency reactor shutdown N/A

b. ☐ Containment heat removal

c. ☐ Containment isolation

d. ☐ Reactor heat removal

e. ☐ Reactor core cooling

f. ☐ Prevent significant release of radioactive material to environment

g. ☐ Does the component function to mitigate the consequences of one or more of the following events: ☐ Yes ☐ No

☐ LOCA ☐ HELB ☐ MSLB

☐ Other _____ N/A

4. Safety requirements:

☐ Intermittent Operation

☐ Continuous Operation

☐ During postulated event

☐ Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational: _____

_____ (e.g., hours, days, etc.)

5. For VALVES:

Does the component ☐ Fail open? ☒ Fail closed? ☐ Fail as is?

Is this the fail-safe position? ☐ Yes ☐ No N/A

Is the valve used for throttling purposes? ☐ Yes ☒ No

Is the valve part of the reactor coolant pressure boundary? ☐ Yes ☒ No

Does the valve have a specific limit for leakage? ☒ Yes ☐ No

If "Yes", give limit: Per Specification

Rev. Orig (11-11-82)

PROJECT NO.: 4536-32 | FILE NO.: COD- 02072 | Revision: 00

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component:
   ASME CODE, SECT. III, SUBSECT ND, SUBARTICLE ND-3500

2. Reference those qualification standards used as a guide to qualify the component:
   IEEE-344-1975 (FOR BOTH VALVE & OPERATOR)

3. Identify those parts of the above qualification standards deleted or modified in the qualification program:

   Deleted: N/A

   Modified: N/A

4. Have acceptance criteria been established and documented in the test plan(s) for the component? ☐ Yes ☒ No (ACCEPTANCE CRITERIA AVAIL. PER RPT. FQP16-2)

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? LOSS OF ELECTRIC POWER TO THE SOLENOID VALVE OR LOSS OF AIR PRESSURE TO THE SUPPLY PRESSURE REGULATOR

6. Are the margins identified in the qualification documentation? (Margin is the difference between design basis parameters and the test parameters used for equipment qualification.)
   ☒ Yes ☐ No VALVE WAS ANALYZED, MARGINS ARE AVAIL. PER FQP-16-2

Note: If component is a ☐ Pump, complete item IV.7; if component is a ☒ Valve, complete item IV.8.

7. Pump operability has been demonstrated by: ☐ Analysis ☐ Test ☐ Combination

   Identify PUMP tests performed:

   a. ☐ Shell hydrostatic (ASME Section III)
   b. ☐ Bearing temperature evaluations
   c. ☐ Seismic loading
   d. ☐ Vibration levels
   e. ☐ Exploratory vibration (Fundamental freq. _____)
   f. ☐ Seal leakage @ hydrostatic pressure
   g. ☐ Aging: ☐ Thermal ☐ Mechanical
   h. ☐ Flow performance

   Are curves provided? ☐ Yes ☐ No

N/A

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i. ☐ Pipe reaction end loads (nozzle loads)

N/A

j. ☐ Others: _____

k. ☐ Extreme environment:

- ☐ Humidity
- ☐ Chemical
- ☐ Radiation
- ☐ Thermal

8. Valve operability has been demonstrated by: ☐ Analysis ☒ Test ☐ Combination

Identify VALVE test performed:

a. ☐ Shell hydrostatic (ASME Section III) *

b. ☐ Cold cyclic; list times: * Open _____ Closed _____

c. ☒ Seismic loading (VALVE ANALYZED W/OPERATOR WEIGHT)

d. ☐ Hot cyclic; list times: Open _____ Closed _____

e. ☒ Exploratory vibration (Fundamental freq. > 33 Hz)

f. ☐ Main seat leakage

g. ☐ Aging: ☐ Thermal ☐ Mechanical N/A

h. ☐ Back seat leakage

j. ☐ Disc hydrostatic

i. ☒ Pipe reaction end loading (VALVE ONLY)

k. ☐ Extreme environment:

- ☐ Humidity
- ☐ Chemical
- ☐ Radiation
- ☐ Thermal

N/A

l. ☐ Flow interruption capability

m. ☐ Flow characterstics: Are curves provided? ☐ Yes ☐ No

n. ☐ Others: _____

9. As a result of any of the tests (or analysis), were any deviations from design requirements identified? ☐ Yes ☒ No

If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation: _____

N/A

* This information is not available since the valve is passive

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PROJECT NO.: 4536-32	FILE NO.: COD- 02072 Revision: 00

10. Was the test component precisely identical (same model, size, etc.) to the in-plant component?
☒ Yes ☐ No (VALVE WAS QUALIFIED BY ANALYSIS)
If "No", is installed component ☐ oversized or ☐ undersized? N/A

11. If type test was used to qualify the component, does the type test meet the requirements of IEEE 323-1974, Section 5? ☐ Yes ☐ No N/A

12. Is component orientation sensitive? ☒ Yes ☐ No ☐ Unknown
If "Yes", does installed orientation coincide with test orientation? ☒ Yes ☐ No Verified through walkdown program

13. Is the component mounted in the same manner in-plant as it was during the testing (i.e., welded, same number and size of bolts, etc.)? ☐ Yes ☐ No ☒ Unknown VERIFIED THROUGH NORMAL CONSTRUCTION PROCESS

14. Were the qualification tests performed in sequence and on only one component? ☐ Yes ☐ No N/A
If "Yes", identify sequence (e.g., radiation, seismic, cyclic, thermal, etc.): N/A

15. If aging (as outlined in Section 4.4.1 of IEEE 627-1980) was performed, identify the significant aging mechanisms: N/A

16. Identify loads imposed (assumed) on the component for the qualification tests (analysis) performed:
a. ☐ Plants (shutdown loads) N/A
b. ☐ Extreme environment N/A
c. ☒ Seismic load (VALVE ANALYZED WITH OPERATOR WEIGHT)
d. ☐ Others N/A

17. Have component design specifications been reviewed in-house to assure that they envelop all expected operating, transient, and accident conditions? ☐ Yes ☐ No

18. Does the component utilize any unique or special materials (e.g., special gaskets or packing limitations on nonferrous materials, special coatings or surfaces)? ☐ Yes ☐ No
If "Yes", identify: N/A

19. Does component require any special maintenance procedures or practices (including shorter periods between maintenance)? ☐ Yes ☐ No
If "Yes", identify: N/A

20. Is the qualified life for the component less than 40 years? ☐ Yes ☐ No
If "Yes" what is the qualified life? N/A

Form MAS-COD-2 10
Rev. Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: CQD- 02072 Revision: 00

V. COMMENTS

MS-1072-1

PROJECT NAME: CLINTON -	PROJECT NO: 4536-32	FILE NO: CQD-020712 Revision: 00

Docket No: 50-461

☒ BWR ☐ PWR

☐ BOP ☒ NSSS

☒ SAFETY-RELATED ☐ NON-SAFETY RELATED

Reviewed By: [signature] (signature) Date: 8-9-85

Review Approved By: A N Mahajan (signature) Date: 8/9/85

NSSS Supplier: GENERAL ELECTRIC

Spec. No: K-2801 Title: LIGHT WATER REACTOR NUCLEAR WATER SYSTEM

Vendor/Manufacturer: GE / ITT HAMMEL DAHL CONFLOW

Qualification Report No., Title, Revision, and Date (Plus other vendor information):

1) ITT, HAMMEL DAHL CONFLOW DESIGN REPORT #638 REV. 03 DATED 8/21/79 - SQ-CL730

I. CONCLUSION OF REVIEW

☒ Accepted ☐ Rejected

Comments: VALVE IS CONSIDERED TO BE PASSIVE SINCE IT IS ONLY REQUIRED TO MAINTAIN PRESSURE INTEGRITY OF THE RECIRCULATION DISCHARGE LINE

II. GENERAL COMPONENT INFORMATION

The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

1. Supplier: ☒ NSSS ☐ BOP
2. Location: a. Building/Room: CONTAINMENT / ROOM NOT AVAIL.
   b. Elevation: 729'-8"
   c. System: REACTOR RECIRCULATION
3. Component number on in-house drawings: 1B33-F060A

Note: If component is a ☐ Pump, complete item II 4. If component is a ☒ Valve, complete item II 5.

Form MAS-CQD-2.10 Approved by: [signature] Dept Mgr
Rev. Orig. (11-11-82)

THIS STANDARD IS TO BE USED FOR ACTIVE PUMPS AND VALVES WHEN REQUESTED BY THE NRC	MECHANICAL DEPARTMENT STANDARD: CHECKLIST FOR ACTIVE PUMP AND VALVE OPERABILITY ASSURANCE REVIEW
FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY	SARGENT & LUNDY ENGINEERS

PROJECT NO.: 4536-32 | FILE NO.: CQD-020712 Revision: 00

4. General Pump Data

a. Pump

Name _____
Mfg _____
Model _____
Serial No.: _____
Type _____
Size _____
Weight _____
Mounting Method _____
Required bhp _____

Parameter	Design	Operating
Pressure		
Temperature		
Flow		
Head		

Required NPSH at maximum flow _____
Available NPSH _____
Operating Speed _____
Critical Speed _____

b. Prime-mover

Name _____
Mfg _____
Model _____
Serial No.: _____
Type _____
Size _____
Weight _____
Mounting Method _____
hp _____

Power requirements: (include normal, maximum and minimum).

Electrical _____

N/A

Other _____

If MOTOR, list:

Duty cycle _____
Stall current _____
Class of insulation _____

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the pump assembly operational (e.g., coupling, lubricating oil system, etc.):

List control signal inputs: _____

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Rev. Orig (11-11-82)

PROJECT NO.: 4536-32 | FILE NO.: COD-020712 Revision: 00

5. General Valve Data

a. Valve

Name: RECIRCULATION CONTROL VALVE
Mfg.: ITT HAMMEL DAHL CONFLOW
Model: Not Available
Serial No.: 76/9010/003
Type: CONTROL VALVE
Size: 20"
Weight: 12,500 LBS (WET)
Mounting Method: BUTT-WELDED TO PIPE
Required Torque: NOT AVAILABLE

Parameter *	Design	Operating
Pressure	1675 PSI	NOT AVAIL
Temperature	575°F	↓
Flow	33050 GPM	↓
Max. ΔP across valve	350 PSI	
Closing time @ max. ΔP	NOT AVAILABLE	
Opening time @ max. ΔP	NOT AVAILABLE	

Power requirements for functional accessories, (if any): N/A

b. Actuator (if not an integral unit)

Name: HYDRAULIC OPERATOR
Mfg.: ITT General Control
Model: Not Available
Serial No.: Not Available
Type: HYDRAULIC
Size: Not Available
Weight: 1000 LBS
Mounting Method: BOLTED TO VALVE YOKE
Torque: Not Available

Power requirements: (include normal, maximum and minimum).
Electrical: 60 Hz, 3 PHASE, 480 V AC,

Other: ☐ Pneumatic ☒ Hydraulic

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the valve assembly operational (e.g., limit switches, etc.): NONE

List control signal inputs: NONE FROM A SAFETY CONSIDERATION. THIS VALVE IS NORMALLY OPEN. IT IS A HAND OR MANUALLY OPERATED FLOW CONTROL VALVE. NO PROVISION FOR AUTOMATIC OPERATION. REF: M05-1072 SH 1 & E02-1RR99 SH. 13

* FROM GE DOCUMENT 21A3884AB

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PROJECT NO.: 4536-32	FILE NO.: COD- 020712 Revision: 0D

III. FUNCTION

1. Briefly describe component's normal and safety functions: NORMAL FUNCTION IS TO MAINTAIN PRESSURE INTEGRITY OF RECIRCULATION DISCHARGE LINE. SAFETY FUNCTION: SAME AS NORMAL

2. The component's normal state is: ☐ Operating ☐ Standby

3. Safety function: N/A

a. ☐ Emergency reactor shutdown
b. ☐ Containment heat removal
c. ☐ Containment isolation
d. ☐ Reactor heat removal
e. ☐ Reactor core cooling
f. ☐ Prevent significant release of radioactive material to environment
g. ☐ Does the component function to mitigate the consequences of one or more of the following events: ☐ Yes ☐ No

N/A

☐ LOCA ☐ HELB ☐ MSLB

☐ Other _____

4. Safety requirements:

☐ Intermittent Operation
☐ During postulated event
☐ Continuous Operation
☐ Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational: _____

_____ (e.g., hours, days, etc.)

5. For VALVES:

Does the component ☐ Fail open? ☐ Fail closed? ☐ Fail as is?

Is this the fail-safe position? ☐ Yes ☐ No

N/A

Is the valve used for throttling purposes? ☐ Yes ☐ No

Is the valve part of the reactor coolant pressure boundary? ☐ Yes ☐ No

Does the valve have a specific limit for leakage? ☒ Yes ☐ No

If "Yes", give limit: PER MANUFACTURER'S STANDARD

Form MAS-COD-2 10
Rev. Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: CQD-020712J Revision: 00

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component:
   ASME BPVC, SECTION III, SUBSECTION NB, SUBARTICLE NB3500
   ANSI B16.5

2. Reference those qualification standards used as a guide to qualify the component:
   IEEE-344-1975 (FOR BOTH VALVE & OPERATOR)

3. Identify those parts of the above qualification standards deleted or modified in the qualification program:

   Deleted: N/A

   Modified: N/A

4. Have acceptance criteria been established and documented in the test plan(s) for the component? ☐ Yes ☐ No N/A NO TEST PLAN - QUALIFIED BY ANALYSIS

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? SAFETY FUNCTION OF VALVE IS TO MAINTAIN PRES. INTEGRITY
   VALVE DOES NOT PERFORM ANY ACTIVE SAFETY FUNCTION (PASSIVE VALVE)

6. Are the margins identified in the qualification documentation? (Margin is the difference between design basis parameters and the test parameters used for equipment qualification.)
   ☒ Yes ☐ No VALVE WAS QUALIFIED BY ANALYSIS.

Note: If component is a ☐ Pump, complete item IV.7; if component is a ☒ Valve, complete item IV.8.

