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L30-85(12-04)-L
1A.120

ILLINOIS POWER COMPANY

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

December 4, 1985

Docket No. 50-461

Director of Nuclear Reactor Regulation
Attention: 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
Long Forms for the 21 PVORT Components

Dear Mr. Butler:

Enclosed please find the long forms for the twenty-one (21) PVORT components. Long forms are included for the following components:

1. 1E12-F073A
2. 1E12-F103A
3. 1B21-F037A
4. 1E31-F014
5. 1SX01PC
6. 1E21-C002
7. 1E51-F015
8. 1RF019
9. 1B21-F041A
10. 1B21-F067A
11. 1E51-C001, 2
12. 1E51-C002E
13. 1FC004A
14. 1E22-F005
15. 1HG010C
16. 1SX025B
17. 1CC050
18. 1E22-F001
19. 1E12-F021
20. 1SX01PA
21. 1CC076B

Long forms will be available with the PVORT packages at the time of the re-audit.

Please contact us if you have any questions on this matter.

Sincerely yours,

F. A. Spangenberg
Manager - Licensing
and Safety

SAB:1jb

Enclosures

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

ZZZZ RVR PM 1/10

PSB (BWR)
EB (BWR)
J. Lombardo
B. Siegel
A. Lee
Docket File
NSIC
LPDR
NRC PDR
24X

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

System Engineer Review J Wonika Date 11/7/85

Equipment Qual. Review [illegible] Date 11/7/85

Electrical Engineer Review Robert N Beavers Date 11-7-85

C&I Engineer Review Oggie Kantal Date 11-7-85

Reconcilation of IPC Walkdown Results

_____ Date _____

REFERENCE

1. P&ID Drawings: M05-1073, Sht. 1, Rev. T and
   M05-1075, Sht. 1, Rev. U

2. Vendor Drawings:
   a. A-25513 (K-2826)
   b. N768857 #1 (K-2826)
   c. N768857 #2 (K-2826)
   d. 602531-682 (K-2882)

3. S&L Electrical Schematic Drawings: E02-1LP99, Sht. 8
   and E02-1LP99, Sht. 504

4. S&L Specification K-2826

5. Equipment Foundation Drawing: M04-1102

6. Foundation Load Calculations: CQD-001919 and EMD-013242

7. Seismic Qual Reports: A. SQ-CL009 and B. SQ-CL042

8. Environmental Qual Report: EQ-CL061A

9. Mechanical EQ Report: MEQ-CL079

10. Code Data Report - Serial Number N768B857

Illinois Power Company
Clinton Power Station

PUMP AND VALVE
OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461

3. Utility: Illinois Power Company

4. NSSS: General Electric Co. [ ] PWR [x] BWR

5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [ ] NSSS [x] BOP Specification K-2826

2. Location: a. Building/Room Aux/Env. Zone=H-11

b. Elevation 707'-6"

c. System LPCS Water Leg

3. Component number on in-house drawings: 1E21-C002

4. If component is a [x] Pump complete II.5.

If component is a [ ] Valve complete II.6.

5. General Pump Data

a. Pump	b. Prime-mover
Name LPCS Water Leg Pump	Name Motor
Mfg. Gould Pumps, Inc.	Mfg. Reliance Electric
Model 3196ST	Model 215T-Frame
S/N N768B857	S/N 3YF883403A2 PL
Type Centrifugal	Type Horizontal, single speed, TEFC

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

a. Pump (continued)

Size 1" x 1-1/2" - 6

Weight 86 lb.(wet);84 lb.(dry)

Mounting Method Bolted to Base Plate

Required B.H.P. 4

Parameter	Design	Operating
Press	150 psig	66 psig
Temp	185 F	104 F
Flow	50 gpm	50 gpm
Head	130 ft	130 ft

Required NPSH at maximum Flow 3 ft

Available NPSH 8.8 ft

Operating Speed 3550 rpm

Critical Speed 14938 rpm/Ref. 7A Tab D

List functional accessories:* None

List control signal inputs: Remote manual hand switch 1E21AS007

b. Prime-mover (continued)

Size 215T, 5 H.P.

Weight 140 lb.

Mounting Method Bolted to Base Plate

H.P. 5

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

Electrical

3 Phase; 60 Hz; 460 volts

(±10%, -25% for 1 min.)

Other None

If Motor is:

Duty cycle Continuous

Stall current 58 amps

Class of insulation H

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

N/A

a. Valve

Name _____

Mfg. _____

Model _____

S/N _____

Type _____

Size _____

Weight _____

Mounting Method _____

Required Torque _____

b. Actuator (if not an integral unit)

Name _____

Mfg. _____

Model _____

S/N _____

Type _____

Size _____

Weight _____

Mounting Method _____

Torque _____

Ref.: Valve Data Sheet No. _____

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

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

Electrical _____

_____

_____

Ref. _____

Other: []Pneumatic[]Hydraulic

_____

_____

_____

List control signal inputs: _____

_____

List functional accessories: _____

III. FUNCTION

1. Briefly describe components normal and safety functions: This pump's normal and safety function is to keep the LPCS piping and RHR loop A piping filled with water in order to avoid the time delays in filling the line and to avoid hydraulic hammer.

2. The components normal state is: [X] Operating [] Standby

3. Safety function:

a. [] Emergency reactor shutdown

b. [X] Containment heat removal

c. [] Containment isolation

d. [X] 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? [X] Yes [] No
If "Yes", identify.

[X] LOCA [] HELB [] MSLB

[] Other

4. Safety requirements:

[] Intermittent Operation

[X] During postulated event

[X] Continuous Operation

[X] 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.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [] Fail open [] Fail closed [] Fail as

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 N/A

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

If "Yes" give limit: _____

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME B&PV Code, Sec. III, Class-2 1974 Edition thru Winter 1975 addenda, code case 1677

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

IEEE 323-1974, 344-1975, 334-1974

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

Deleted:	Modified:
None	None

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [x] No [] Ref. Document: 8 Tab F (Motor)

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

None

6. Are the margins* identified in the qualification documentation? [X] Yes [ ] No
Ref. Documents: 7A & 7B Tab D; 8 & 9 Tabs C & F .

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

7. Pump operability has been demonstrated by: [ ] Analysis
[ ] Test [X] Combination

Identify PUMP tests performed:

a. [X] Shell hydrostatic (ASME Section III)
Ref. .

b. [X] Bearing temperature evaluations

c. [ ] Seismic loading
Ref. .

d. [X] Vibration levels

e. [ ] Exploratory vibration
(Fundamental freq.)
Rev. .

f. [ ] Seal leakage @ hydro press

g. [X] Aging: [X] Thermal
[X] Mechanical
Ref. Doc. 8 Tab F .

h. [X] Flow performance
Are curves provided [X] Yes [ ] No
Ref. 2A

i. [ ] Pipe reaction end loads (nozzle loads)
Ref. Doc. .

j. [ ] Others

k. [X] Extreme environment:
[X] Humidity
[ ] Chemical
[X] Radiation
Ref. Doc. 8 Tab F .

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

Identify VALVE tests performed:

b. [ ] Shell hydrostatic (ASME Section III) N/A
Ref. Doc. .

b. [ ] Cold cyclic
List times: Open
Closed
Ref. .