7. Pump operability has been demonstrated by: ☐ Analysis ☐ Test ☐ Combination

   Identify PUMP tests performed:

   a. ☐ Shell hydrostatic (ASME Section III)
   b. ☐ Bearing temperature evaluations
   c. ☐ Seismic loading
   d. ☐ Vibration levels
   e. ☐ Exploratory vibration (Fundamental freq. _____)
   f. ☐ Seal leakage @ hydrostatic pressure
   g. ☐ Aging: ☐ Thermal ☐ Mechanical
   h. ☐ Flow performance
      Are curves provided? ☐ Yes ☐ No

N/A

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i. ☐ Pipe reaction end loads (nozzle loads) N/A

j. ☐ Others: _____

k. ☐ Extreme environment:
- ☐ Humidity
- ☐ Chemical
- ☐ Radiation
- ☐ Thermal

8. Valve operability has been demonstrated by: ☐ Analysis ☐ Test ☒ Combination

Identify VALVE test performed:

a. ☒ Shell hydrostatic (ASME Section III)

b. ☐ Cold cyclic; list times:
Open NOT AVAIL.
Closed _____

c. ☒ Seismic loading (VALVE ONLY)

d. ☐ Hot cyclic; list times:
Open NOT AVAIL.
Closed _____

e. ☒ Exploratory vibration (Fundamental freq > 33 Hz) (FOR VALVE)

f. ☐ Main seat leakage

g. ☐ Aging: ☐ Thermal ☐ Mechanical N/A

h. ☐ Back seat leakage

j. ☐ Disc hydrostatic

i. ☒ Pipe reaction end loading

k. ☐ Extreme environment:
- ☐ Humidity
- ☐ Chemical N/A
- ☐ Radiation
- ☐ Thermal

l. ☐ Flow interruption capability

m. ☒ Flow characterstics:
Are curves provided?
☐ Yes ☒ No NOT AVAIL.

n. ☐ Others: _____

9. As a result of any of the tests (or analysis), were any deviations from design requirements identified? ☐ Yes ☒ No

If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation: N/A

Form MAS-CQD-2 10
Rev. Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: CQD-020712 Revision: 00

10. Was the test component precisely identical (same model, size, etc.) to the in-plant component?
☒ Yes ☐ No (VALVE WAS ANALYZED BY ANALYSIS)
If "No", is installed component ☐ oversized or ☐ undersized? N/A

11. If type test was used to qualify the component, does the type test meet the requirements of IEEE 323-1974, Section 5? ☐ Yes ☐ No N/A

12. Is component orientation sensitive? ☒ Yes ☐ No ☐ Unknown
If "Yes", does installed orientation coincide with test orientation? ☐ Yes ☐ No VERIFIED THROUGH NORMAL CONST. PROCESS

13. Is the component mounted in the same manner in-plant as it was during the testing (i.e., welded, same number and size of bolts, etc.)? ☐ Yes ☐ No ☒ Unknown VERIFIED THROUGH NORMAL CONSTRUCTION PROCESS

14. Were the qualification tests performed in sequence and on only one component? ☐ Yes ☐ No N/A
If "Yes", identify sequence (e.g., radiation, seismic, cyclic, thermal, etc.): _____

15. If aging (as outlined in Section 4.4.1 of IEEE 627-1980) was performed, identify the significant aging mechanisms: N/A

16. Identify loads imposed (assumed) on the component for the qualification tests (analysis) performed
a. ☐ Plants (shutdown loads)
b. ☐ Extreme environment
c. ☒ Seismic load (VALVE WAS ANALYZED)
d. ☐ Others _____

17. Have component design specifications been reviewed in-house to assure that they envelop all expected operating, transient, and accident conditions? ☒ Yes ☐ No

18. Does the component utilize any unique or special materials (e.g., special gaskets or packing limitations on nonferrous materials, special coatings or surfaces)? ☐ Yes ☐ No
If "Yes", identify: N/A

19. Does component require any special maintenance procedures or practices (including shorter periods between maintenance)? ☐ Yes ☐ No
If "Yes", identify: N/A

20. Is the qualified life for the component less than 40 years? ☐ Yes ☐ No
If "Yes" what is the qualified life? N/A COMPONENT IS PASSIVE.

Form MAS-CQD-2.10
Rev Orig (11-11-82)

V. COMMENTS

PROJECT NAME: CLINTON - 1	PROJECT NO.: 4536-32	FILE NO.: CQD- 020837 Revision: 00

Docket No.: 50-461

☒ BWR ☐ PWR

☐ BOP ☒ NSSS

☒ SAFETY-RELATED ☐ NON-SAFETY RELATED

Reviewed By: lykamle (signature) Date 8-9-85

Review Approved By: BNahey (signature) Date 8/9/85

NSSS Supplier: GENERAL ELECTRIC

Spec. No.: K-2801 Title: LIGHT WATER REACTOR NUCLEAR STEAM SUPPLY SYSTEM

Vendor/Manufacturer: GE / ELECTROMOTIVE DIVISION OF GENERAL MOTORS / VIKING

Qualification Report No., Title, Revision, and Date (Plus other vendor information):

1) "SEISMIC ANALYSIS REPORT", DATED 12/15/78, SQ-CL027., CQD-026005 & CQD-020956; SQ-CL027 REV2, 7/26/85 ADDS NAVY SHOCK TEST DATA

I. CONCLUSION OF REVIEW

☒ Accepted ☐ Rejected

Comments: FUEL OIL PUMP 1E22-C301 IS QUALIFIED WITH DIESEL GENERATOR SETS AND THE EMD ENGINES

II. GENERAL COMPONENT INFORMATION

The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

1. Supplier: ☒ NSSS ☐ BOP

2. Location: a. Building/Room DIESEL / ROOM - 1C

b. Elevation 737'-0"

c. System HIGH PRESSURE CORE SPRAY

3. Component number on in-house drawings: 1E22-C301

Note: If component is a ☒ Pump, complete item II 4; if component is a ☐ Valve, complete item II 5

Approved by: _____ Dept. Mgr

Form MAS-CQD-2.10 Rev. Orig (11-11-82)

THIS STANDARD IS TO BE USED FOR ACTIVE PUMPS AND VALVES WHEN REQUESTED BY THE NRC	MECHANICAL DEPARTMENT STANDARD CHECKLIST FOR ACTIVE PUMP AND VALVE OPERABILITY ASSURANCE REVIEW
FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY	SARGENT & LUNDY ENGINEERS

PROJECT NO.: 4536-32

FILE NO.: CQD- 020837 Revision: 00

4. General Pump Data

a. Pump

Name FUEL OIL PUMP
Mfg. ELECTRO MOTIVE DIV. OF GM
Model GV-731-A
Serial No.: 8410219
Type ROTARY GEAR
Size 3/8" FLANGE
Weight N/A
Mounting Method BY COUPLING GUARD
Required bhp 3/4

Parameter	Design (TESTING PER MI-4110*)	Operating
Pressure (AT PUMP OUTLET)	80 PSI	65 PSI (max)
Temperature	NOT AVAIL.	40 - 120 °F
Flow	4 GPM	4 GPM
Head	10" of Hg	8"

Required NPSH at maximum flow NOT AVAIL.
Available NPSH 1 FT
Operating Speed 1200 RPM
Critical Speed NOT AVAIL.

b. Prime-mover

Name DRIVEN DIRECTLY BY DIESEL SHAFT
Mfg.
Model
Serial No.:
Type NOT APPLICABLE
Size
Weight
Mounting Method
hp

Power requirements: (include normal, maximum and minimum).
Electrical NOT APPLICABLE
Other NOT APPLICABLE

If MOTOR, list:
Duty cycle
Stall current NOT APPLICABLE
Class of insulation

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the pump assembly operational (e.g., coupling, lubricating oil system, etc.):

N/A

List control signal inputs: PUMP IS DRIVEN BY DIESEL SHAFT AND OPERATES WHEN THE DIESEL ENGINE STARTS. THERE ARE NO EXTERNAL CONTROL SIGNAL INPUTS.

* SEE REF TAG C2

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FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY

SARGENT & LUNDY ENGINEERS

PROJECT NO.: 4536-32	FILE NO.: CQD-020837 Revision: 00

5. General Valve Data

a. Valve

Name _____

Mfg. _____

Model _____

Serial No.: _____

Type _____

Size _____

Weight _____

Mounting Method _____

Required Torque _____

Parameter	Design	Operating
Pressure	_____	N/A
Temperature	_____	_____
Flow	_____	_____

Max. ΔP across valve _____

Closing time @ max. ΔP _____

Opening time @ max. ΔP _____

Power requirements for functional accessories, (if any) _____

b. Actuator (if not an integral unit)

Name _____

Mfg. _____

Model _____

Serial No.: _____

Type _____

Size _____

Weight _____

Mounting Method _____

Torque _____

Power requirements: (include normal, maximum and minimum).

Electrical _____

_____

_____

_____

Other: ☐ Pneumatic ☐ Hydraulic

_____

_____

_____

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the valve assembly operational (e.g., limit switches, etc.): _____

_____

_____

_____

List control signal inputs: _____

_____

_____

_____

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PROJECT NO.: 4536-32 | FILE NO.: COD- 020837 Revision: 00

III. FUNCTION

1. Briefly describe component's normal and safety functions:

, SAFETY FUNCTION IS TO SUPPLY DIESEL ENGINE WITH ADEQUATE FUEL FOR OPERATION.

NORMAL FUNCTION IS STANDBY.

2. The component's normal state is: ☐ Operating ☒ Standby

3. Safety function:

a. ☒ Emergency reactor shutdown
b. ☐ Containment heat removal
c. ☐ Containment isolation
d. ☐ Reactor heat removal
e. ☐ Reactor core cooling
f. ☐ Prevent significant release of radioactive material to environment

g. ☒ Does the component function to mitigate the consequences of one or more of the following events: ☒ Yes ☐ No

☒ LOCA ☒ HELB ☒ MSLB

☐ Other _____

4. Safety requirements:

☐ Intermittent Operation
☒ Continuous Operation
☒ During postulated event
☒ Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational: 100 DAYS (e.g., hours, days, etc.)

5. For VALVES:

Does the component ☐ Fail open? ☐ Fail closed? ☐ Fail as is?

Is this the fail-safe position? ☐ Yes ☐ No

Is the valve used for throttling purposes? ☐ Yes ☐ No Not Applicable

Is the valve part of the reactor coolant pressure boundary? ☐ Yes ☐ No

Does the valve have a specific limit for leakage? ☐ Yes ☐ No

If "Yes", give limit: _____

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IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: NONE (QUALIFED BY ANALYSIS, DOCUMENTED IN SQ-CL027)

2. Reference those qualification standards used as a guide to qualify the component: NONE

3. Identify those parts of the above qualification standards deleted or modified in the qualification program:

   Deleted: N/A

   Modified: N/A

4. Have acceptance criteria been established and documented in the test plan(s) for the component? ☐ Yes ☒ No (NO TESTING WAS PERFORMED)

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? MECHANICAL FAILURE OF PUMP OR COUPLING

6. Are the margins identified in the qualification documentation? (Margin is the difference between design basis parameters and the test parameters used for equipment qualification.)
   ☒ Yes ☐ No

Note: If component is a ☒ Pump, complete item IV.7; if component is a ☐ Valve, complete item IV.8.

7. Pump operability has been demonstrated by: ☒ Analysis ☐ Test ☐ Combination & Navy Shock Test Data

   Identify PUMP tests performed:

   a. ☒ Shell hydrostatic (ASME Section III) WILL BE TESTED DURING PRE-OP. TEST.

   b. ☐ Bearing temperature evaluations NOT AVAIL.

   c. ☒ Seismic loading

   d. ☒ Vibration levels

   e. ☐ Exploratory vibration (Fundamental freq.____ ____)

   f. ☒ Seal leakage @ hydrostatic pressure WILL BE TESTED DURING PRE-OP TEST.

   g. ☒ Aging: ☐ Thermal ☒ Mechanical

   h. ☒ Flow performance "

   Are curves provided? ☐ Yes ☒ No

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i. ☒ Pipe reaction end loads (nozzle loads)

j. ☐ Others: N/A

k. ☐ Extreme environment:
- ☐ Humidity
- ☐ Chemical N/A
- ☐ Radiation
- ☐ Thermal

8. Valve operability has been demonstrated by: ☐ Analysis ☐ Test ☐ Combination

Identify VALVE test performed:

a. ☐ Shell hydrostatic (ASME Section III)

b. ☐ Cold cyclic; list times:
Open _____
Closed _____

c. ☐ Seismic loading

d. ☐ Hot cyclic; list times:
Open _____
Closed _____

N/A

e. ☐ Exploratory vibration (Fundamental freq._____)

f. ☐ Main seat leakage

g. ☐ Aging: ☐ Thermal ☐ Mechanical

h. ☐ Back seat leakage

j. ☐ Disc hydrostatic

i. ☐ Pipe reaction end loading

k. ☐ Extreme environment:
- ☐ Humidity
- ☐ Chemical
- ☐ Radiation
- ☐ Thermal

l. ☐ Flow interruption capability

m. ☐ Flow characterstics:
Are curves provided?
☐ Yes ☐ No

n. ☐ Others: _____

9. As a result of any of the tests (or analysis), were any deviations from design requirements identified? ☐ Yes ☒ No

If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation: _____

N/A

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10. Was the test component precisely identical (same model, size, etc.) to the in-plant component?
☐ Yes ☐ No N/A (COMPONENT WAS QUALIFIED BY ANALYSIS)
If "No", is installed component ☐ oversized or ☐ undersized? N/A

11. If type test was used to qualify the component, does the type test meet the requirements of IEEE 323-1974, Section 5? ☐ Yes ☐ No N/A

12. Is component orientation sensitive? ☒ Yes ☐ No ☐ Unknown
If "Yes", does installed orientation coincide with test orientation? ☒ Yes ☐ No VERIFIED THROUGH NORMAL CONST. PROCESS.

13. Is the component mounted in the same manner in-plant as it was during the testing (i.e., welded, same number and size of bolts, etc.)? ☒ Yes ☐ No ☐ Unknown
PUMP TESTED MOUNTED ON ENGINE

14. Were the qualification tests performed in sequence and on only one component? ☐ Yes ☐ No N/A
If "Yes", identify sequence (e.g., radiation, seismic, cyclic, thermal, etc.): _____

15. If aging (as outlined in Section 4.4.1 of IEEE 627-1980) was performed, identify the significant aging mechanisms: N/A (MILD ENVIRONMENT)

16. Identify loads imposed (assumed) on the component for the qualification tests (analysis) performed:
a. ☐ Plants (shutdown loads) b ☐ Extreme environment
c ☒ Seismic load d. ☐ Others: _____

17. Have component design specifications been reviewed in-house to assure that they envelop all expected operating, transient, and accident conditions? ☒ Yes ☐ No (FOR ENTIRE DIESEL ASSEMBLY)

18. Does the component utilize any unique or special materials (e.g., special gaskets or packing limitations on nonferrous materials, special coatings or surfaces)? ☐ Yes ☐ No
If "Yes", identify: N/A (IN MILD ENVIRONMENT)

19. Does component require any special maintenance procedures or practices (including shorter periods between maintenance)? ☐ Yes ☒ No
If "Yes", identify: _____

20. Is the qualified life for the component less than 40 years? ☐ Yes ☐ No
If "Yes" what is the qualified life? N/A

Form MAS-COD-2.10
Rev. Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: CQD- 020837 Revision: 00

V. COMMENTS

Form MAS-CQD-2.10
Rev. Orig (11-11-82)

PROJECT NAME: CLINTON-1	PROJECT NO: 4536-32	FILE NO: CQD-020721 Revision: 00

Docket No: 50-461

☒ BWR ☐ PWR

☒ BOP ☐ NSSS

☒ SAFETY-RELATED ☐ NON-SAFETY RELATED

Reviewed By: Sykemle (signature) Date: 8-9-85

Review Approved By: R Mahey (signature) Date: 8/9/85

NSSS Supplier: GENERAL ELECTRIC

Spec. No: K-2866A Title: ASME SECTION III VALVES 2½" & LARGER

Vendor/Manufacturer: ANCHOR DARLING / SAME

Qualification Report No., Title, Revision, and Date (Plus other vendor information):

NONE (VALVE DOES NOT HAVE ANY EXTENDED PROPORTIONS) SEISMIC QUALIFICATION NOT REQD. PER ASME CODE

I. CONCLUSION OF REVIEW

☒ Accepted ☐ Rejected

Comments:

II. GENERAL COMPONENT INFORMATION

The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

1. Supplier: ☐ NSSS ☒ BOP
2. Location: a. Building/Room: FUEL (109 A-K)
   b. Elevation: 714'-4"
   c. System: FUEL POOL COOLING AND CLEANUP
3. Component number on in-house drawings: 1FC013A & 1FC013B

Note: If component is a ☐ Pump, complete item II 4. If component is a ☒ Valve, complete item II 5

Form MAS-CQD-2.10 Approved by: Dept. Mgr.
Rev. Orig. (11-11-82)

THIS STANDARD IS TO BE USED FOR ACTIVE PUMPS AND VALVES WHEN REQUESTED BY THE NRC	MECHANICAL DEPARTMENT STANDARD CHECKLIST FOR ACTIVE PUMP AND VALVE OPERABILITY ASSURANCE REVIEW
FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY	SARGENT & LUNDY ENGINEERS

4. General Pump Data

N/A

a. Pump

Name _____
Mfg. _____
Model _____
Serial No.: _____
Type _____
Size _____
Weight _____
Mounting Method _____
Required bhp _____

Parameter	Design	Operating
Pressure		
Temperature		
Flow		
Head		

Required NPSH at maximum flow _____
Available NPSH _____
Operating Speed _____
Critical Speed _____

b. Prime-mover

Name _____
Mfg _____
Model _____
Serial No.: _____
Type _____
Size _____
Weight _____
Mounting Method _____
hp _____

Power requirements: (include normal, maximum and minimum).
Electrical _____
_____
_____
Other _____
_____

If MOTOR, list:
Duty cycle _____
Stall current _____
Class of insulation _____
_____

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the pump assembly operational (e.g., coupling, lubricating oil system), etc.):

_____
_____
_____

List control signal inputs: _____
_____
_____
_____

Form MAS CQD-2.10
Rev. Orig (11-11-82)

PROJECT NO.: 4536-32 | FILE NO.: COD- 020721 Revision: 00

5. General Valve Data

N/A

a. Valve		b. Actuator (if not an integral unit)
Name	MANUAL CHECK VALVE	Name
Mfg.	ANCHOR DARLING	Mfg.
Model	TILTING DISC CHECK VALVE	Model
Serial No.:	E6214-210-1	Serial No.:
Type	CHECK VALVE	Type
Size	14" - 150#	Size
Weight	930 LBS	Weight
Mounting Method	BUTT-WELDED TO PIPE	Mounting Method
Required Torque	N/A	Torque

Parameter	Design	Operating
Pressure *	155 PSIG	110 PSIG
Temperature *	200°F	120°F
Flow	NOT AVAIL.	NOT AVAIL.
Max. ΔP across valve	N/A	
Closing time @ max. ΔP	N/A	
Opening time @ max. ΔP	N/A	

Power requirements for functional accessories, (if any): N/A

Power requirements: (include normal, maximum and minimum).

Electrical

Other: ☐ Pneumatic ☐ Hydraulic

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the valve assembly operational (e.g., limit switches, etc.): N/A

List control signal inputs: NONE - BOTH ARE CHECK VALVES
REFERENCE (M05-1037 sheet 3) (Lines 6D & 6A)

* INFORMATION IS TAKEN FROM PIPING LINE LIST. LINE NUMBER 1FC09AA & 1FC09AB

Form MAS-COD-2 10 Rev Orig (11-11-82)

FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY

SARGENT & LUNDY ENGINEERS

PROJECT NO.: 4536-32 | FILE NO.: CQD- 020721 Revision: 00

III. FUNCTION

1. Briefly describe component's normal and safety functions: NORMAL/SAFETY FUNCTION FOR ONE VALVE IS TO BE NORMALLY OPEN AND THE OTHER IS CLOSED IN A STANDBY MODE. THE VALVE THAT IS OPEN IS USED TO PASS FUEL POOL COOLING FLOW TO THE FC SYSTEM

2. The component's normal state is: ☒ Operating ONE ☒ Standby ONE

3. Safety function:

a. ☐ Emergency reactor shutdown
b. ☐ Containment heat removal
c. ☐ Containment isolation
d. ☐ Reactor heat removal
e. ☐ Reactor core cooling
f. ☒ Prevent significant release of radioactive material to environment

g. ☐ Does the component function to mitigate the consequences of one or more of the following events: ☐ Yes ☒ No

☐ LOCA ☐ HELB ☐ MSLB

☐ Other _____

4. Safety requirements:

☐ Intermittent Operation
☐ During postulated event
☒ Continuous Operation
☐ Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational: _____

_____ (e.g., hours, days, etc.)

5. For VALVES:

Does the component ONE ☒ Fail open? ONE ☒ Fail closed? ☐ Fail as is?

Is this the fail-safe position? ☒ Yes ☐ No

Is the valve used for throttling purposes? ☐ Yes ☒ No

Is the valve part of the reactor coolant pressure boundary? ☐ Yes ☒ No

Does the valve have a specific limit for leakage? ☒ Yes ☐ No

If "Yes", give limit: PER SPECIFICATION

Form MAS-CQD-2.10 Rev Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: CQD- 020721 Revision: 00

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component:

   ASME CODE, SECT. III, SUBSECT. ND, SUBARTICLE ND-3500

2. Reference those qualification standards used as a guide to qualify the component:

   Not Applicable

3. Identify those parts of the above qualification standards deleted or modified in the qualification program:

   Deleted: N/A

   Modified: N/A

4. Have acceptance criteria been established and documented in the test plan(s) for the component? ☐ Yes ☐ No N/A

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? MECHANICAL FAILURE OF VALVE

6. Are the margins identified in the qualification documentation? (Margin is the difference between design basis parameters and the test parameters used for equipment qualification.)
   ☐ Yes ☐ No N/A

Note: If component is a ☐ Pump, complete item IV.7; if component is a ☒ Valve, complete item IV.8.

~~7.~~ Pump operability has been demonstrated by: ☐ Analysis ☐ Test ☐ Combination

Identify PUMP tests performed:

a. ☐ Shell hydrostatic (ASME Section III)

b. ☐ Bearing temperature evaluations

c. ☐ Seismic loading

d. ☐ Vibration levels

e. ☐ Exploratory vibration (Fundamental freq. _____)

f. ☐ Seal leakage @ hydrostatic pressure

g. ☐ Aging: ☐ Thermal ☐ Mechanical

h. ☐ Flow performance

Are curves provided? ☐ Yes ☐ No

N/A

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i. ☐ Pipe reaction end loads (nozzle loads)

j. ☐ Others: _____

k. ☐ Extreme environment:
- ☐ Humidity
- ☐ Chemical
- ☐ Radiation
- ☐ Thermal

8. Valve operability has been demonstrated by: ☐ Analysis ☒ Test ☐ Combination

Identify VALVE test performed:

a. ☐ Shell hydrostatic (ASME Section III) *

c. ☐ Seismic loading Not Reqd. N/A

* b. ☐ Cold cyclic; list times: Open _____ Closed _____

d. ☐ Hot cyclic; list times: Open _____ Closed _____

f. ☐ Main seat leakage

h. ☐ Back seat leakage

j. ☐ Disc hydrostatic

l. ☐ Flow interruption capability

e. ☐ Exploratory vibration (Fundamental freq _____)

g. ☐ Aging: ☐ Thermal ☐ Mechanical

i. ☐ Pipe reaction end loading

k. ☐ Extreme environment:
- ☐ Humidity
- ☐ Chemical
- ☐ Radiation
- ☐ Thermal

m. ☐ Flow characterstics; Are curves provided? ☐ Yes ☐ No

n. ☐ Others: _____

9. As a result of any of the tests (or analysis), were any deviations from design requirements identified? ☐ Yes ☒ No

If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation: N/A

* Since These Are Passive Valves Information Not Available

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PROJECT NO.: 4536-32 | FILE NO.: CQD- 02072 Revision: 00

10. Was the test component precisely identical (same model, size, etc.) to the in-plant component?
☐ Yes ☐ No N/A

If "No", is installed component ☐ oversized or ☐ undersized?

N/A

11. If type test was used to qualify the component, does the type test meet the requirements of IEEE 323-1974, Section 5? ☐ Yes ☐ No

12. Is component orientation sensitive? ☐ Yes ☐ No ☐ Unknown

If "Yes", does installed orientation coincide with test orientation? ☐ Yes ☐ No

13. Is the component mounted in the same manner in-plant as it was during the testing (i.e., welded, same number and size of bolts, etc.)? ☐ Yes ☐ No ☐ Unknown

14. Were the qualification tests performed in sequence and on only one component? ☐ Yes ☐ No

If "Yes", identify sequence (e.g., radiation, seismic, cyclic, thermal, etc.): _____

_____

15. If aging (as outlined in Section 4.4.1 of IEEE 627-1980) was performed, identify the significant aging mechanisms: _____

_____

16. Identify loads imposed (assumed) on the component for the qualification tests (analysis) performed:

a. ☐ Plants (shutdown loads)

b. ☐ Extreme environment

c. ☐ Seismic load

d. ☐ Others: _____

_____

17. Have component design specifications been reviewed in-house to assure that they envelop all expected operating, transient, and accident conditions? ☐ Yes ☐ No

18. Does the component utilize any unique or special materials (e.g., special gaskets or packing limitations on nonferrous materials, special coatings or surfaces)? ☐ Yes ☐ No

If "Yes", identify: _____

_____ _____

19. Does component require any special maintenance procedures or practices (including shorter periods between maintenance)? ☐ Yes ☐ No

If "Yes", identify: _____

_____

20. Is the qualified life for the component less than 40 years? ☐ Yes ☐ No

If "Yes" what is the qualified life? _____

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PROJECT NO.: 4536-32	FILE NO.: CQD- 020724 Revision: 00

V. COMMENTS

Form MAS-CQD-2.10
Rev. Orig (11-11-82)

PROJECT NAME: CLINTON-1	PROJECT NO.: 4536-32	FILE NO.: CQD- Revision:

Docket No.: 50-461

☒ BWR ☐ PWR

☒ BOP ☐ NSSS

☒ SAFETY-RELATED ☐ NON-SAFETY RELATED

Reviewed By: _____ (signature) Date 7/25/85

Review Approved By: _____ (signature) Date 7/25/85

NSSS Supplier: GENERAL ELECTRIC

Spec. No: K-2873 Title: VACUUM RELIEF VALVES (NUCLEAR SAFETY/ RELATED AND NON-NUCLEAR SAFETY RELATED)

Vendor/Manufacturer: GRE CONTROLS / SAME

Qualification Report No., Title, Revision, and Date (Plus other vendor information)

1) GRE CONTROLS REPORT # LA241-171, REV B (11-17-81)
S&L REPORT SCQ-CL196

2) S&L MECHANICAL ENVIRONMENTAL QUAL. REPORT MEQ-CL097 (under preperation)

3) LICON LIMIT SWITCH EQ & Seismic Reports under preperation.

I. CONCLUSION OF REVIEW

☒ Accepted ☐ Rejected

Comments: _____

II. GENERAL COMPONENT INFORMATION

The component, whether pump or valve, is considered to be an assembly composed of the body internals, prime-mover (or actuator) and functional accessories.

1. Supplier: ☐ NSSS ☒ BOP
2. Location: a. Building/Room DRYWELL BUILDING / ROOM N/A
   b. Elevation 764'
   c. System CONTAINMENT COMBUSTION GAS CONTROL
3. Component number on in-house drawings: 1HG01OC

Note: If component is a ☐ Pump, complete item II 4; if component is a ☒ Valve, complete item II 5

Form MAS-COD-2.10 Rev. Orig (11-11-82) Approved by _____ Dept. Mgr

THIS STANDARD IS TO BE USED FOR ACTIVE PUMPS AND VALVES WHEN REQUESTED BY THE NRC	MECHANICAL DEPARTMENT STANDARD CHECKLIST FOR ACTIVE PUMP AND VALVE OPERABILITY ASSURANCE REVIEW	
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NOTE: N/A IS USED THROUGHOUT REPORT TO DESIGNATE "NOT APPLICABLE"

PROJECT NO.: 4536-32 | FILE NO.: CQD- | Revision:

4. General Pump Data

a. Pump

Name _____
Mfg. _____
Model _____
Serial No.: _____
Type _____
Size _____
Weight _____
Mounting Method _____
Required bhp _____

Parameter	Design	Operating
Pressure		
Temperature		
Flow		
Head		

N/A

Required NPSH at maximum flow _____
Available NPSH _____
Operating Speed _____
Critical Speed _____

b. Prime-mover

Name _____
Mfg. _____
Model _____
Serial No.: _____
Type _____
Size _____
Weight _____
Mounting Method _____
hp _____

Power requirements: (include normal, maximum and minimum).