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [ ] Seismic loading

d. [] Hot cyclic
Lists times: Open _____
Closed _____
Ref. _____

e. [] Exploratory vibration
Ref. _____

f. [] Main seat leakage
Ref. _____

g. [] Aging: [] Thermal
[] Mechanical
Ref. _____

h. [] Back seat leakage
Ref. _____

i. [] Pipe reaction end loading
Ref. _____

j. [ ] Disc hydrostatic
Ref. _____

k. [] Extreme environment
[] Humidity
[] Chemical
[] Radiation
Ref. _____

l. [] Flow interruption capability
Ref. _____

m. [] Flow characteristics
Are curves provided?
Ref. _____
[] Yes [] No

n. [] Others _____

N/A

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [] Yes [X] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____

_____

_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [X] No If "No", is installed component [] oversized or [] undersized? See Attachment A, Note 3.

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

12. Is component orientation sensitive? [] Yes [X] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [] Yes [] No

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[X] Yes [] No [] Unknown

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

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

15. If "aging"* was performed, identify the significant aging mechanisms: Thermal, Mechanical, Radiation

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

a. [] Plants (shutdown loads) b. [X] Extreme environment

c. [X] Seismic load d. [X] Others Pool dynamic, operational

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.) [X] Yes [] No

If "Yes", identify: See Attachment A, Note 2

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

If "Yes", identify: See Attachment A, Notes 1 & 2

20. Is the qualified life for the component less than 40 years? [] Yes [X] No If "Yes", what is the qualified life?

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
N768856	Static Seismic Analysis for RHR Water Leg Pump	11-14-78	Gould Pumps	S&L-CQD (CQD-021184, SQ-CL009)
-	Letter of Response	03-21-79	Gould Pumps	S&L-CQD (CQD-021184, SQ-CL009)
ME-1168	Seismic Stress Analysis of Horizontal Motor, 5HP, 215T Frame	04-01-85	McDonald Engineering Analysis Co.	S&L CQD (CQD-021573, SQ-CL042)
NUC-28A	Environmental Qualification Report for Water Leg Pump Motor	02-08-85	Reliance Electric Co.	S&L-CQD, (CQD-013857, EQ-CL061A)
N/A	Environmental Qualification of Gould Pump Model 31965T	08-09-85	S&L-CQD	S&L-CQD (CQD-012440, MEQ-CL079)

ATTACHMENT A

Note 1: - Bearings in the motor are required to be replaced every three years (Ref. 8 Tab E)

Note 2: - For the water leg pump, the following components made from Buna-N must be replaced with Viton before the start-up operation:

oil seal - outboard ---------- 332A
oil seal - inboard ---------- 333A
o-ring-bearing housing ------- 496

Also, for the pump the following maintenance and surveillance requirements are to be followed:

i) Whenever a metal part adjacent to each non-metallic part is removed, i.e., for maintenance, the non-metallic should be replaced.

ii) Thrust bearings (MRC 5306) must be replaced every 4.5 years.

iii) During the bearings replacement schedule, the teflon impeller o-ring (412A) must also be replaced.

iv) Use Mobil DTE 26 for pump bearing lubrication. (Ref. 9 Tabs C & E)

Note 3: - The subject motor is 5HP, 3550RPM, Frame 215T with Insulation Class H, Type RN; located in Auxiliary Building. The motors tested in Environmental Qualification are:-

i) 3 HP, 1730RPM, Frame 182TC with Insulation Class H, Type RH for Normal Service (Non-Containment). (Ref: 8 Tab F, Sec. 5, Report No. NUC-22)

ii) 150/75 HP, 1200/600 RPM, Frame D5005 with Insulation Class H, Type RN for In-containment Service. (Ref: 8 Tab F, Sec. 6, Report No. X-604)

Class H Type RN insulation has the same basic materials as Class H Type RH; but has mulitple layers of insulating materials which enables it to have additional margin.

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. A

System Engineer Review H. E. Wadleigh Date 11-7-85

Equipment Qual. Review [signature] Date 11-7-85

Electrical Engineer Review Robert N. Brown Date 11-7-85

C&I Engineer Review Ogan Kantal Date 11-7-85

Reconciliation of IPC Walkdown Results

_____ Date _____

REFERENCES

1. PVOP CHECKLIST

2. P&ID DRAWING: M05-1052, Sheet 3 , Rev. T

3. VENDOR DRAWINGS:

   a) FD1A278, Rev. 6,

   b) B-35705X, Rev. 2

4. S&L ELECTRICAL SCHEMATIC DRAWINGS: E02-1SX99-003, Rev. M

5. S&L SPECIFICATIONS: K-2828B, Amend. 2

6. EQUIPMENT FOUNDATION DRAWING:

   S22-1018, Rev. AB
   S22-1011, Rev. R
   S22-1017, Rev. V
   S21-1610, Rev. AB

8. SEISMIC QUALIFICATION REPORT:

   a) Report No. SES/TR-79-01, Dynamic Qualification of Model 8x14A VCM 2-stage Shutdown Service Water Pump, dated 01-19-79 (CQD-019842, SQ-CL017)

   b) Report No. EL-8-5134-90323-01, Seismic Withstand Capability of Siemens-Allis A.C. Induction Motor, dated 01-19-79 (CQD-019843, SQ-CL18)

9. CODE DATA REPORTS/HYDROSTATIC TEST REPORT/PUMP PERFORMANCE TEST FOR PUMP 1SX01PC, Serial #1A278 & 8-5134-90323-01

10. MISCELLANEOUS

    a) Bingham-Willamette Co. Contract Proposal Page 5 (PD)

    b) Bingham-Willamette Co.'s Code Data Report/Hydrostatic Test Report

    c) Bingham-Willamette Co. - Pump Performance Test (Serial #1A278)

Illinois Power Company
Clinton Power Station

PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461
3. Utility: Illinois Power Company
4. NSSS: General Electric Co. [] PWR [x] BWR
5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [x] BOP Specification K-2828B
2. Location: a. Building/Room Circulating Water Screen House/Env. Zone M-25
   b. Elevation 699'-0"
   c. System Shutdown Service Water
3. Component number on in-house drawings: 1SX01PC
4. If component is a [x] Pump complete II.5.
   If component is a [] Valve complete II.6.
5. General Pump Data

a. Pump	b. Prime-mover
Name Shutdown Service Water Pump Div. 3	Name Motor
Mfg. Bingham-Willamette Co.	Mfg. Siemens-Allis
Model 8x14 A VCM - 2-Stage	Model Frame 404VP
S/N 1A278	S/N 8-5134-90323-01
Type VCM 2-Stage	Type Vertical, single speed, squirrel cage induction, ODP

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

a. Pump (continued)

Size 8x14A
Weight 3750 lbs. (dry)

Mounting Method Anchored to floor through mounting plate with bolts

Required B.H.P. 68

Parameter	Design	Operating
Press	107	75
Temp	32-95°F.	32-95°F.
Flow	1100 GPM	1100 GPM
Head	175 ft. H_2O	175 ft. H_2O

Required NPSH at maximum Flow 2 ft. Submergence

Available NPSH 2'-1-1/2" Submergence (Min.)

Operating Speed 1760 RPM

Critical Speed 2370 RPM /Ref. C

List functional accessories:* None

List control signal inputs: See Attachment B

b. Prime-mover (continued)

Size Frame 404VP, 75HP, 1755 RPM
Weight 1025 lbs.

Mounting Method Bolted to pump supporting disc.