Electrical _____
_____
_____
Other _____
_____

If MOTOR, list:

Duty cycle _____
Stall current _____
Class of insulation _____
_____

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the pump assembly operational (e.g., coupling, lubricating oil system, etc.):

_____
_____
_____

List control signal inputs: _____
_____
_____
_____

Form MAS-COD-2.10
Rev. Orig (11-11-82)

PROJECT NO.: 4536-32 | FILE NO.: CQD- | Revision:

5. General Valve Data

a. Valve

Name: DOUBLE IN-LINE VACUUM RELIEF VALVE
Mfg.: GPE CONTROLS
Model: LD240-420
Serial No.: 7712-0526-63
Type: VACUUM RELIEF VALVE
Size: 10"
Weight: 860 LBS
Mounting Method: Flange Mounted
Required Torque: N/A

Parameter	Design	MAX. Operating
Pressure	30 PSIG	3 PSIG
Temperature	330 °F	310 °F
Flow	3528 SCFM	400 SCFM

Max. ΔP across valve: NOT APPLICABLE
Closing time @ max. ΔP: "
Opening time @ max. ΔP: "
Power requirements for functional accessories, (if any): N/A

b. Actuator (if not an integral unit) N/A

Name:
Mfg.:
Model:
Serial No.:
Type:
Size:
Weight:
Mounting Method:
Torque:

Power requirements: (include normal, maximum and minimum).
Electrical: N/A

Other: ☐ Pneumatic ☐ Hydraulic

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the valve assembly operational (e.g., limit switches, etc.): NONE

List control signal inputs: N/A

Form MAS-COD-2.10
Rev. Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: CQD- Revision:

III. FUNCTION

1. Briefly describe component's normal and safety functions: NORMALLY THIS VALVE IS CLOSED. THE SAFETY FUNCTION IS FOR THE VALVE TO OPEN IN ORDER TO MIX THE DRYWELL AND CONTAINMENT ATMOSPHERES FOR POST LOCA HYDROGEN GENERATION

2. The component's normal state is: ☐ Operating ☒ Standby (CLOSED)

3. Safety function:

a. ☐ Emergency reactor shutdown
b. ☐ Containment heat removal
c. ☐ Containment isolation
d. ☐ Reactor heat removal
e. ☐ Reactor core cooling
f. ☒ Prevent significant release of radioactive material to environment

g. ☒ Does the component function to mitigate the consequences of one or more of the following events: ☒ Yes ☐ No

☒ LOCA ☐ HELB ☐ MSLB

☐ Other _____

4. Safety requirements:

☒ Intermittent Operation
☐ During postulated event
☐ Continuous Operation
☒ Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational: 100 Days (e.g., hours, days, etc.)

5. For VALVES:

Does the component ☐ Fail open? ☒ Fail closed? ☐ Fail as is?

Is this the fail-safe position? ☒ Yes ☐ No

Is the valve used for throttling purposes? ☐ Yes ☒ No

Is the valve part of the reactor coolant pressure boundary? ☐ Yes ☒ No

Does the valve have a specific limit for leakage? ☒ Yes ☐ No

If "Yes", give limit: PER SPEC.

Form MAS-CQD-2.10
Rev. Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: CQD- Revision:

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component:
   ASME CODE, SECT III, SUBSECTION NB, SUBARTICLE NB-3500

2. Reference those qualification standards used as a guide to qualify the component:
   IEEE 344-1975
   IEEE 323-1974

3. Identify those parts of the above qualification standards deleted or modified in the qualification program:

   Deleted: N/A

   Modified: N/A

4. Have acceptance criteria been established and documented in the test plan(s) for the component? ☒ Yes ☐ No

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? MECHANICAL

6. Are the margins identified in the qualification documentation? (Margin is the difference between design basis parameters and the test parameters used for equipment qualification.)
   ☒ Yes ☐ No

Note: If component is a ☐ Pump, complete item IV.7; if component is a ☒ Valve, complete item IV.8.

~~7. Pump operability has been demonstrated by: ☐ Analysis ☐ Test ☐ Combination~~

~~Identify PUMP tests performed:~~

~~a. ☐ Shell hydrostatic (ASME Section III)~~

~~b. ☐ Bearing temperature evaluations~~

~~c. ☐ Seismic loading~~

~~d. ☐ Vibration levels~~

~~e. ☐ Exploratory vibration (Fundamental freq. _____)~~

~~f. ☐ Seal leakage @ hydrostatic pressure~~

~~g. ☐ Aging: ☐ Thermal ☐ Mechanical~~

~~h. ☐ Flow performance~~

~~Are curves provided? ☐ Yes ☐ No~~

~~N/A~~

Form MAS-CQD-2.10
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i. ☐ Pipe reaction end loads (nozzle loads)

j. ☐ Others: _____

k. ☐ Extreme environment: N/A

- ☐ Humidity
- ☐ Chemical
- ☐ Radiation
- ☐ Thermal

8. Valve operability has been demonstrated by: ☐ Analysis ☐ Test ☒ Combination

Identify VALVE test performed:

a. ☒ Shell hydrostatic (ASME Section III)

b. ☐ Cold cyclic; list times: (NOT REQ'D (PRESSURE DEPENDENT))
Open _____
Closed _____

c. ☒ Seismic loading

d. ☐ Hot cyclic; list times: (NOT REQ'D (PRESSURE DEPENDENT))
Open _____
Closed _____

e. ☒ Exploratory vibration (Fundamental freq > 60 HZ)

f. ☒ Main seat leakage

g. ☒ Aging: ☒ Thermal ☒ Mechanical } Test complete

h. ☒ Back seat leakage

j. ☒ Disc hydrostatic

i. ☒ Pipe reaction end loading

k. ☒ Extreme environment: } Undergoing Test
- ☒ Humidity
- ☐ Chemical
- ☒ Radiation
- ☒ Thermal

l. ☐ Flow interruption capability } NOT REQ'D

m. ☒ Flow characterstics:
Are curves provided?
☐ Yes ☒ No

n. ☐ Others: _____

9. As a result of any of the tests (or analysis), were any deviations from design requirements identified? ☐ Yes ☒ No

If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation: _____

Form MAS-CQD-2.10 Rev. Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: CQD- Revision:

10. Was the test component precisely identical (same model, size, etc.) to the in-plant component?

☒ Yes ☐ No

If "No", is installed component ☐ oversized or ☐ undersized?

11. If type test was used to qualify the component, does the type test meet the requirements of IEEE 323-1974, Section 5? ☒ Yes ☐ No

12. Is component orientation sensitive? ☒ Yes ☐ No ☐ Unknown

If "Yes", does installed orientation coincide with test orientation? ☒ Yes ☐ No

13. Is the component mounted in the same manner in-plant as it was during the testing (i.e., welded, same number and size of bolts, etc.)? ☒ Yes ☐ No Unknown

14. Were the qualification tests performed in sequence and on only one component? ☒ Yes ☐ No

If "Yes", identify sequence (e.g., radiation, seismic, cyclic, thermal, etc.): RADIATION, THERMAL AGING, SEISMIC, DBE

15. If aging (as outlined in Section 4.4.1 of IEEE 627-1980) was performed, identify the significant aging mechanisms: THERMAL & MECHANICAL DEGRADATION

16. Identify loads imposed (assumed) on the component for the qualification tests (analysis) performed:

a. ☒ Plants (shutdown loads)

b ☒ Extreme environment

c. ☒ Seismic load

d. ☒ Others HYDRO TEST FOR DESIGN COND

17. Have component design specifications been reviewed in-house to assure that they envelop all expected operating, transient, and accident conditions? ☒ Yes ☐ No

18. Does the component utilize any unique or special materials (e.g., special gaskets or packing limitations on nonferrous materials, special coatings or surfaces)? ☒ Yes ☐ No

If "Yes", identify: GREASE

19. Does component require any special maintenance procedures or practices (including shorter periods between maintenance)? ☐ Yes ☒ No

If "Yes", identify:

20. Is the qualified life for the component less than 40 years? ☐ Yes ☒ No *

If "Yes" what is the qualified life?

* Qualification for the Licon limit switch is not complete. However, it is anticipated to be qualified for 40 years.

Form MAS-CQD-2.10
Rev. Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: CQD- Revision:

V. COMMENTS

1) FOR PLANT MAINTENANCE PROCEDURE, SEE REF.

2) FOR PRE-OPERATIONAL TEST REQUIREMENTS, SEE REF.

Form MAS-CQD-2 10
Rev. Orig (11-11-82)

PROJECT NAME: CLINTON	PROJECT NO.: 4536-32	FILE NO.: CQD-020834 Revision: 00

Docket No.: 50-461

☒ BWR ☐ PWR

☒ BOP ☐ NSSS

☒ SAFETY-RELATED ☐ NON-SAFETY RELATED

Reviewed By: _____ (signature) Date: 5-2-85

Review Approved By: _____ (signature) Date: 8/2/85

NSSS Supplier: General Electric Co.

Spec. No: K-2905B Title: Refrigeration Equipment

Vendor/Manufacturer: CARRIER/JAMESBURY VALVE ; PACIFIC AIR/ITT Controls (Actuator)

Qualification Report No., Title, Revision, and Date (Plus other vendor information):

1) JHA-81-167 Rev. 0 Dated 12/28/81 (Report Filed in SQ-CL319)

2) AETL REPORT NO. 5480-8230, Volumes I & II (Report Filed in SQ-CL265)

*Note:

The Valve is located in a Mild Environmental Zone, therefore Per 10CFR50.49 Environmental Qualification is Not Required

I. CONCLUSION OF REVIEW

☒ Accepted ☐ Rejected

Comments: _____

II. GENERAL COMPONENT INFORMATION

The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

1. Supplier: ☐ NSSS ☒ BOP
2. Location: a. Building/Room: AUXILIARY BLDG.
   b. Elevation: 825'
   c. System: Shutdown Service Water
3. Component number on in-house drawings: * 1SX025B (See Note Above)

Note: If component is a ☐ Pump, complete item II 4; if component is a ☒ Valve, complete item II 5

Approved by _____ Dept. Mgr.

Form MAS-CQD-2.10 Rev. Orig (11-11-82)

THIS STANDARD IS TO BE USED FOR ACTIVE PUMPS AND VALVES WHEN REQUESTED BY THE NRC

MECHANICAL DEPARTMENT STANDARD

CHECKLIST FOR ACTIVE PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY

SARGENT & LUNDY ENGINEERS

PROJECT NO.: 4536-32 | FILE NO.: CQD- 020834 Revision: 00

4. General Pump Data

N/A

a. Pump		b. Prime-mover	
Name		Name	
Mfg.		Mfg.	
Model		Model	
Serial No.:		Serial No.:	
Type		Type	
Size		Size	
Weight		Weight	
Mounting Method		Mounting Method	
Required bhp		hp	

Parameter	Design	Operating
Pressure		
Temperature		
Flow		
Head		

Power requirements: (include normal, maximum and minimum).

Electrical

Other

Required NPSH at maximum flow

Available NPSH

Operating Speed

Critical Speed

If MOTOR, list:

Duty cycle

Stall current

Class of insulation

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the pump assembly operational (e.g., coupling, lubricating oil system, etc.):

List control signal inputs:

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PROJECT NO.: 4536-32 | FILE NO.: COD-020834 Revision: 00

5. General Valve Data

a. Valve

Name: 2" BWS 2366 PP Ball Valve
Mfg: Jamesbury Corp
Model: 2" Ball Valve
Serial No.: ND-658460 1B (Ref C6)
Type: BALL
Size: 2"
Weight: 14 #
Mounting Method: Socket Welded to Pipe
Required Torque: N/A

Parameter	Design	Operating
Pressure	150psig	150 psig
Temperature	120°F	120°F
Flow	13-180 GPM	13-180 GPM

Max. ΔP across valve: Not Available
Closing time @ max. ΔP: This is a Modulating Valve, therefore closing & opening times are not critical
Opening time @ max. ΔP:
Power requirements for functional accessories, (if any): 4-20 MA DC, 400 Ω

b. Actuator (if not an integral unit)

Name: Hydramotor Actuator
Mfg: ITT General Controls
Model: NH-91
Serial No.: 253768-01-001
Type: Hydramotor
Size: NH-91
Weight: 95 #
Mounting Method: Bolted
Torque: N/A

Power requirements: (include normal, maximum and minimum).
Electrical: 460 Volts
Other: ☐ Pneumatic ☒ Hydraulic

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the valve assembly operational (e.g., limit switches, etc.): Internal Control Signal Switch

List control signal inputs: Valve is being modulated to maintain service water flow to the Switchgear Heat Removal Unit Cooling Coil to maintain the pressure of the outlet refrigerant at the set point value when the Switchgear Heat Removal Condensing Unit is operating (Start Mode). Valve is closed when switchgear heat removal fan is not running (stop mode). [Switchgear Heat Removal Condensing unit 1VX06CB] Ref Dwgs: M05-1052-3 #4, M05-1115-1, M10-1115-7 & M15-1115-3

Form MAS-COD-2 10 Rev. Orig (11-11-82)

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SARGENT & LUNDY ENGINEERS

PROJECT NO.: 4536-32 | FILE NO.: COD-020837 Revision: 00

III. FUNCTION

1. Briefly describe component's normal and safety functions: This valve does not OPEN during the normal mode except during testing or during the loss of non-safety related HVAC system served by the plant chilled water system. The safety function for this valve is to open immediately POST LOCA.

2. The component's normal state is: ☐ Operating ☒ Standby (CLOSED)

3. Safety function:

a. ☒* Emergency reactor shutdown
b. ☐ Containment heat removal
c. ☐ Containment isolation
d. ☐ Reactor heat removal
e. ☐ Reactor core cooling
f. ☐ Prevent significant release of radioactive material to environment
g. ☒ Does the component function to mitigate the consequences of one or more of the following events: ☒ Yes ☐ No

☒ LOCA ☐ HELB ☐ MSLB

☒ Other *

4. Safety requirements:

☐ Intermittent Operation
☒ Continuous Operation
☐ During postulated event
☒ Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational: These valves are required to be functional for 100 days post LOCA (e.g., hours, days, etc.)

5. For VALVES:

Does the component ☐ Fail open? ☒ Fail closed? ☐ Fail as is?

Is this the fail-safe position? ☐ Yes ☒ No **

Is the valve used for throttling purposes? ☒ Yes ☐ No

Is the valve part of the reactor coolant pressure boundary? ☐ Yes ☒ No

Does the valve have a specific limit for leakage? ☒ Yes ☐ No

If "Yes", give limit: Per MANUFACTURER'S STANDARD

* This valve is part of the safety related cooling system for the switchgear rooms which provides 1E power Post-LOCA.

** SWITCH TO REDUNDANT SWITCHGEAR ROOMS WHICH HAVE THEIR SEPARATE COOLING SYSTEM. ALSO, MANUAL BYPASS PROVIDED FOR THE CONDENSER OUTLET VALVE

Form MAS-COD-2.10 Rev. Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: CQD- 020 834 Revision: 00

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code, Section III Subsection NC - Subarticle NC-3500

2. Reference those qualification standards used as a guide to qualify the component: IEEE 344-1975 for the Actuator

3. Identify those parts of the above qualification standards deleted or modified in the qualification program:

   Deleted: N/A

   Modified: N/A

4. Have acceptance criteria been established and documented in the test plan(s) for the component? ☒ Yes ☐ No

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? Mechanical or Electrical Failure

6. Are the margins identified in the qualification documentation? (Margin is the difference between design basis parameters and the test parameters used for equipment qualification.)
   ☒ Yes ☐ No

Note: If component is a ☐ Pump, complete item IV.7; if component is a ☒ Valve, complete item IV.8.

7. Pump operability has been demonstrated by: ☐ Analysis ☐ Test ☐ Combination

   Identify PUMP tests performed:

   a. ☐ Shell hydrostatic (ASME Section III)
   b. ☐ Bearing temperature evaluations
   c. ☐ Seismic loading
   d. ☐ Vibration levels
   e. ☐ Exploratory vibration (Fundamental freq _____)
   f. ☐ Seal leakage @ hydrostatic pressure
   g. ☐ Aging: ☐ Thermal ☐ Mechanical
   h. ☐ Flow performance
      Are curves provided? ☐ Yes ☐ No

N/A

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i. ☐ Pipe reaction end loads (nozzle loads)

N/A

j. ☐ Others: _____

k. ☐ Extreme environment:

- ☐ Humidity
- ☐ Chemical
- ☐ Radiation
- ☐ Thermal

8. Valve operability has been demonstrated by: ☐ Analysis ☐ Test ☒ Combination

Identify VALVE test performed:

a. ☒ Shell hydrostatic (ASME Section III)

b. ☐ Cold cyclic: list times:
Open Not REQ'D PER SPEC.
Closed "

c. ☒ Seismic loading

d. ☐ Hot cyclic: list times:
Open Not REQ'D PER SPEC.
Closed "

e. ☒ Exploratory vibration (Fundamental freq. > 33Hz.)

f. ☒ Main seat leakage

g. ☐ Aging: ☐ Thermal ☐ Mechanical } N/A Mild Environment

h. ☒ Back seat leakage

j. ☒ Disc hydrostatic

i. ☒ Pipe reaction end loading

k. ☐ Extreme environment: } N/A

- ☐ Humidity
- ☐ Chemical
- ☐ Radiation
- ☐ Thermal

l. ☐ Flow interruption capability
Not REQ'D PER SPEC.

m. ☐ Flow characterstics:
Are curves provided?
☐ Yes ☒ No NOT REQ'D PER SPEC.

n. ☐ Others: _____

9. As a result of any of the tests (or analysis), were any deviations from design requirements identified? ☐ Yes ☒ No

If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation: N/A

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Rev. Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: CQD- 020834 Revision 00

10. Was the test component precisely identical (same model, size, etc.) to the in-plant component?

☒ Yes ☐ No

If "No", is installed component ☐ oversized or ☐ undersized?

11. If type test was used to qualify the component, does the type test meet the requirements of IEEE 323-1974, Section 5? ☐ Yes ☐ No (N/A Equipment Located in Mild Environment)

12. Is component orientation sensitive? ☒ Yes ☐ No ☐ Unknown

If "Yes", does installed orientation coincide with test orientation? ☒ Yes ☐ No

13. Is the component mounted in the same manner in-plant as it was during the testing (i.e., welded, same number and size of bolts, etc.)? ☒ Yes ☐ No ☐ Unknown

14. Were the qualification tests performed in sequence and on only one component? ☐ Yes ☐ No N/A

If "Yes", identify sequence (e.g., radiation, seismic, cyclic, thermal, etc.): _____

15. If aging (as outlined in Section 4.4.1 of IEEE 627-1980) was performed, identify the significant aging mechanisms: N/A

16. Identify loads imposed (assumed) on the component for the qualification tests (analysis) performed:

a. ☐ Plants (shutdown loads)

b ☐ Extreme environment

c. ☒ Seismic load

d. ☐ Others _____

17. Have component design specifications been reviewed in-house to assure that they envelop all expected operating, transient, and accident conditions? ☒ Yes ☐ No

* 18. Does the component utilize any unique or special materials (e.g., special gaskets or packing limitations on nonferrous materials, special coatings or surfaces)? ☐ Yes ☐ No

If "Yes", identify: N/A

* 19. Does component require any special maintenance procedures or practices (including shorter periods between maintenance)? ☐ Yes ☐ No

If "Yes", identify: N/A

* 20. Is the qualified life for the component less than 40 years? ☐ Yes ☐ No

If "Yes" what is the qualified life? N/A

* These questions are not applicable since the valve is located in a mild environment.

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Rev. Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO: CQD-020534/ Revision: 00

V. COMMENTS

1) For Plant Maintenance Procedure See Ref. C1

2) For Pre Operational Requirements See Ref. C2

Form MAS-CQD-2 10
Rev. Orig (11-11-82)

PROJECT NAME: CLINTON-1	PROJECT NO.: 4536-32	FILE NO.: CQD-011403 Revision: 02

Docket No.: 50-461

☒ BWR ☐ PWR

☐ BOP ☒ NSSS

☒ SAFETY-RELATED ☐ NON-SAFETY RELATED

Reviewed By: [signature] (signature) Date 8/9/85

Review Approved By: [signature] (signature) Date: 8/9/85

NSSS Supplier: GENERAL ELECTRIC

Spec. No.: K-2801 Title: LIGHT WATER REACTOR NUCLEAR STEAM SUPPLY SYSTEM

Vendor/Manufacturer: GENERAL ELECTRIC / BYRON JACKSON PUMP DIV. & BINGHAM WILLAMETTE CO

Qualification Report No., Title, Revision, and Date (Plus other vendor information):

1) GE ENVIRONMENTAL QUAL. RPT NO. 456HA898, REV. 8, 9-30-76 } EQ RPT - EQ-CL001,
2) GE ENVIRONMENTAL QUAL. RPT NO. 491HA988, 7-18-80 } EQ-CL010,
3) BYRON JACKSON RPT NO. TCF-1031-STR, 6-1-77 (SQ-CL614)
4) RCIC TURBINE SEISMIC QUAL. RPT. SQ-CL617
5) BINGHAM WILLAMETTE RPT NO. DRF# ESI-00101, 11-4-81 (SQ-CL706)

I. CONCLUSION OF REVIEW

☒ Accepted ☐ Rejected

Comments:

II. GENERAL COMPONENT INFORMATION

The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

1. Supplier: ☒ NSSS ☐ BOP
2. Location: a. Building/Room AUX. BLDG / ENVIR. ZONE H-12
   b. Elevation 707'-6"
   c. System RHR, RCIC,
3. Component number on in-house drawings: 1E12-C002A, B, C; 1E51-C001; 1E51-C002E

Note: If component is a ☒ Pump, complete item II 4. If component is a ☐ Valve, complete item II 5

Form MAS-CQD-2.10 Rev. Orig (11-11-82) Approved by: [signature] Dept. Mgr.

THIS STANDARD IS TO BE USED FOR ACTIVE PUMPS AND VALVES WHEN REQUESTED BY THE NRC	MECHANICAL DEPARTMENT STANDARD CHECKLIST FOR ACTIVE PUMP AND VALVE OPERABILITY ASSURANCE REVIEW
FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY	SARGENT & LUNDY ENGINEERS

* THROUGH-OUT THE CHECKLIST N/A DESIGNATES NOT APPLICABLE

PROJECT NO.: 4536-32 | FILE NO.: CQD-011403 Revision: 02

FOR RHR A PUMPS: 1E12-C002A
1E12-C002B
1E12-C002C

4. General Pump Data

a. Pump		b. Prime-mover	
Name	RHR PUMP	Name	MOTOR
Mfg.	BYRON JACKSON PUMP DIV.	Mfg.	GENERAL ELECTRIC
Model	28DX, 18.5 CKLX2, 3 STG, VMT	Model	5K6336XC333A
Serial No.:	741-S-1448, -1449, -1450	Serial No.:	JMJ922025; JMJ922026; JMJ922027
Type	VERTICAL PUMP	Type	INDUCTION MOTOR
Size	28DX, 18.5 CKLX2, 3 STG, VMT	Size	4 POLE, 700 HP, FRAME 6336P36
Weight	19,000 lb.	Weight	5400 LBS.
Mounting Method	BOLTED TO FLOOR	Mounting Method	BOLTED TO PUMP
Required bhp	630 HP	hp	700 HP

Parameter	Design	Operating
(DISCHARGE) Pressure	500PSI	381 PSIG
Temperature	40°F-360°F	344°F
Flow	—	** 5165 GPM
Head	293 FT	293 Ft.

Power requirements: (include normal, maximum and minimum).
Electrical 1780 RPM, 3 PHASE, 60 Hz, 4000 V (SAME FOR ALL THREE CONDITIONS)
Other N/APPLICABLE

Required NPSH at maximum flow 5 Ft. @ 2 Ft. Above Mnt. Flange
Available NPSH * @ 2 Ft. Above Mnt Flange
Operating Speed 1780 RPM
Critical Speed 2534 CPM

If MOTOR, list:
Duty cycle 31892 HRS. (FSAR, SECT. 6.3.2.6.2) SEE PG 8
Stall current 589 AMPS
Class of insulation F

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the pump assembly operational (e.g., coupling, lubricating oil system, etc.):
N/A: PUMP ASS'Y (INCLUDES MOTOR AND COUPLING) FURNISHED BY VENDOR

List control signal inputs: SEE PG A8.1 & A8.2

* 14.2 Ft for 1E12-C002A,B and 14.7 Ft for 1E12-C002C
** MAX. OPERATING.

FORM MAS-CQD-2.10
Rev. Orig. (11-11-82)

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SARGENT & LUNDY ENGINEERS

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Page A2.0 of A8.2

PROJECT NO.: 4536-32

FILE NO.: COD-011403 Revision: 02

FOR RCIC PUMP: 1E51-C001

RCIC Turbine & Stop Valve 1E51-C002 / 1E51-C002E

4. General Pump Data

a. Pump		b. Prime-mover	
Name	RCIC PUMP	Name	TURBINE (EIN 1E51-C002) #
Mfg.	BINGHAM WILLAMETTE CO.	Mfg.	TERRY STEAM TURBINE COMP.
Model	6X6X10½ CP - 4 STAGE	Model	TYPE - GS-2
Serial No.:	16210287	Serial No.:	UNIQUELY IDENTIFIED BY TERRY DWG. # 96553E/38170 LF
Type	CENTRIFUGAL PUMP	Type	GS-2
Size	6 X 6 X 10½	Size	see dwg. referenced above
Weight	* 6575 LBS	Weight	3400 LBS (APPROX.)
Mounting Method	BOLTED TO BASE PLATE	Mounting Method	BOLTED TO BASE PLATE
Required bhp	600 HP	hp	700 HP

Parameter	Design	Operating
Pressure	1525 PSIG	1525 PSIG
Temperature	140°F - 140°F	40°F - 140°F
Flow	—	** 625 GPM
Head	610 Ft TO 2980 Ft	610' TO 2980'

Power requirements: (include normal, maximum and minimum).

Electrical: N/Applicable

Other:

Required NPSH at maximum flow: 21 Ft.

Available NPSH: 35.37 Ft. & 40.7 Ft.

Operating Speed: 2250 - 4550 RPM

Critical Speed: not available (will be tested)

If MOTOR, list:

Duty cycle: N/Applicable

Staff current:

Class of insulation:

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the pump assembly operational (e.g., coupling, lubricating oil system, etc.):

TURBINE STOP VALVE - QUALIFIED AS UNIT WITH TURBINE

List control signal inputs: SEE PG A8.1

* WEIGHT OF PUMP: 5275 LBS.; WEIGHT OF BASE: 1300 LBS

** MAX. OPERATING

Form MAS-COD-2.10 Rev. Orig. (11-11-82)

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SARGENT & LUNDY ENGINEERS

MAS-COD-2.10

Page A2.1 of A8.2

PROJECT NO.: 4536-32 | FILE NO.: CQD-011403 Revision: 02

5. General Valve Data

NA

a. Valve		b. Actuator (if not an integral unit)
Name		Name
Mfg.		Mfg.
Model		Model
Serial No.:		Serial No.:
Type		Type
Size		Size
Weight		Weight
Mounting Method		Mounting Method
Required Torque		Torque

Parameter	Design	Operating
Pressure		
Temperature		
Flow		
Max. ΔP across valve		
Closing time @ max. ΔP		
Opening time @ max. ΔP		
Power requirements for functional accessories, (if any)		

Power requirements: (include normal, maximum and minimum)

Electrical

Other ☐ Pneumatic ☐ Hydraulic

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the valve assembly operational (e.g., limit switches, etc.):

List control signal inputs:

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SARGENT & LUNDY ENGINEERS

K-7801

PROJECT NO: 4536-32 | FILE NO.: COD-011403 Revision: 02

Pumps 1E12-C002A, B, C

III FUNCTION

1. Briefly describe component's normal and safety functions: Normal function is to be on standby. Safety function is to provide design flows for LPCI injection, Post-Accident Containment Cooling (Suppression Pool & Spray) following LOCA signals.