H.P. 75

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

Electrical

460 ± 10% Volts

-25% for 1 minute

Other

If Motor list:

Duty cycle continuous

Stall current 434 amps

Class of insulation F

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve

Name _____

Mfg. _____

Model _____

S/N _____

Type _____

Size _____

Weight _____

Mounting Method _____

Required Torque _____

b. Actuator (if not an integral unit)

Name _____

Mfg. _____

Model _____

S/N _____

Type _____

Size _____

Weight _____

Mounting Method _____

N/A

Torque _____

Ref.: Valve Data Sheet No. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____

Max ΔP across valve _____

Closing time @ max ΔP _____ /Ref. _____

Opening time @ max ΔP _____ /Ref. _____

Power requirements for functional accessories, (if any) _____

_____

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

Electrical _____

_____

_____

_____

Ref. _____

Other: []Pneumatic []Hydraulic

_____

_____

_____

List control signal inputs: _____

_____

List functional accessories: _____

III. FUNCTION

1. Briefly describe components normal and safety functions: Normal: Function is to be on standby. Safety: Function is to operate to provide cooling water to equipment served by Div. 3 Shutdown Service Water System as a result of remote-manual initiation or automatic initiation start signals. Pump will stop with operator's remote-manual initiation.

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [X] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [ ] Containment isolation

d. [X] 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? [X] Yes [ ] No
If "Yes", identify.

[X] LOCA [ ] HELB [ ] MSLB

[X] Other Loss of Offsite Power (LOOP)

4. Safety requirements:

[ ] Intermittent Operation [X] During postulated event

[X] Continuous Operation [X] 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.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [] Fail open [] Fail closed [] Fail as

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 N/A

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

If "Yes" give limit: _____

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME B&PV Code, Sec. III, Class -3, 1974 Edition including 1976 Summer Addenda

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

IEEE: -344 - 1975

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

Deleted:	Modified:
None	None

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [] No [] Ref. Document: N/A - Qualification by Analysis

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

6. Are the margins* identified in the qualification documentation? [X] Yes [] No
Ref. Documents: 8a and 8b, Tab. D

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

7. Pump operability has been demonstrated by: [] Analysis
[] Test [X] Combination

Identify PUMP tests performed:

a. [X] Shell hydrostatic (ASME Section III)
Ref. D

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq.)
Rev.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal
[] Mechanical
Ref. Doc.

h. [X] Flow performance
Are curves provided [X] Yes [] No
Ref. E

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc.

j. [] Others

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc.

8. Valve operability has been demonstrated by: [] Analysis
[] Test [x] Combination

Identify VALVE tests performed:

b. [ ] Shell hydrostatic (ASME Section III) N/A
Ref. Doc.

b. [ ] Cold cyclic
List times: Open
Closed
Ref.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [ ] Seismic loading

d. [] Hot cyclic
Lists times: Open _____
Closed _____

Ref. _____

Ref. _____

e. [] Exploratory vibration

f. [] Main seat leakage

Ref. _____

Ref. _____

g. [] Aging: [] Thermal
[] Mechanical

h. [] Back seat leakage

Ref. _____

Ref. _____

i. [] Pipe reaction end loading

j. [ ] Disc hydrostatic

Ref. _____

Ref. _____

k. [] Extreme environment

l. [] Flow interruption capability

Ref. _____

[] Humidity

N/A

[] Chemical

[] Radiation

Ref. _____

m. [] Flow characteristics
Are curves provided?

n. [] Others _____

Ref. _____

[] Yes [] No

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [] Yes [X] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____

_____

_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [X] Yes [] No If "No", is installed component [] oversized or [] undersized? N/A
Qualification by analysis.

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 - See Attachment A Note.

12. Is component orientation sensitive? [] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [X] Yes [] No

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[X] Yes [] No [] Unknown

14. Were the qualification tests performed in sequence and on only one component? [] Yes [] No N/A - See Attachment A Note.

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

15. If "aging"* was performed, identify the significant aging mechanisms: N/A - See Attachment A Note.

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

a. [] Plants (shutdown loads) b. [] Extreme environment

c. [x] Seismic load d. [x] Others Operational

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [x] Yes [] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[] Yes [x] No

If "Yes", identify:

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

If "Yes", identify:

20. Is the qualified life for the component less than 40 years?
[] Yes [x] No If "Yes", what is the qualified life?

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Item No.	Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
A	SES/TR-79-01	Dynamic Qualification of Model 8x14A VCM 2-stage Shutdown Service Water Pump	01-19-79	Structural Engineering Services (Control Data Corp.)	S&L - CQD (CQD-019842, SQ-CL017)
B	EL-8-5134-90323-01	Seismic Withstand Capability of Siemens-Allis A.C. Induction Motor	01-19-79	Siemens-Allis	S&L - CQD (CQD-019843, SQ-CL018)

REFERENCES

Item No.	Description
C	Bingham-Willamette Company, Contract Proposal page 5 (PD)
D	Bingham-Willamette Company, Code Data Report/Hydrostatic Test Report
E	Bingham-Willamette Company, Pump Performance Test (Serial No. 1A278)

ATTACHMENT A

Note: The pump is located in a mild zone; Environmental Qualification is not required.

ATTACHMENT B

Shutdown Service Water Pump 1C will start with the following signal inputs:

1. Pump start initiation by pump remote-manual control switch 1HS-SX009, or

2. Strainer 1SX01FC outlet pressure below set point, or

3. No pump stop action has been initiated by pump remote-manual control switch 1HS-SX009 and there is either "high drywell pressure" or "RPV level low (level 2)" signal present.

The pump will stop with the following signal inputs:

1. Pump stop has been initiated by remote-manual control switch 1HS-SX009.

CHECKLIST(S)

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. A

System Engineer Review [signature] Date 11/4/85

Equipment Qual. Review [signature] Date 11/4/85

Electrical Engineer Review [signature] Date 11-4-85

C&I Engineer Review [signature] Date 11-4-85

Reconcilation of IPC Walkdown Results

_____ Date _____

References

1. 10" Double In-Line Vacuum Relief Valve Spring Loaded, GPE Controls, Drawing LD240-420, Revision AC.

2. S&L Specification K-2873, "Vacuum Relief Valves" Amendment 6, July 9, 1985.

3. S&L Drawing M05-1063, Sheet 1, Revision G, December 14, 1984.

4. Clinton FSAR Subsection 6.2, Figures 6.2-4 and 6.2-13, Amendment 34, July 1985.

5. S&L Drawing M06-1063, Sheet 2, Revision Y, August 27, 1984.

6. SQ-CL189, Dynamic Qualification of GPE Controls/Licon Limit Switch Assembly.

7. EQ-CL092, Environmental Qualification of GPE Controls/Licon Limit Switch Model #65-430189.

8. MEQ-CL097, Environmental Qualification of Vacuum Relief Valves 2" and 10".

9. SQ-CL196, Seismic Qualification of 2" and 10" Vacuum Relief Valves.

10. IPC Record Package for Document Record Number: Baldwin P.O. C14133, RIR Number Not Indicated, Valve Serial Number 7712-0526-63.

11. NSLD Calculation 3C10-0976-002, "Maximum External Drywell Pressure on the Drywell Structure," Revision O, November 29, 1976.

Illinois Power Company
Clinton Power Station

PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461
3. Utility: Illinois Power Company
4. NSSS: General Electric Co. [] PWR [x] BWR
5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [x] BOP Specification K-2873
2. Location:
   a. Building/Room Containment/Containment(H-
   b. Elevation 764'-0" (Ref. 5)
   c. System Containment Combustible Gas Control
3. Component number on in-house drawings: 1HG010C
4. If component is a [] Pump complete II.5.
   If component is a [x] Valve complete II.6.
5. General Pump Data

a. Pump	b. Prime-mover
Name	Name
Mfg.	Mfg.
Model	Model
S/N	S/N
Type	Type

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

a. Pump (continued)

Size _____
Weight _____ _____

Mounting Method _____

Required B.H.P. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____
Head	_____	_____

Required NPSH at maximum

Flow _____

Available NPSH _____

Operating Speed _____

Critical Speed _____ /Ref.

List functional accessories:* _____

_____

_____

List control signal inputs: _____

_____

_____

b. Prime-mover (continued)

Size _____
Weight _____

Mounting Method _____

H.P. _____

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

Electrical _____

_____

_____

Other _____

_____

If Motor list:

Duty cycle _____

Stall current _____

Class of insulation _____

_____

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve

Drywell/Containment Double Inline Vacuum Relief Valve

Name

Mfg. Vapor Corporation GPE Controls Division

Model LD240-420

S/N 7712-0526-63 (See Attachment A, Note 1)

Type Vacuum Relief Valve

Size 10"

Weight 680 lbs (Ref. 1)

Mounting Method Bolted to Flange in Pipeline

Required Torque NA - No Operator

b. Actuator (if not an integral unit)

NA: Valve is operated by ΔP across va

Name NA

Mfg. NA

Model NA

S/N NA

Type NA

Size NA

Weight NA

Mounting Method NA

Torque NA

Parameter	Design	Operating
Press (Psig)	30 (Ref. 1)	30 (Attachment to Ref. 2)
Temp (^{o}F)	330 (Ref. 1)	330 (Attachment to Ref. 2)
Flow (scfm@ 1 psid)	3528	3528 less than (See Attachment A, Note 4)
Max ΔP across valve	20 psid (Ref. 4)	
Closing time @ max ΔP /Ref.	NA NA	
Opening time @ max ΔP /Ref.	NA NA	

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

Electrical NA

Ref. NA

Other: []Pneumatic[]Hydraulic

NA

Power requirements for functional accessories, (if any)

See Attachment A, Note 5

List control signal inputs: NA

List functional accessories: See Attachment A Note 5

III. FUNCTION

1. Briefly describe components normal and safety functions:

See Attachment A, Note 2

2. The components normal state is: [ ] Operating [x] 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? [x] Yes [ ] No
If "Yes", identify.

[x] LOCA [ ] HELB [ ] MSLB

[x] Other Limits Drywell to Containment Negative Differential Pressure

4. Safety requirements:

[x] Intermittent Operation [ ] During postulated event
During Normal Operation
[x] Continuous Operation [x] Following postulated event
Following a LOCA (i.e., LOCA)

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

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

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [] Fail open [] Fail closed [] Fail as
See Attachment A, Note 3
Is this the fail safe position? [] Yes [] No
See Attachment A, Note 3
Is the valve used for throttling purposes? [] Yes [x] No

Is the valve part of the reactor coolant pressure boundary?
[] Yes [x] No

Does the valve have a specific limit for leakage?
[x] Yes []No

If "Yes" give limit: 20cc/hr (Ref. 2, p3-5)

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code, Section III, Class 2 Subarticle NC-3500, Edition 1977, Addenda Summer 1977 and Code Case N-95.2.

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

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

Deleted:	Modified:
None	None

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [x] No [] Ref. Document: 6,7

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

6. Are the margins* identified in the qualification documentation? [x] Yes [] No
Ref. Documents: 6, 7, 8.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed:

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal
[] Mechanical
Ref. Doc. _____.

h. [] Flow performance
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis
[] Test [x] Combination
Ref. 6,7,8,9,10

Identify VALVE tests performed:

b. [x] Shell hydrostatic (ASME Section III)
Ref. Doc. 10.

b. [ ] Cold cyclic
List times: Open _____
Closed _____
Ref. _____.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [x] Seismic loading
Ref. 6

d. [] Hot cyclic
Lists times: Open
Closed
Ref.

e. [] Exploratory vibration
Ref.

f. [x] Main seat leakage
Ref. 10

g. [x] Aging: [x] Thermal
[x] Mechanical
Ref. 7

h. [] Back seat leakage
Ref.

i. [] Pipe reaction end loading
Ref.

j. [ ] Disc hydrostatic
Ref.

k. [x] Extreme environment
[x] Humidity
[x] Chemical
[x] Radiation
Ref. 7

l. [] Flow interruption capability
Ref.

m. [x] Flow characteristics
Are curves provided?
Ref. 10
[] Yes [x] No

n. [x] Others Pressure Loadings
Ref. 9

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [x] Yes [] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.
For limit switch qualification: 1) TRS did not envelope RRS below 2.25 Hz. This is acceptable because because there are no resonances in that frequency Range (Ref. 6).
2) See Attachment A Note 6. MEH 11/5/85

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [x] 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?
[x] Yes [] No

12. Is component orientation sensitive? [x] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [x] Yes [] No

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[x] Yes [] No [] Unknown

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

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

15. If "aging"* was performed, identify the significant aging mechanisms: Radiation, thermal, cyclic and seismic

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

c. [ ] Plants (shutdown loads) b. [x] Extreme environment

c. [x] Seismic load d. [x] Others Pool Dyanamics and Pressure Loads

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [x] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[ ] Yes [x] No

If "Yes", identify:

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

If "Yes", identify:

20. Is the qualified life for the component less than 40 years?
[ ] Yes [x] No If "Yes", what is the qualified life?

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
LA241-171	Design Analysis for Seismic and Operating Conditions 10" GPE Model LD240-420 Double Vacuum Relief Valves	11/17/81	GPE Controls	S&L/CQD SQ-CL196
LA241-174	Minimum Wall Thickness Calculations for Valve Model LD240-420	3/27/79	GPE Controls	S&L/CQD SQ-CL196
N/A	Environmental Qualification of Vacuum Relief Valves 2" & 10"	10/16/85	S&L/CQD	S&L/CQD MEQ-CL097
47420-1	Nuclear Environmental Qualification Test Program on (4) GPE Controls/Licon Limit Switch Assemblies	9/13/85	Wyle	S&L/CQD SQ-CL189 EQ-CL092

ATTACHMENT A

Note 1

Serial number is for valve body. Duplicate serial numbers occur (i.e., for 1GH010C/11C) because there are two valves (discs) per body, thus two valve tag numbers will have the same body serial number.

Note 2

This vacuum relief valve assembly consists of two valves (1HG010C and 1HG011C) in series which penetrate the drywell wall. These valves are closed when the drywell differential pressure with respect to the containment is less than 0.2 psid. In order to minimize the drywell to containment negative differential pressure and to assist containment to drywell atmosphere mixing when the combustible gas control mixing compressors are in operation, these valves are designed to start opening at 0.2 psid and be fully opened at 0.5 psid. The valves are shown in Reference 3.

Note 3

Drywell vacuum relief is accomplished by four parallel valve assemblies into the drywell. Failure of one of the valves in an assembly to open is accounted for by the redundant parallel paths into the drywell. Failure of one of the valves in an assembly to close is accounted for by the redundant in-line valve within each valve assembly. Therefore, the fail safe position for these valves may be postulated as fail open, fail close, or fail as-is, without adverse effect on system function.

Note 4

A "K" factor of 1.68 $\pm$ .168 based on a valve port diameter of 7" has been checked using test data (Reference 10). The flow at 1 PSID differential across the valve based on this K factor is, 3528 SCFM, the rated flow of the valve. The maximum external pressure on the drywell structure at Clinton was calculated in Reference 11. This calculation conservatively modelled the drywell containment vacuum relief valves. Since the calculated external drywell design pressure is less than the external drywell design pressure, it was concluded that the drywell vacuum relief valves were properly sized.