2. The component's normal state is: ☐ Operating ☒ Standby

3. Safety function:

a. ☒ Emergency reactor shutdown
b. ☒ Containment heat removal
c. ☐ Containment isolation
d. ☐ Reactor heat removal
e. ☐ Reactor core cooling
f. ☐ Prevent significant release of radioactive material to environment
g. ☒ Does the component function to mitigate the consequences of one or more of the following events: ☒ Yes ☐ No

☒ LOCA ☒ HELB ☒ MSLB

☐ Other _____

4. Safety requirements:

☐ Intermittent Operation
☒ Continuous Operation
☒ During postulated event
☒ Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational: 100 Days (e.g., hours, days, etc.)

5. For VALVES:

Does the component ☐ Fail open? ☐ Fail closed? ☐ Fail as is?

Is this the fail-safe position? ☐ Yes ☐ No

Is the valve used for throttling purposes? ☐ Yes ☐ No

Is the valve part of the reactor coolant pressure boundary? ☐ Yes ☐ No

Does the valve have a specific limit for leakage? ☐ Yes ☐ No

If "Yes", give limit: _____

N/A

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Rev. Orig (11-11-82)

PROJECT NO.: 4536-32 | FILE NO.: COD-011403 Revision: 02

Pump 1ES1-C001

III. FUNCTION

1. Briefly describe component's normal and safety functions: Normal function is to be on standby for RCIC operation during Reactor Core Isolation. Cooling Safety function is to provide design flow to RPV on initiation of RCIC.

2. The component's normal state is: ☐ Operating ☒ Standby

3. Safety function:

a. ☐ Emergency reactor shutdown
b. ☐ Containment heat removal
c. ☐ Containment isolation
d. ☐ Reactor heat removal
e. ☒ Reactor core cooling
f. ☐ Prevent significant release of radioactive material to environment

g. ☒ Does the component function to mitigate the consequences of one or more of the following events: ☒ Yes ☐ No

☐ LOCA ☐ HELB ☐ MSLB
☒ Other Reactor Core Isolation

4. Safety requirements:

☐ Intermittent Operation
☒ Continuous Operation
☒ During postulated event
☒ Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational: 12 HRS (e.g., hours, days, etc.)

5. For VALVES:

Does the component ☐ Fail open? ☐ Fail closed? ☐ Fail as is?
Is this the fail-safe position? ☐ Yes ☐ No
Is the valve used for throttling purposes? ☐ Yes ☐ No
Is the valve part of the reactor coolant pressure boundary? ☐ Yes ☐ No
Does the valve have a specific limit for leakage? ☐ Yes ☐ No
If "Yes", give limit: N/A

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Rev. Orig. (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: CQD- 011403 Revision: 02

FOR RHR PUMPS ONLY

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component:
   ASME CODE, SECT. III, SUBSECT. NC, SUBARTICLE NC-3400
   ANSI B16.5
2. Reference those qualification standards used as a guide to qualify the component:
   IEEE - 323 - 1974 (MOTOR)
   IEEE - 344 - 1975 (BOTH MOTOR AND PUMP)
3. Identify those parts of the above qualification standards deleted or modified in the qualification program:

   Deleted: N/A

   Modified: N/A
4. Have acceptance criteria been established and documented in the test plan(s) for the component? ☒ Yes ☐ No ACCEPTANCE CRITERIA DOCUMENTED IN SPECIFICATION
5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? LOSS OF ELECTRIC POWER SUPPLY
6. Are the margins identified in the qualification documentation? (Margin is the difference between design basis parameters and the test parameters used for equipment qualification.)
   ☒ Yes ☐ No

Note: If component is a ☒ Pump, complete item IV.7; if component is a ☐ Valve, complete item IV.8.

7. Pump operability has been demonstrated by: ☐ Analysis ☐ Test ☒ Combination

   Identify PUMP tests performed:

   a. ☒ Shell hydrostatic (ASME Section III) PUMP ANALYZED W/MOTOR WT.
   b. ☐ Bearing temperature evaluations
   c. ☒ Seismic loading MOTOR TESTED BY ITSELF
   d. ☐ Vibration levels
   e. ☒ Exploratory vibration (Fundamental freq. 16.4 Hz) FOR PUMP
   f. ☒ Seal leakage @ hydrostatic pressure
   g. ☒ Aging: ☒ Thermal ☒ Mechanical } FOR MOTOR ONLY
   h. ☒ Flow performance
      Are curves provided? ☒ Yes ☐ No

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FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY	SARGENT & LUNDY ENGINEERS	MAS-COD-2.10 A5.0 of A5.1 Page A5.0 of A8.2

PROJECT NO.: 4536-32	FILE NO.: CQD- 011403 Revision: 02

FOR RCIC PUMP AND TURBINE

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component:
   ASME CODE, SECT. III, SUBSECT. NC, SUBARTICLE NC-3400
   ANSI B16.5

2. Reference those qualification standards used as a guide to qualify the component:
   IEEE - 344 - 1975 (BOTH PUMP + TURBINE)

3. Identify those parts of the above qualification standards deleted or modified in the qualification program:

   Deleted: N/A

   Modified: N/A

4. Have acceptance criteria been established and documented in the test plan(s) for the component? ☒ Yes ☐ No ACCEPTANCE CRITERIA PER SPECIFICATION

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? MECHANICAL FAILURE

6. Are the margins identified in the qualification documentation? (Margin is the difference between design basis parameters and the test parameters used for equipment qualification.)
   ☒ Yes ☐ No

Note: If component is a ☒ Pump, complete item IV.7; if component is a ☐ Valve, complete item IV.8.

7. Pump operability has been demonstrated by: ☐ Analysis ☐ Test ☒ Combination

   Identify PUMP tests performed:

   a. ☒ Shell hydrostatic (ASME Section III)
   b. ☐ Bearing temperature evaluations
   c. ☒ Seismic loading
   d. ☐ Vibration levels
   e. ☒ Exploratory vibration (Fundamental freq. ~~47.44 Hz~~) PUMP ONLY
   f. ☒ Seal leakage @ hydrostatic pressure
   g. ☐ Aging: ☐ Thermal ☐ Mechanical — NOT APPLICABLE
   h. ☒ Flow performance
      Are curves provided? ☒ Yes ☐ No

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i. ☒ Pipe reaction end loads (nozzle loads) (FOR RHR & RCIC PUMPS)

j. ☐ Others: N/A

k. ☒ Extreme environment: (FOR RHR MOTOR ONLY)

- ☒ Humidity
- ☒ ~~Chemical~~ DEMINERALIZED WATER
- ☒ Radiation
- ☒ Thermal

N/A

8. Valve operability has been demonstrated by: ☐ Analysis ☐ Test ☐ Combination

Identify VALVE test performed:

a. ☐ Shell hydrostatic (ASME Section III)

b. ☐ Cold cyclic; list times:
Open _____
Closed _____

c. ☐ Seismic loading

d. ☐ Hot cyclic; list times:
Open _____
Closed _____

e. ☐ Exploratory vibration (Fundamental freq _____)

f. ☐ Main seat leakage

g. ☐ Aging: ☐ Thermal ☐ Mechanical

h. ☐ Back seat leakage

j. ☐ Disc hydrostatic

i. ☐ Pipe reaction end loading

k. ☐ Extreme environment:

- ☐ Humidity
- ☐ Chemical
- ☐ Radiation
- ☐ Thermal

l. ☐ Flow interruption capability

m. ☐ Flow characterstics; Are curves provided? ☐ Yes ☐ No

n. ☐ Others: _____

N/A

9. As a result of any of the tests (or analysis), were any deviations from design requirements identified? ☐ Yes ☒ No

If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation: N/A

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PROJECT NO.: 4536-32	FILE NO.: CQD- 011403 Revision: 01

FOR RHR PUMPS

10. Was the test component precisely identical (same model, size, etc.) to the in-plant component?

☒ Yes ☐ No (MOTORS)

If "No", is installed component ☐ oversized or ☐ undersized? N/A

11. If type test was used to qualify the component, does the type test meet the requirements of IEEE 323-1974, Section 5? ☒ Yes ☐ No (FOR MOTOR)

12. Is component orientation sensitive? ☒ Yes ☐ No ☐ Unknown

If "Yes", does installed orientation coincide with test orientation? ☒ Yes ☐ No

13. Is the component mounted in the same manner in-plant as it was during the testing (i.e., welded, same number and size of bolts, etc.)? ☒ Yes ☐ No ☐ Unknown

14. Were the qualification tests performed in sequence and on only one component? ☒ Yes ☐ No (FOR MOTOR)

If "Yes", identify sequence (e.g., radiation, seismic, cyclic, thermal, etc.):

THERMAL, RADIATION, VIBRATION AND DBE (FOR MOTOR)

15. If aging (as outlined in Section 4.4.1 of IEEE 627-1980) was performed, identify the significant aging mechanisms: THERMAL AND RADIATION AGING (FOR MOTOR ONLY)

16. Identify loads imposed (assumed) on the component for the qualification tests (analysis) performed:

a. ☐ Plants (shutdown loads)

b. ☒ Extreme environment (FOR MOTOR ONLY)

c. ☒ Seismic load AND HYDRODYNAMIC LOAD (IN RRS CURVES) PUMP ANALYZED W/MOTOR WT. MOTOR TESTED BY ITSELF

d. ☐ Others: N/A

17 Have component design specifications been reviewed in-house to assure that they envelop all expected operating, transient, and accident conditions? ☒ Yes ☐ No

18. Does the component utilize any unique or special materials (e.g., special gaskets or packing limitations on nonferrous materials, special coatings or surfaces)? ☒ Yes ☐ No

If "Yes", identify: ETHYLENE PROPYLENE FOR O-RING MATERIAL

19. Does component require any special maintenance procedures or practices (including shorter periods between maintenance)? ☒ Yes ☐ No

If "Yes", identify: MOTOR BEARING REQUIRE LUBRICATION EVERY 6 MONTH (EQ REPORT, CQD-002562, TAB E REF: C2 & C3)

20. Is the qualified life for the component less than 40 years? ☐ Yes ☒ No

If "Yes", what is the qualified life? N/A

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PROJECT NO.: 4536-32	FILE NO.: CQD-01403 Revision: 01

FOR RCIC PUMP & TURBINE

10. Was the test component precisely identical (same model, size, etc.) to the in-plant component?
☒ Yes ☐ No (BOTH PUMP & TURBINE) (ANALYSIS WAS PERFORMED)
If "No", is installed component ☐ oversized or ☐ undersized? N/A

* 11. If type test was used to qualify the component, does the type test meet the requirements of IEEE 323-1974, Section 5? ☐ Yes ☐ No

12. Is component orientation sensitive? ☒ Yes ☐ No ☐ Unknown
If "Yes", does installed orientation coincide with test orientation? ☒ Yes ☐ No

13. Is the component mounted in the same manner in-plant as it was during the testing (i.e., welded, same number and size of bolts, etc.)? ☒ Yes ☐ No ☐ Unknown

* 14. Were the qualification tests performed in sequence and on only one component? ☐ Yes ☐ No
If "Yes", identify sequence (e.g., radiation, seismic, cyclic, thermal, etc.): _____

* 15. If aging (as outlined in Section 4.4.1 of IEEE 627-1980) was performed, identify the significant aging mechanisms: _____

16. Identify loads imposed (assumed) on the component for the qualification tests (analysis) performed:
a. ☐ Plants (shutdown loads)
b. ☐ Extreme environment
c. ☒ Seismic load
d. ☐ Others _____

17. Have component design specifications been reviewed in-house to assure that they envelop all expected operating, transient, and accident conditions? ☒ Yes ☐ No

* 18. Does the component utilize any unique or special materials (e.g., special gaskets or packing limitations on nonferrous materials, special coatings or surfaces)? ☐ Yes ☐ No
If "Yes", identify: _____

* 19. Does component require any special maintenance procedures or practices (including shorter periods between maintenance)? ☐ Yes ☐ No
If "Yes", identify: _____

* 20. Is the qualified life for the component less than 40 years? ☐ Yes ☐ No
If "Yes" what is the qualified life? _____

* THE MECHANICAL EQ FOR THE RCIC PUMP & TURBINE IS UNDER PREPARATION.

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V. COMMENTS

1) MOTOR DUTY CYCLE

	RHR
IN-SHOP TEST	4 (HRS)
PREOPERATION	168 "
MONTHLY TESTING	480 "
YEARLY TESTING	40 "
POST LOCA	2400 "
SHUTDOWN	28800 "
	31 892 HRS

2) RCIC TURBINE STOP VALVE (1E51-C002E) IS QUALIFIED AS PART OF THE RCIC TURBINE (1E51-C002) REPORT. REFERENCE S&L SEISMIC QUALIFICATION REPORT SQ-CL617. Therefore a separate checklist for the stop valve is not prepared

3) The Mechanical EQ for the RCIC Pump and Turbine is under preparation.

5. General Valve Data (Continued)

For pump: 1E12-C002A

List control signal inputs: This pump can be started & stopped remote manually using hand switch 1E12A-S003A. It automatically starts on either of the following signals:

a. Combination of high drywell pressure + manual initiation of Containment Spray "A" remote switch 1E12A-S063A

b. Combination of high drywell pressure, LPCI and high containment pressure.

Ref. E02-1R499, Sheets 7 & 10

For pump: 1E51-C001

List control signal inputs: None - This is a steam turbine driven pump. The pump is required to operate & remain operable through all conditions. The turbine speed is controlled within a specified speed range from pump discharge flow:

Ref - M05-1079, 82.2

5. General Valve Data (Continued)

For pump: 1E12-C002B

List control signal inputs: This pump can be started or stopped remote manually using hand switch 1E12A-S003B. It automatically starts on either of the following signals:

a. Combination of high drywell pressure & manual initiation of Containment Spray "B" remote switch 1E12A-S063B.

b. Combination of high drywell pressure LPCI and high containment pressure.

Ref. E02-1RH99, Sheets 7 & 18

For pump: 1E12-C002C

List control signal inputs: This pump can be started or stopped remote manually using hand switch 1E12A-S003C. It automatically starts on initiation of a LPCI signal.