Note 5

Solenoid: (Non-Safety-Related), 120 VAC, 60 Hz, 6W
Limit Switches: (Safety-Related), 5A @ 125 VAC or 250 VAC (125 VDC @ 0.5A)
2A @ 20 VDC (Inductive)

ATTACHMENT A (CON'T)

Note 6

For Limit Switch qualification:

1) TRS did not envelope RRS below 2.25 Hz. This is acceptable because there are no resonances in this frequency range (SQ-CLI89).

2) i) Accident profile did not specify a chamber pressure for testing. S&L directed Wyle to reduce the pressure to Opsig.

ii) The switches were to be actuated once per day during accident testing. S&L directed Wyle to actuate the switches at the 1-hour, 6-hour, and 24-hour points of the accident phase in addition to the specified once per day actuation. Also, contact resistance and insulation resistance measurements to be taken at the 1-hour, 24-hour, and near the end of post-accident aging phase.

iii) At option of S&L, after accident aging, additional accident aging with the conduit junction box open. S&L decided to go with this additional testing.

The above modifications to the accident aging phase do not affect the devices qualification as stated in the above items.

MEH
1/15/85

CHECKLIST(S)

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. 1

System Engineer Review John A Graham Date 11-04-85

Equipment Qual. Review [illegible] Date 11-04-85

Electrical Engineer Review R.L. Bowers Date 11-4-85

C&I Engineer Review Ogm Kartal Date 11-4-85

Reconcilation of IPC Walkdown Results

_____ Date _____

References

1.	System Description	Tab B
2.	Fisher Controls letter (K. E. Jeppsen to R. E. Wadlington) dated 10-18-85	
3.	Valve Data Sheet - CV-281	Tab H
4.	Valve Data Table - DT-011	Tab H
5.	Drawings	Tab F
5.1	P&ID - M05-1037-3	
5.2	C&ID - M10-1037-5	
5.3	Logic Diagram - M15-1037-3	
5.4	S&L Electrical Schematic Drawing E02-1FC99	
5.5	Fisher Controls Drawing No. 37A2037	
6.	Seismic Qualification Reports	
6.1	SQ-CL046	
6.2	SQ-CL048	
6.3	SQ-CL060	
6.4	SQ-CL062	
7.	Equipment Qualification Reports	
7.1	EQ-CL008	
7.2	EQ-CL024	
7.3	EQ-CL094	
8.	Mechanical Equipment Qualification Reports	
8.1	MEQ-CL082	
9.	ASME Section III Code Data Report & Test Results	Tab D
10.	Pre-op test procedures/results	Tab E
11.	Walkdown Results	Tab G

Illinois Power Company
Clinton Power Station

PUMP AND VALVE
OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461

3. Utility: Illinois Power Company

4. NSSS: General Electric Co. [] PWR [x] BWR

5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [X] BOP Specification K2864

2. Location: a. Building/Room F.O/Zone H-5

b. Elevation 712'-0"

c. System Fuel Pool Cooling & Cleanup

3. Component number on in-house drawings: 1FC004A

4. If component is a [] Pump complete II.5.

If component is a [X] Valve complete II.6.

5. General Pump Data

a. Pump	b. Prime-mover
Name	Name
Mfg.	Mfg.
Model	Model
S/N	S/N
Type	Type

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

a. Pump (continued)

Size _____
Weight _____

Mounting Method _____

Required B.H.P. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____
Head	_____	_____

Required NPSH at maximum

Flow _____

Available NPSH _____

Operating Speed _____

Critical Speed _____ /Ref. _____

List functional accessories:* _____

_____

_____

List control signal inputs: _____

_____

_____

b. Prime-mover (continued)

Size _____
Weight _____

Mounting Method _____

H.P. _____

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

Electrical _____

_____

_____

Other _____

_____

If Motor list:

Duty cycle _____

Stall current _____

Class of insulation _____

_____

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve		b. Actuator (if not an integral unit)	
Name	DEMINERALIZER FLOW REGULATOR VLV.	Name	PNEUMATIC ACTUATOR
Mfg.	FISHER CONTROLS	Mfg.	FISHER CONTROLS
Model	ED	Model	N/A
S/N	7603759	S/N	N/A
Type	GLOBE	Type	657NS
Size	8"-150#	Size	70
Weight	849#	Weight	256# (including appurtenances; from SQ-CL048)
Mounting Method	BUTT-WELDED TO PIPE	Mounting Method	BOLTED TO THE BONNET
Required Thrust	2,420# (SQ-CL048, TABD)	Thrust	5,280# (SQ-CL048, TABD)

Ref.: Ref.3

Parameter	Design	Operating
Press	146 PSIG	122.8 PSIG
Temp	140°F	140°F
Flow	-	4150 GPM (maximum operating)

Power requirements: (include normal, maximum and minimum).
Electrical None

Max ΔP across valve 58.6 psig Ref. See Att. A,
Closing time @ max ΔP Note 7 Other: [X] Pneumatic [ ] Hydraulic
/Ref.
Opening time @ max ΔP " Available Air Pressure 80-120 psig
/Ref.
Power requirements for functional accessories, (if any) 120V AC +12 Volts -18 Volts

List control signal inputs: When the manual control switch is in 'auto', the valve will modulate when there is no 'high drywell pressure', or 'RPV level low (level 2)' signal present. Either of these isolation signals will cause the valve to fully open. The valve can be closed manually by 1HS-FC110 only in the absence of the above referenced signals.

List functional accessories: Two solenoid valves, 1HSV-FC110
1PSV-FC110

III. FUNCTION

1. Briefly describe components normal and safety functions: Normal: This valve modulates to pass the preset (1,000 GPM) flow through the demineralizer.

Safety: Open the valve completely to prevent automatic closing as a result of the no-flow condition through the demineralizer, on a containment isolation signal.

2. The components normal state is: [X] Operating [] Stand

3. Safety function:

a. [] Emergency reactor shutdown

b. [] Containment heat removal

c. [] Containment isolation

d. [] Reactor heat remova

e. [] Reactor core cooling

f. [X] Prevent significan release of radio-active material to environment

g. Does the component function to mitigate the consequences of one or more of the following events? [X] Yes [] No
If "Yes", identify.

[X] LOCA [] HELB [] MSLB

[] Other _____

4. Safety requirements:

[X] Intermittent Operation

[X] During postulated event

[] Continuous Operation

[] Following postulated eve

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

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

* Functional accessories are those sub-components not supplied by th manufacturer that are required to make the valve assembly operational (e.g., limit switches).

5. For VALVES:

Does the component [X] Fail open [ ] Fail closed [ ] Fail As

Is this the fail safe position? [ ] Yes [X] No

Is the valve used for throttling purposes? [ ] Yes [X] No

Is the valve part of the reactor coolant pressure boundary?
[ ] Yes [X] No

Does the valve have a specific limit for leakage?
[ ] Yes [X] No

If "Yes" give limit: _____

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code, Section III, Class 3 Subarticle ND3500, Edition 1974, with Addenda Summer 1976.

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: None

Modified: Valve body design calcs. were done in accordance with ANSI B16.34-1977 instead of ANSI B16.5 1968 (Design Requirements B16.34 satisfied or exceeded all Design Requirements of B16.5).