Ref. E02-1RH99, Sheets 7 & 18

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PROJECT NAME: CLINTON	PROJECT NO.: 4536-32	FILE NO.: CQD-011451 Revision: 01

Docket No.: 50-461

☒ BWR ☐ PWR

☒ BOP ☐ NSSS

☒ SAFETY-RELATED ☐ NON-SAFETY RELATED

Reviewed By: _____ (signature) Date 8/8/85

Review Approved By: _____ (signature) Date 8/8/85

NSSS Supplier: GENERAL ELECTRIC

Spec. No: K-2828A Title: SHUTDOWN SERVICE WATER PUMPS

Vendor/Manufacturer: BORG WARNER / SAME

Qualification Report No., Title, Revision, and Date (Plus other vendor information):

1) DC-1502, REV. A, DATED 8/28/78 (SQ-CLOIS FOR PUMP) & SIEMENS ALLIS REPORT EL-8-5017-90307-01 (SQ-CL016 FOR MOTOR)

2) NO ENVIRONMENTAL QUALIFICATION IS REQUIRED. PUMPS ARE LOCATED IN A MILD ENVIRONMENT PER 10CFR50.49

I. CONCLUSION OF REVIEW

☒ Accepted ☐ Rejected

Comments: _____

II. GENERAL COMPONENT INFORMATION

The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

1. Supplier: ☐ NSSS ☒ BOP
2. Location: a. Building/Room SCREEN HOUSE
   b. Elevation 699'-0"
   c. System SHUTDOWN SERVICE WATER
3. Component number on in-house drawings: 1SX01PA

Note: If component is a ☒ Pump, complete item II.4; if component is a ☐ Valve, complete item II.5

Form MAS-CQD-2.10 Approved by _____ Dept. Mgr.
Rev. Orig. (11-11-82)

THIS STANDARD IS TO BE USED FOR ACTIVE PUMPS AND VALVES WHEN REQUESTED BY THE NRC	MECHANICAL DEPARTMENT STANDARD CHECKLIST FOR ACTIVE PUMP AND VALVE OPERABILITY ASSURANCE REVIEW
FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY	SARGENT & LUNDY ENGINEERS

* THROUGH OUT THE REPORT, N/A DESIGNATES NOT APPLICABLE

PROJECT NO.: 4536-32

FILE NO.: CQD-011451 Revision: -01

4. General Pump Data

a. Pump

Name SHUTDOWN SERVICE WATER
Mfg. BORG WARNER
Model 37 KXL - 2 STAGES V.C.T.
Serial No.: 761 - C - 0091
Type 2 STAGES VCT
Size 37 KXL
Weight 22,800 LBS.
Mounting Method BOLTED TO FLOOR
Required bhp 1500 HP

Parameter	Design	Operating
Pressure	200 PSI	120 PSI
Temperature	125°F	95°F
Flow	16,500 GPM	15,100 GPM
Head	275 Ft.	260 Ft.

Required NPSH at maximum flow *
Available NPSH *
Operating Speed 890 RPM
Critical Speed 1405 RPM

b. Prime-mover

Name MOTOR
Mfg. ALLIS - CHALMERS
Model 8-5017-90307-1-1
Serial No.: 8-5017-90307-1-2
Type AC INDUCTION MOTOR
Size 3747
Weight 11,100 LBS.
Mounting Method BOLTED TO PUMP
hp 1500 HP

Power requirements: (include normal, maximum and minimum).
Electrical 4000 V, 3 PHASES, 60 Hz
Other N/A

If MOTOR, list:
Duty cycle SERVICE FACTOR OF 1.15
Stall current 1219 AMPS
Class of insulation F
DWG # A-10-1.1

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the pump assembly operational (e.g., coupling, lubricating oil system, etc.):

NONE

List control signal inputs: SEE PG A8.1

* THIS IS A VERTICAL PUMP THAT IS REQUIRED TO BE SUBMERGED A MINIMUM OF 7 Ft. TO THE BOTTOM OF BELL. (BELL ELEVATION 657'-6" LOW-WATER-LEVEL IS 671'-6")

Form MAS-CQD-2.10
Rev. Orig. (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: COD- 011451 Revision: 0

5. General Valve Data

a. Valve

Name _____

Mfg. _____

Model _____

Serial No.: _____

Type _____

Size _____

Weight _____

Mounting Method _____

Required Torque _____

Parameter	Design	Operating
Pressure	_____	N/A
Temperature	_____	_____
Flow	_____	_____

Max. ΔP across valve _____

Closing time @ max. ΔP _____

Opening time @ max. ΔP _____

Power requirements for functional accessories, (if any) _____

b. Actuator (if not an integral unit)

Name _____

Mfg. _____

Model _____

Serial No.: _____

Type _____

Size _____

Weight _____

Mounting Method _____

Torque _____

Power requirements: (include normal, maximum and minimum).

Electrical _____

_____

_____

_____

Other: ☐ Pneumatic ☐ Hydraulic

_____

_____

_____

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the valve assembly operational (e.g., limit switches, etc.): _____

_____

_____

_____

List control signal inputs: _____

_____

_____

_____

Form MAS-CQD-2.10
Rev Orig (11-11-82)

PROJECT NO.: 4536-32 | FILE NO.: COD- 011451 Revision: 01

III. FUNCTION

1. Briefly describe component's normal and safety functions:

NORMAL FUNCTION: COOLING WATER DURING NORMAL PLANT OPERATION IS PROVIDED BY THE PLANT SERVICE WATER PUMPS. THE SX PUMP IS ON STANDBY DURING NORMAL PLANT OPERATION. SAFETY: WITH A LOSS OF PSWS PUMPS, THE SX PUMP WILL AUTOMATICALLY START TO MAINTAIN COOLING WATER FLOW TO ALL THE EQUIPMENT SERVICED BY THE SX SYSTEM.

2. The component's normal state is: ☐ Operating ☒ Standby

3. Safety function:

a. ☒ Emergency reactor shutdown
b. ☐ Containment heat removal
c. ☐ Containment isolation
d. ☐ Reactor heat removal
e. ☐ Reactor core cooling
f. ☐ Prevent significant release of radioactive material to environment
g. ☒ Does the component function to mitigate the consequences of one or more of the following events: ☒ Yes ☐ No

☒ LOCA ☒ HELB ☒ MSLB

☐ Other _____

4. Safety requirements:

☐ Intermittent Operation
☒ Continuous Operation
☒ During postulated event
☒ Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational: 100 DAYS POST ACCIDENT.

_____ (e.g., hours, days, etc.)

N/A 5. For VALVES:

Does the component ☐ Fail open? ☐ Fail closed? ☐ Fail as is?

Is this the fail-safe position? ☐ Yes ☐ No

Is the valve used for throttling purposes? ☐ Yes ☐ No

Is the valve part of the reactor coolant pressure boundary? ☐ Yes ☐ No

Does the valve have a specific limit for leakage? ☐ Yes ☐ No

If "Yes", give limit: _____

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Rev Orig (11-11-82)

PROJECT NO.: 4536-32	FILE NO.: COD- 0114	Revision: 0 /

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component:

   ASME CODE, SECT. III, SUBSECT. ND, SUBARTICLE ND-3400
   ANSI B16.5

2. Reference those qualification standards used as a guide to qualify the component:

   IEEE - 344 - 1975 (BOTH MOTOR AND PUMP)

3. Identify those parts of the above qualification standards deleted or modified in the qualification program:

   Deleted: N/A

   Modified: N/A

4. Have acceptance criteria been established and documented in the test plan(s) for the component? ☐ Yes ☒ No ACCEPTANCE CRITERIA DOCUMENTED IN SPECIFICATION

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? LOSS OF ELECTRIC POWER

6. Are the margins identified in the qualification documentation? (Margin is the difference between design basis parameters and the test parameters used for equipment qualification.)
   ☒ Yes ☐ No MARGINS ARE AVAILABLE IN THE REFERENCE DOCUMENTS

Note: If component is a ☒ Pump, complete item IV.7; if component is a ☐ Valve, complete item IV.8.

7. Pump operability has been demonstrated by: ☐ Analysis ☐ Test ☒ Combination

   Identify PUMP tests performed:

   a. ☒ Shell hydrostatic (ASME Section III)
   b. ☒ Bearing temperature evaluations
   c. ☒ Seismic loading
   d. ☒ Vibration levels
   e. ☒ Exploratory vibration (Fundamental freq. 23.4 Hz)
   f. ☒ Seal leakage @ hydrostatic pressure
   g. ☐ Aging: ☐ Thermal ☐ Mechanical N/A
   h. ☒ Flow performance
      Are curves provided? ☒ Yes ☐ No

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i. ☒ Pipe reaction end loads (nozzle loads) FOR PUMP

j. ☐ Others: N/A

k. ☐ Extreme environment:
- ☐ Humidity
- ☐ Chemical N/A
- ☐ Radiation
- ☐ Thermal

8. Valve operability has been demonstrated by: ☐ Analysis ☐ Test ☐ Combination

Identify VALVE test performed:

a. ☐ Shell hydrostatic (ASME Section III)

b. ☐ Cold cyclic; list times:
Open _____
Closed _____

c. ☐ Seismic loading

d. ☐ Hot cyclic; list times:
Open _____
Closed _____

e. ☐ Exploratory vibration (Fundamental freq. _____) N/A

f. ☐ Main seat leakage

g. ☐ Aging: ☐ Thermal ☐ Mechanical

h. ☐ Back seat leakage

j. ☐ Disc hydrostatic

i. ☐ Pipe reaction end loading

k. ☐ Extreme environment:
- ☐ Humidity
- ☐ Chemical
- ☐ Radiation
- ☐ Thermal

l. ☐ Flow interruption capability

m. ☐ Flow characterstics:
Are curves provided?
☐ Yes ☐ No

n. ☐ Others: _____

9. As a result of any of the tests (or analysis), were any deviations from design requirements identified? ☐ Yes ☒ No

If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation: _____

N/A

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10. Was the test component precisely identical (same model, size, etc.) to the in-plant component?

☒ Yes ☐ No

If "No", is installed component ☐ oversized or ☐ undersized? N/A

11. If type test was used to qualify the component, does the type test meet the requirements of IEEE 323-1974, Section 5? ☐ Yes ☐ No N/A (TEST NOT PERFORMED)

12. Is component orientation sensitive? ☒ Yes ☐ No ☐ Unknown

If "Yes", does installed orientation coincide with test orientation? ☒ Yes ☐ No

Component not tested however installation coincides with orientation

13. Is the component mounted in the same manner in-plant as it was during the testing (i.e., welded, same number and size of bolts, etc.)? ☒ Yes ☐ No ☐ Unknown

see above (item 12)

14. Were the qualification tests performed in sequence and on only one component? ☐ Yes ☐ No N/A

If "Yes", identify sequence (e.g., radiation, seismic, cyclic, thermal, etc.): _____

15. If aging (as outlined in Section 4.4.1 of IEEE 627-1980) was performed, identify the significant aging mechanisms: N/A

16. Identify loads imposed (assumed) on the component for the qualification tests (analysis) performed:

a. ☐ Plants (shutdown loads) b. ☐ Extreme environment

c. ☒ Seismic load d. ☐ Others: _____

17. Have component design specifications been reviewed in-house to assure that they envelop all expected operating, transient, and accident conditions? ☒ Yes ☐ No

18. Does the component utilize any unique or special materials (e.g., special gaskets or packing limitations on nonferrous materials, special coatings or surfaces)? ☐ Yes ☐ No

If "Yes", identify: N/A

19. Does component require any special maintenance procedures or practices (including shorter periods between maintenance)? ☐ Yes ☐ No

If "Yes", identify: N/A

20. Is the qualified life for the component less than 40 years? ☐ Yes ☐ No

If "Yes" what is the qualified life? N/A

* ITEMS 11, 14, 15, 18, 19, 20 ARE NOT APPLICABLE TO PUMP SINCE THERE IS NO ENVIRONMENT QUALIFICATION PERFORMED (Mild Environment per 10CFR50.49)

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V. COMMENTS

FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY

SARGENT & LUNDY ENGINEERS

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5. General Valve Data (Continued)

For PUMP : 1SX01PA

List control signal inputs: EITHER OF THE FOLLOWING TWO WILL START THE PUMP:

1. XFER SWITCH 1C61-HS503 IN "START" AND SWITCH 1C61-HS501 IN "EMERGENCY"

2. 1C61-HS501 IN "NORMAL" AND ONE OF THE FOLLOWING:
   a. CONTROL SWITCH 1HS-SX007 IN "START"
   b. STRAINER 1A OUTLET PRESSURE LO-LO-LO
   c. LOCA SIGNAL & 1HS-SX007 NOT IN "STOP"

EITHER OF THE FOLLOWING WILL STOP THE PUMP:

1. 1C61-HS501 IN "EMERGENCY" AND 1C61-HS503 IN "STOP"

2. 1C61-HS501 IN "NORMAL" AND 1HS-SX007 IN "STOP"

REF. DWGS.: M05-1052-1
M15-1052-6
M15-1068-2

For Valves:

List control signal inputs:

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Docket No.: 50-461

☒ BWR ☐ PWR

☐ BOP ☒ NSSS

☒ SAFETY-RELATED ☐ NON-SAFETY RELATED

Reviewed By: [signature] Date: 8/9/83

Review Approved By: [signature] Date: 8/9/83

NSSS Supplier: GENERAL ELECTRIC

Spec. No: K-2801 Title: LIGHT WATER REACTOR NUCLEAR STEAM SUPPLY SYSTEM

Vendor/Manufacturer: GENERAL ELECTRIC / CONAX CORP.

Qualification Report No., Title, Revision, and Date (Plus other vendor information)

a) QUALIFICATION REPORT # NEDC-30630, CLASS II JUNE 1984, (EQ-CL064)

b) DYNAMIC TEST REPORT # 58869, DATED AUGUST 22, 1983 (SQ-CL711)

I. CONCLUSION OF REVIEW

☒ Accepted ☐ Rejected

Comments: NONE

II. GENERAL COMPONENT INFORMATION

The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

1. Supplier: ☒ NSSS ☐ BOP
2. Location: a. Building/Room: CONTAINMENT (ENVIR ZONE H-26)
   b. Elevation: 803'-0"
   c. System: STANDBY LIQUID CONTROL SYSTEM (SLCS)
3. Component number on in-house drawings: 1C41-F004A, B

Note: If component is a ☐ Pump, complete item II.4; if component is a ☒ Valve, complete item II.5.