4. Have acceptance criteria been established and documented in the test plan(s) for the component? Yes [X] No [ ] Ref. Document: Attachment A, Note 1

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

6. Are the margins* identified in the qualification documentation? [X] Yes [] No
Ref. Documents: SQ-CL048, SQ-CL046, SQ-CL060, EQ-CL008, EQ-CL094.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed:

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal [] Mechanical
Ref. Doc. _____.

h. [] Flow performance
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis [] Test [x] Combination

Identify VALVE tests performed:

b. [X] Shell hydrostatic (ASME Section III)
Ref. Doc. #9.

b. [ ] Cold cyclic
List times: Open _____
Closed _____
Ref. 10.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [x] Seismic loading
Ref. See Note 2, Att. A

d. [] Hot cyclic
Lists times: Open
Closed
Ref. No. 10

e. [] Exploratory vibration
Ref.

f. [] Main seat leakage
N/A See Note 8, Att. A
Ref.

g. [x] Aging: [x] Thermal
[x] Mechanical
Ref. EQ-CL008, 24, 94

h. [] Back seat leakage
Ref.

i. [] Pipe reaction end loading
Ref.

j. [ ] Disc hydrostatic
N/A See Notes 7 & 8, Att.
Ref.

k. [x] Extreme environment
[x] Humidity
[] Chemical
[x] Radiation
Ref. EQ-CL008, 024, 094

l. [] Flow interruption capability
Ref.

m. [] Flow characteristics
Are curves provided?
Ref.
[] Yes [] No

n. [] Others

9. As a result of any of the test (or analysis), were any deviatio from design requirements identified? [x] Yes [] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

See Attachment A, Note 3

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [x] No If "No", is installed component [x] oversized or [] undersized? *See Note 6

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

12. Is component orientation sensitive? [] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [x] Yes [] No

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[x] Yes [] No [] Unknown

14. Were the qualification tests performed in sequence and on only one component? [x] Yes [ ] No Except for pilot solenoid valve, See Attachment A, Note 4.
If "Yes" identify sequence, (e.g., radiation, seismic, cyclic, thermal, etc.): Thermal Aging, Mechanical Aging, Radiation Aging, Seismic & Loca

15. If "aging"* was performed, identify the significant aging mechanisms: Thermal, Mechanical & Radiation Aging. These apply for NAMCO Limitswitches, ASCo Sol. Vlvs. & Conax Seal

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

c. [ ] Plants (shutdown loads) b. [x] Extreme environment

c. [x] Seismic load d. [x] Others Pool Dynamics & Operating Loads

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [x] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[ ] Yes [x] No

If "Yes", identify:

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

If "Yes", identify: See Attachment A, Note 5

20. Is the qualified life for the component less than 40 years?
[ ] Yes [x] No If "Yes", what is the qualified life? See Attachment A, Note 5

* As outlined in Section 4.4.1 of IEEE-627 1980.

Attachment A

Note 1 (IV Subsection 4)

Seismic Qual Report SQ-CL048 Tab D (Page 12). Environmental & Seismic Report No. AQR-6738, Rev. 1 for ASCo Solenoid Vlvs. (contained in Qual Packages SQ-CL060, Tab D, Page 62 Table 5.2 and EQ-CL024 Tab F1, Att. A, P. A4-A10 & Tab C Page C6). Seismic Qual Package SQ-CL046 for the NAMCO Limitswitches (Tab D, P. 7-5), and Environmental Qual. Package EQ-CL008 Tab F-1, P. 11-27. Environmental Qual. Package EQ-CL094 Tab F-2, P. 6&7.

Note 2 (IV Subsection 8.C)

The valve was qualifed by analysis. A static load test was performed on two parent valves (See Note 6 of this attachment for further information) to demonstrate operability. The other appurtances such as NAMCO Limitswitches, Solenoid Vlvs. & Conax Seals were individually qualified by test and analysis (See SQ-CL048, Tab D. Qual Summary P.5-13 for further information).

Note 3 (IV Subsection 9)

The following items were noted for the qualification Documentation:

1) SQ-CL046 Tab D, P. 5-7 identifies a test failure for maintained contact short travel type limitswitches. This is not a concern; standard travel series limitswitches are the only type used for 1FC004A.

2) SQ-CL060: The required OBE G level was not enveloped. However, the magnitude and duration of the SSE testing more than fulfills the OBE Excitation requirements for the subject test. See comment #4 on P. A10 of the SQ-CL Package for further explanation.

3) EQ-CL008: See results in P10-10 of T.R.3613-PP for anomaly. For the disposition see page 7-1, Article 7.2 of QTR 105. This disposition is acceptable (See 7ABC Pages C25 thru C29 for further info.).

4) EQ-CL024: See P. 56-60. Also see Section 15 of Tab A Checklist for disposition.

5) EQ-CL094: Abnormalities identified and justified in Sections 6.9.3 and 6.10 of Report IPS 1079.

Note 4 (IV Subsection 14)

*EQ-CL024: The sequence per IEEE 323-1974 was not followed in the test of ASCo Solenoid Vlvs. (i.e., Equipment was not operated to extreme of electrical characteristics after base line test). However, testing performed after DBE shows acceptability (See TAB C).

Note 5 (IV Subsection 19)

Item	Environmental Maintenance Frequency	Maintenance Activity	Reference
VLV & Actuator	4 yrs.	Replace Nitrile Diaphragms	MEQ-CL082
NAMCO Limit-switches	19 yrs.	Replace the EPDM O-Rings (Lever Shaft Covers screws)	EQ-CL008
	19.13 yrs.	Replace Boot (Lever Shaft)	EQ-CL008
ASCO Solenoid VLV.	16 yrs.	Replace Solenoid Coil	EQ-CL024
1HSV-FC110 & 1FSV-FC110	35 yrs.	Replace Elasto-metors (Lower & Upper Seat)	EQ-CL024

Conax seals must be used in the electrical installation of the limit-switches and solenoid valves. In addition the solenoid must be installed vertical and upright.

Note 6

To prove operability of the valve assembly, a static Pull Test was performed on two Parent Valves (#3 and #5). Parent Valve 3A (3"-600 #ED-667NS 70) was chosen to qualify operability of the actuator is the same size as the actuator used in valve 1FC004A. To prove operability of the moving parts within the valve, Parent Valve #5 (4"-600#ED-667NS 45) was chosen because the valve is the same design and is within the generic family. Seismic Loading on Parent Valve #5 was greater than the specified

Note 7

This is a modulating control valve which provides no isolation function. Therefore there is no requirement for opening/closing times.

Note 8

This valve is set to pass 1000 GPM at the full close position per valve data sheet CV-281 (Ref. 3). Therefore, valve closure and seat leakage tests are not applicable.

21. Information Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
FQP-16-10	Group Control Vlvs. Qualification Report Rev. B	3-3-83	Fisher Controls	S&L/CQD SQ-CL048
QTR-105 Rev. 4	Qualification of EA180 Limit Switches	1-9-84	NAMCO Controls	S&L/CQD SQ-CL046
ABS21678/ TR Rev. A & AQR-67368 Rev. 1	Qual. of solenoid vlvs. by environmental exposure to elevated Temperature, Radiation Wear Aging Seismic vibration endurance, Radiation & Loca	July 79 8-19-83	Isomedix ASCo	S&L/CQD SQ-CL060
IPS-1079 Rev. D IPS-1080 Rev. A	Design Qualification Test Report For Electric Conductor Seal Assy. (ECSA) for Conax Corp.	5-21-84 8-15-83	Conax	S&L/CQD SQ-CL062
N/A	Analysis of Fisher Control Valves		S&L	S&L/CQD MEQ-CL082
QTR-105 Rev. 3	Qual. of EA180 Series Limit Switches	8-20-81	NAMCO Controls	S&L/CQD EQ-CL008
AQR-6738 Rev. 1	Qual. of ASCo CatNP-1 Solenoid Vlvs.	8-19-83	ASCo	S&L/CQD EQ-CL024
IPS-1079 Rev. D	Design Qual. Test Report for Conax Seal	5-21-84	Conax	S&L/CQD EQ-CL094

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. A

System Engineer Review J Wozika Date 11-5-85

Equipment Qual. Review N Madan Date 11-5-85

Electrical Engineer Review Robert M Beaver Date 11-5-85

C&I Engineer Review Ogan Kartal Date 11-5-85

Reconcilation of IPC Walkdown Results

_____ Date _____

REFERENCES

P&ID: M05-1002, Sheet 2, Rev. G

Vendor Drawing: Rockwell International
Rockwell - Edward Hermavalve Drawing ACD 31602652
GE 105D5575, Rev. 0
GE 131C7911A, Rev. 5

S&L Electrical Schematics: E02 1NB99-203, Rev. J
E02 INB99-216, Rev. F
E02 INB99-225, Rev. D

Seismic Qualification Report: SA 493726, Rev. A
Engineering Report 84-08 (Dated 10-5-84)
10959 (Dated 12-24-81)
CQD-000731, Rev. 0 (Dated 1-11-80)
B0037

Environmental Qualification Report: B-0058 (Dated 01-11-80)

Mechanical EQ Report: MEQ-CL085 (Dated 07-17-85)

Illinois Power Company
Clinton Power Station

PUMP AND VALVE
OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461
3. Utility: Illinois Power Company
4. NSSS: General Electric Co. [] PWR [x] BWR
5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [X] BOP Specification K-2882
2. Location: a. Building/Room Aux. Building /Env. Zone H30
   b. Elevation 768'-9"
   c. System Nuclear Boiler
3. Component number on in-house drawings: 1B21-F067A
4. If component is a [] Pump complete II.5.
   If component is a [X] Valve complete II.6.
5. General Pump Data

a. Pump		b. Prime-mover	
Name	NA	Name	NA
Mfg.		Mfg.	
Model		Model	
S/N		S/N	
Type		Type	

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

a. Pump (continued)

Size _____
Weight _____

Mounting Method NA

Required B.H.P. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____
Head	_____	_____

Required NPSH at maximum

Flow _____

Available NPSH _____

Operating Speed _____

Critical Speed _____ /Ref. _____

List functional accessories:* _____

_____

_____

List control signal inputs: _____

_____

_____

b. Prime-mover (continued)

Size _____
Weight _____

Mounting Method _____

H.P. _____

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

Electrical _____

_____

_____

Other _____

_____

If Motor list:

Duty cycle _____

Stall current _____

Class of insulation _____

_____

_____

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve 1B21-F067A		b. Actuator (if not an integral unit)	
Name	Hermavalve	Name	Limitorque Operator
Mfg.	Rockwell-Edward	Mfg.	Limitorque Corporation
Model	15104MLPT1	Model	SMB-00-10
S/N	BL024	S/N	349971
Type	Globe	Type	Electric
Size	1-1/2" - 1500#	Size	10 ft-lbs.
Weight	53 lbs. (without actuator)	Weight	220 lbs.
Mounting Method	Socket Weld	Mounting Method	Bolted (Valve Mounted)
Required Torque	53 Ft.-Lbs.	Torque	90 Ft.-Lbs.

Ref.: Valve Data Sheet No. MO-910

Parameter	Design	Operating
Press	1250 psig	992 psig
Temp	575 F	546 F
Flow	2000 #/Hr.	2000 #/Hr.

Power requirements: (include normal, maximum and minimum).
Electrical 460± 10% Vac
Spec. K-2882-21, Form 1810Q
(Ref. GE Dwg. 105D5575, Rev. 0 & and 131C7911A, Rev. 5)

Max ΔP across valve 1250 psi Ref.

Closing time @ max ΔP 7.5sec. Other: []Pneumatic[]Hydraulic
/Ref. GE 22A4622AV
Opening time @ max ΔP 7.5sec. None
/Ref. GE 22A4622AV
Power requirements for functional accessories, (if any) None

List control signal inputs: 1B21-F067A can be opened and closed remote-manually by control switch (HS) 1B21HS035. It is under (MSIV) logic control.

List functional accessories: None
and will trip closed upon presence of any of the following containment isolation signals; MSL Hi radiation, MSL Hi flow, MSL Tunnel Temp. Hi, MSL In Turbine Bldg. Temp. Hi, Turbine Inlet Pressure Low, Condenser Vacuum Low, Reactor Water Level Low (Level 1).

III. FUNCTION

1. Briefly describe components normal and safety functions: Normal function is to provide control over elimination of condensate in Main Steam Line A during startup and low load operations.

Safety function is containment isolation.

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [ ] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [X] 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? [X] Yes [ ] No
If "Yes", identify.

[X] LOCA [ ] HELB [X] MSLB

[ ] Other

4. Safety requirements:

[X] Intermittent Operation

[X] 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.

N/A (e.g., hours, days, etc.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

*'Fail as is' feature will not negate isolation of containment as the main steam inboard isolation valve will be intact and able to perform this function.

5. For VALVES:

Does the component [ ] Fail open [ ] Fail closed [X] Fail as

Is this the fail safe position? [X] Yes [ ] No (*)

Is the valve used for throttling purposes? [ ] Yes [X] No

Is the valve part of the reactor coolant pressure boundary [X] Yes [ ] No

Does the valve have a specific limit for leakage? [X] Yes [ ] No

If "Yes" give limit: 15 ml/hr
Ref. Article 8, Form 273D per Article 202.I.d of Specification K-2882.

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code, Section III, Div. 1, Edition 1977 with Winter 1977 Addenda and Code Case No. N-154 (1791).

2. Reference those qualification standards, used as a guide to qualify the component: IEEE-323-1974, IEEE-382-1972, IEEE-344-1975

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

Deleted:	Modified:
None	None

4. Have acceptance criteria been established and documented in the test plan(s) for the component? Yes [X] No [ ] Ref. Document: Documented in EQ-CL009.

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

None

6. Are the margins* identified in the qualification documentation? [X] Yes [] No
Ref. Documents: Inherent margins are discussed in detail in Tab C of EQ-CL009.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed: NA

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. _____)
Rev. _____.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal [] Mechanical
Ref. Doc. _____.

h. [] Flow performance
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis [] Test [x] Combination

Identify VALVE tests performed:

b. [X] Shell hydrostatic (ASME Section III)
Ref. Doc. Vendor's Final Hydro Test Report.

b. [X] Cold cyclic
List times: Open 6.38 sec. Closed 6.53 sec.
Ref Vendor's Certificate of Test.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [X] Seismic loading
Ref. SQ-CL203

d. [ ] Hot cyclic
Lists times: Open _____
Closed _____
Ref. _____

e. [X] Exploratory vibration (Fundamental freq. 30.6 Hz)
Ref. SQ-CL203

f. [X] Main seat leakage
Ref. Vendor's Final Hydro Test Report

g. [X] Aging: [X] Thermal [X] Mechanical
Ref. EQ-CL009

h. [X] Back seat leakage
Ref. Vendor's Final Hydro Test Report

i. [ ] Pipe reaction end loading
Ref. _____

j. [X] Disc hydrostatic
Ref. Vendor's Final Hydro Test Report

k. [X] Extreme environment
[X] Humidity
[ ] Chemical
[X] Radiation
Ref. EQ-CL009

l. [ ] Flow interruption
Ref. _____

m. [ ] Flow characteristics
Are curves provided?
Ref. _____
[ ] Yes [X] No

n. [ ] Others _____

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [ ] Yes [X] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [ ] Yes [X] No If "No", is installed component [ ] oversized or [X] undersized?
(See Attachment A Note 2)

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

12. Is component orientation sensitive? [X] Yes [ ] No [ ] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [ ] Yes [X] No (See Attachment A Note 1)

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[X] Yes [ ] No [ ] Unknown

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

If "Yes" identify sequence, (e.g., radiation, seismic, cyclic, thermal, etc.): Thermal, Mechanical, Radiation, Seismic & LOCA

15. If "aging"* was performed, identify the significant aging mechanisms: Thermal, Mechanical, Radiation

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

a. [ ] Plants (shutdown loads) b. [X] Extreme environment

c. [X] Seismic load d. [X] Others LOCA/HELB Pool Dynamic and Operating Loads.