Approved by: [signature] Dept. Mgr

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THIS STANDARD IS TO BE USED FOR ACTIVE PUMPS AND VALVES WHEN REQUESTED BY THE NRC

MECHANICAL DEPARTMENT STANDARD

CHECKLIST FOR ACTIVE PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY

SARGENT & LUNDY ENGINEERS

NOTE: N/A USED THROUGHOUT REPORT DESIGNATES "NOT APPLICABLE"

4. General Pump Data

a. Pump

Name _____
Mfg. _____
Model _____
Serial No.: _____
Type _____
Size _____
Weight _____
Mounting Method _____
Required bhp _____

Parameter	Design	Operating
Pressure		
Temperature		
Flow		
Head		

Required NPSH at maximum flow _____ N/A
Available NPSH _____
Operating Speed _____
Critical Speed _____

b. Prime-mover

Name _____
Mfg. _____
Model _____
Serial No.: _____
Type _____
Size _____
Weight _____
Mounting Method _____
hp _____

Power requirements: (include normal, maximum and minimum).

Electrical _____
_____
_____
Other _____
_____

If MOTOR, list:

Duty cycle _____
Stall current _____
Class of insulation _____
_____

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the pump assembly operational (e.g., coupling, lubricating oil system, etc.):

_____
_____
_____

List control signal inputs: _____
_____
_____
_____

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PROJECT NO.: 4536-32 | FILE NO.: CQD- 020075 Revision: 00

5. General Valve Data

a. Valve

Name: SLCS EXPLOSIVE VALVE
Mfg.: CONAX CORP.
Model: 1837-159-01 (VALVE DWG NO. *1832-159)
Serial No.: GE · RO-529-6414
Type: EXPLOSIVE ACTUATED VALVE
Size: 4" LONG x 7" OD, 500 (1½" LINE) FLANGE RATING
Weight: 50 LBS
Mounting Method: BOLTED TO PIPE FLANGES
Required Torque: N/A

Parameter	Design	Operating
Pressure	1400 PSIG	1220 PSIG
Temperature	150°F	150°F
Flow	*	*

Max. ΔP across valve: 1400 PSIG
Closing time @ max. ΔP: N/A (SEE NOTE 1, PG. A8)
Opening time @ max. ΔP: ~ 0.002 SEC
Power requirements for functional accessories, (if any): 10 MILLIAMP (PER CIRCUIT) CIRCUIT CONTINUITY MONITORING (TEST CIRCUIT)

b. Actuator (if not an integral unit)

Name: REPLACEABLE EXPLOSIVE ACTUATOR
Mfg.: CONAX CORP.
Model: 1532-159-01 (DRAWING NO. FOR REPLACEMENT KIT P/N 1832-159-01)
Serial No.: —
Type: REPLACEMENT PARTS (PRIMER, TRIGGER, INLET FITTING)
Size: PART OF VALVE
Weight: 2.5 LBS.
Mounting Method: THREADED INTO VALVE
Torque: N/A (OPERATES BY SHEARING CAP OFF OF INLET FITTING)

Power requirements: (include normal, maximum and minimum).

Electrical: 100-300 VOLTS FOR VALVE ACTUATION, 2 AMP MINIMUM (AC)
NORMAL CONTINUITY MONITORING ≤ 10 MILLIAMPS PER CIRCUIT

Other: ☐ Pneumatic ☐ Hydraulic
N/A

List functional accessories, i.e., those subcomponents not supplied by the manufacturer that are required to make the valve assembly operational (e.g., limit switches, etc.): NONE

List control signal inputs: VALVES WILL OPEN MANUALLY THRU HAND SWITCHES 1C41-S001A & 1C41-S001B RESPECTIVELY FOR VALVES 1C41-F004A & 1C41-F004B, OR WILL OPEN AUTOMATICALLY THROUGH REACTOR WATER CLEAN-UP ISOLATION SIGNAL.

REF. DWGS: M05-1077-1, E02-1SC99-502
GE DWG: 828E151

* NORMALLY CLOSED; WHEN OPEN C_V = 13 & DESIGN FLOW RATE = 43 GPM

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III. FUNCTION

1. Briefly describe component's normal and safety functions: THESE ARE EXPLOSIVE VALVES. NORMAL FUNCTION IS TO BE CLOSED*. SAFETY FUNCTION IS TO OPEN TO ALLOW SC INJECTION INTO THE RPV FROM THE SC PUMPS.

2. The component's normal state is: ☐ Operating ☒ Standby (CLOSED)

3. Safety function:

a. ☒ Emergency reactor shutdown
b. ☐ Containment heat removal
c. ☐ Containment isolation
d. ☐ Reactor heat removal
e. ☐ Reactor core cooling
f. ☐ Prevent significant release of radioactive material to environment

g. ☒ Does the component function to mitigate the consequences of one or more of the following events: ☒ Yes ☐ No

☐ LOCA ☐ HELB ☐ MSLB

☒ Other ANTICIPATED TRANSIENT WITHOUT SCRAM (ATWS)

4. Safety requirements:

☒ Intermittent Operation (OPERATES ONCE ONLY) ☒ During postulated event

☐ Continuous Operation ☒ Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational: OPERABLE FOR 12 MINUTES OF ATWS (e.g., hours, days, etc.)

5. For VALVES:

Does the component ☐ Fail open? ☒ Fail closed? ☐ Fail as is?

Is this the fail-safe position? ☐ Yes ☒ No (BE FAIL CLOSED, HOWEVER WILL NOT AFFECT SAFE SHUTDOWN OF THE PLANT BECAUSE OF REDUNDANCIES)

Is the valve used for throttling purposes? ☐ Yes ☒ No

Is the valve part of the reactor coolant pressure boundary? ☐ Yes ☒ No

Does the valve have a specific limit for leakage? ☒ Yes ☐ No

If "Yes", give limit: ZERO

* VALVES PROVIDE A LEAK-TIGHT SHUTOFF TO ISOLATE THE SODIUM PENTABORATE FROM THE REACTOR COOLANT.

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IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME CODE, SECT. III, SUBSECTION NB, SUBARTICLE NB-3500; ANSI B16.5

2. Reference those qualification standards used as a guide to qualify the component: IEEE-344-1975
IEEE-323-1974

3. Identify those parts of the above qualification standards deleted or modified in the qualification program:

Deleted: N/A

Modified: N/A

4. Have acceptance criteria been established and documented in the test plan(s) for the component? ☒ Yes ☐ No

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? LOSS OF ELECTRIC POWER

6. Are the margins identified in the qualification documentation? (Margin is the difference between design basis parameters and the test parameters used for equipment qualification.)
☒ Yes ☐ No

Note: If component is a ☐ Pump, complete item IV.7; if component is a ☒ Valve, complete item IV.8.

7. Pump operability has been demonstrated by: ☐ Analysis ☐ Test ☐ Combination

Identify PUMP tests performed:

a. ☐ Shell hydrostatic (ASME Section III)

b. ☐ Bearing temperature evaluations

c. ☐ Seismic loading

d. ☐ Vibration levels

e. ☐ Exploratory vibration (Fundamental freq. _____)

f. ☐ Seal leakage @ hydrostatic pressure

g. ☐ Aging: ☐ Thermal ☐ Mechanical

h. ☐ Flow performance
Are curves provided? ☐ Yes ☐ No

N/A

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i. ☐ Pipe reaction end loads (nozzle loads)

j. ☐ Others: _____

k. ☐ Extreme environment:

- ☐ Humidity
- ☐ Chemical
- ☐ Radiation
- ☐ Thermal

N/A

8. Valve operability has been demonstrated by: ☐ Analysis ☒ Test ☐ Combination

Identify VALVE test performed:

a. ☒ Shell hydrostatic (ASME Section III)

b. ☐ Cold cyclic; list times: N/A
Open _____
Closed _____

c. ☒ Seismic loading

d. ☐ Hot cyclic; list times: N/A
Open _____
Closed _____

e. ☒ Exploratory vibration (Fundamental freq _____)

f. ☐ Main seat leakage (SEE NOTE 2, PG A8)

g. ☒ Aging: ☒ Thermal ☒ Mechanical

h. ☐ Back seat leakage (NO BACKSEAT)

j. ☒ Disc hydrostatic

i. ☐ Pipe reaction end loading

k. ☒ Extreme environment:

- ☒ Humidity
- ☐ Chemical
- ☒ Radiation
- ☒ Thermal

l. ☐ Flow interruption capability N/A

m. ☐ Flow characterstics:
Are curves provided?
☐ Yes ☐ No

n. ☒ Others: PERFORMANCE BRIDGE-WIRE RESISTANCE CHECK PER INSTRUCTION MANUAL REQUIREMENTS WHEN INSTALLING A NEW REPLACEMENT KIT.

9. As a result of any of the tests (or analysis), were any deviations from design requirements identified? ☒ Yes ☐ No

If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation: SEE SECTION IV E ON PAGE 16 OF NEDC-30630 (PRODUCT EVALUATION SECTION OF EQ REPORT) EQ-CL064 Ref(1) Attachment A

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10. Was the test component precisely identical (same model, size, etc.) to the in-plant component?

☒ Yes ☐ No

If "No", is installed component ☐ oversized or ☐ undersized?

11. If type test was used to qualify the component, does the type test meet the requirements of IEEE 323-1974, Section 5? ☒ Yes ☐ No

12. Is component orientation sensitive? ☒ Yes ☐ No ☐ Unknown

If "Yes", does installed orientation coincide with test orientation? ☐ Yes ☐ No

13. Is the component mounted in the same manner in-plant as it was during the testing (i.e., welded, same number and size of bolts, etc.)? ☐ Yes ☐ No ☒ Unknown

WILL BE VERIFIED THROUGH FIELD WALKDOWN

14. Were the qualification tests performed in sequence and on only one component? ☒ Yes ☐ No

WILL BE VERIFIED THROUGH FIELD WALKDOWN

If "Yes", identify sequence (e.g., radiation, seismic, cyclic, thermal, etc.): THERMAL, RADIATION, DYNAMIC, DBE, FLOW TEST

15. If aging (as outlined in Section 4.4.1 of IEEE 627-1980) was performed, identify the significant aging mechanisms: THERMAL & RADIATION

16. Identify loads imposed (assumed) on the component for the qualification tests (analysis) performed:

a. ☐ Plants (shutdown loads)

b ☐ Extreme environment

c. ☒ Seismic load

d ☒ Others RESONANCE SEARCH, VIBRATION, SRV AGING

17. Have component design specifications been reviewed in-house to assure that they envelop all expected operating, transient, and accident conditions? ☒ Yes ☐ No

18. Does the component utilize any unique or special materials (e.g., special gaskets or packing limitations on nonferrous materials, special coatings or surfaces)? ☐ Yes ☒ No

If "Yes", identify:

19. Does component require any special maintenance procedures or practices (including shorter periods between maintenance)? ☐ Yes ☒ No

If "Yes", identify:

20. Is the qualified life for the component less than 40 years? ☒ Yes ☐ No (SEE BELOW)

If "Yes" what is the qualified life?

FOR GROUP I 40 YEARS
FOR GROUP II 5 YEARS

} SEE NOTE 3 PAGE A8

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V. COMMENTS

NOTE 1. VALVES DO NOT RECLOSE AFTER OPENING UNTIL REPLACEMENT KIT PARTS ARE REPLACED

NOTE 2. MAIN SEAT LEAKAGE MONITORED THROUGHOUT EQ TEST PROGRAM. MUST INSTALL PER TORQUING REQUIREMENT EACH TIME REPLACEMENT KIT IS PUT IN

NOTE 3. GROUP I CONSISTS OF CABLE ASSEMBLY & CONNECTORS

GROUP II CONSISTS OF THE REPLACEMENT KIT PARTS — 2 YEARS STORAGE PLUS 3 YEARS OPERATION

E. TEST ANOMALIES

1. The Instruction Manual was discovered to be unclear regarding circuitry notation. Correct circuitry was determined by resistance (circuit continuity) check. No effect on test. Refer to summary item V.C.3 for recommendation.

2. A loose Connector (cable side) was discovered after thermal aging, but not caused by thermal aging. Connectors were tightened. No effect on test. Refer to summary item V.C.2 for recommendation.

3. There were two table excursions -- one of 10g, (not measured), and the other of 45g average, and 80g maximum, as measured at the valve. (Dynamic input was at system natural frequency, apparently at table limit). Refer to Notice of Deviation No. 3 in Appendix H and Test Requestor's notes in Appendix J (Pages C-23 to C-25). No damage to valve and no effect on test except to provide considerable overtesting.

4. During the dynamic testing, the valve arrangement sagged about 1/8" (due to pipe deformation). No loss of pressure occurred. This deformation was significant but not "gross" as indicated by the Wyle anomaly report. Wyle Photograph 3-9 disputes the description, "gross", as given in the anomaly report. Also, refer to Requestor's notes. No effect on test. The anomaly report is Notice of Deviation No. 1 in Appendix H. Photograph No. 3-9 is also contained in Appendix H (Page 3-16). The Test Requestor's notes are found in Appendix J (Pages C-23 to C-25).

5. Sine beats from the Wyle sine beat generator were discrete rather than continuous. Oscillograph traces taken by Wyle indicated that the multiplication factor to the valve at the system natural frequency RIM input to brackets still was high (about 5 as measured at the valve). Evaluation indicated that the SRV event still contained a sufficient number of strong motion cycles to meet test requirements. Therefore, no effect on test. Refer to the letters included at the end of Appendix H and to the Test Requestor's notes in Appendix J (Pages C-23 to C-25) for further information.

6. Inadvertent operation of valve occurred during DBE. See Note 1 of the Product Evaluation Worksheet and foregoing Summary Items IV.D.16 through IV.D.21. The test is considered successful and this explosive valve model considered qualified. An apparent benefit of inadvertent self actuation due to high temperature -- so long as the valve does not act as a containment isolation valve -- is that it might open under the high temperature condition of an accident situation, even if electrical power to the valve were lost.