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[ ] Yes [X] No

If "Yes", identify:

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

If "Yes", identify:

20. Is the qualified life for the component less than 40 years?
[ ] Yes [X] No If "Yes", what is the qualified life?

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

	Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
1)	SA493726 Rev. A	Seismic Calculation	03/09/84	Rockwell International	S&L/CQD (SQ-CL232)
2)	ENG. RPT 84-08	Static Deflection Testing of Electric Motor Operated 1-1/2" Stainless Steel Valve	10/05/84	Rockwell International	S&L/CQD (SQ-CL232)
3)	B-0058	Limitorque Valve Actuator Qualification for Nuclear Service Report.	01/11/80	Limitorque Corporation	S&L/CQD (EQ-CL009)
4)	10959	Dynamic Qualification Report on Two Valves	12/24/81	Structural Dynamics Research Corporation	S&L/CQD (SQ-CL203)
5)	CQD-000731 Rev. 0	Summary Report for Limitorque Valve Operators Testing Program.	01/15/82	S&L/CQD	S&L/CQD (SQ-CL203)
6)	B0037	Seismic Qualification Envelope, Limitorque Valve Actuators	01/11/80	Limitorque Corporation	S&L/CQD (SQ-CL203)
7)	MEQ-CL085	Environmental Qualification of Rockwell Globe Valves	07/17/85	S&L/CQD	S&L/CQD (MEQ-CL085)

ATTACHMENT A

NOTE 1: The valve assembly is not orientation-sensitive from a seismic point of view. However from the environmental view point the valve assembly is sensitive to orientation. To prevent possible intrusion of lubricant into the motor, the motor should not be mounted vertically downward; it should be horizontally mounted. Also in order to prevent flooding of the limit switch, the limit switch compartment should not be oriented facing vertically down.

NOTE 2: For environmental qualification tests a model (SMB-0-25) larger and for seismic qualification tests a model (SMB-000) smaller than the subject component was used.

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

System Engineer Review Richard Hall Date 11-8-85

Equipment Qual. Review M. E. Helmick Date 11/8/85

Electrical Engineer Review Not Applicable Date _____

C&I Engineer Review Not Applicable Date _____

Reconciliation of IPC Walkdown Results

_____ Date _____

REFERENCES

1) Terry Corporation Drawing #96553E sheets 1 and 2

2) Terry Corporation Drawing #71996D

3) SQ-CL617, Dynamic Qualification of Reactor Core Isolation Cooling Turbine, 1E51-C002

4) SQ-CL706, Dynamic Qualification of Reactor Core Isolation Cooling Pump, 1E51-C001

5) General Electric Drawing #105D5646

6) Sargent & Lundy Drawing #M04-1106

7) Bingham Pump Company Drawing FD-16210287

8) 21A9443AY Purchase Specification Data Sheet dated 9/15/76 General Electric Co.

9) VPF 4062-89-4 Pump Vendor Instruction Manual dated 9/13/78 Bingham-Willamette General Electric

10) 762E421AA RCIC Process Diagram Revision 1 General Electric Co.

11) 22A3124 RCIC System Design Spec., Rev. 5, General Electric

12) S.O. 16210287 Quality Assurance Records Binder dated 6/12/79 Bingham-Willamette

Illinois Power Company
Clinton Power Station

PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461
3. Utility: Illinois Power Company
4. NSSS: General Electric Co. [ ] PWR [x] BWR
5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [x] NSSS [ ] BOP Specification K-2801
2. Location:
   a. Building/Room Auxiliary
   b. Elevation 707'-6"
   c. System Reactor Core Isolation Cooling
3. Component number on in-house drawings: 1E51-C001 (Pump), 1E51-C002 (Turbine), 1E51-C002E (Valve)
4. If component is a [x] Pump complete II.5.
   If component is a [x] Valve complete II.6.
5. General Pump Data

a. Pump (1E51-C001)	b. Prime-mover (1E51-C002)
Name Reactor Core Isolation Cooling Pump	Name Reactor Core Isolation Cooling Pump Turbine
Mfg. Bingham Willamette Corp.	Mfg. Terry Corporation
Model 6x6x10½CP, 4-stage	Model GS-2
S/N 16210287	S/N T-38187-A
Type Horizontal Double Case Type CP Centrifugal	Type Steam Driven Turbine

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

a. Pump (continued)

Size 28DX 21CKXL 4-stage VMT
Weight 6600 lbs. (Dry)

Mounting Method Bolted to floor

Required B.H.P. 725 (8)

Parameter	Design	Operating
Press	1525 psi (9)	1419 psi (9&10)
Temp	40-140 F (9)	40-140 F (9)
Flow (design)	625 gpm (9)	625 gpm (9)
Head (mini-flow)	2980 ft. (9)	2980 ft. (9)

Required NPSH at maximum Flow 625 gpm, 18.4 ft. (8) (9)

Available NPSH 21 ft. (8)

Operating Speed 2250 -4450 rpm (8)

Critical Speed N/A

List functional accessories:*

None: All are provided by manufacturer

List control signal inputs:

Inputs are to pump driver

b. Prime-mover (continued)

Size

Weight

Mounting Method

H.P.

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

Electrical N/A

Other

If Motor list:

Duty cycle N/A

Stall current N/A

Class of insulation N/A

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

III. FUNCTION

1. Briefly describe components normal and safety functions: Stand-by system which is manually started on a periodic basis to assure its operability. (11)
Safety: Automatically initiated by reactor low water level to provide vessel water inventory during reactor isolation with loss of normal feedwater, and during the control rod drop accident. (11)

2. The components normal state is: [] Operating [X] Standby

3. Safety function:

a. [] Emergency reactor shutdown
b. [] Containment heat removal
c. [] Containment isolation
d. [] Reactor heat removal
e. [X] 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? [X] Yes [] No
If "Yes", identify.

[] LOCA [] HELB [] MSLB

[X] Other Reactor isolation and the control rod drop accident (11)

4. Safety requirements:

[X] Intermittent Operation [X] 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.

N/A (e.g., hours, days, etc.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

a. Pump (continued)

Size
Weight

Mounting Method

Required B.H.P.

Parameter	Design	Operating
Press		
Temp		
Flow		
Head		

Required NPSH at maximum Flow

Available NPSH

Operating Speed

Critical Speed /Ref.

b. Prime-mover (continued)

Size 6339PY36 (Frame)
Weight 7600 lbs

Mounting Method Bolted to Base Pump

700 HP @ 4550 RPM
H.P. 120 HP @ 2300 RPM

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

Electrical 120 VDC ± 10% for instrumentation, 48 VDC for turbine controls

Other

If Motor list:

Duty cycle

Stall current

Class of insulation

List functional accessories:* All turbine accessories are provided by the turbine manufacturer. Refer to the Turbine Instruction Manual, VPF 3927-7.

List control signal inputs: Reactor low water level

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

III. FUNCTION

1. Briefly describe components normal and safety functions: Standby System which is manually started on a periodic basis to assure its operability. Automatically initiated by reactor low water level to provide vessel water inventory during reactor isolation with loss of normal feedwater, and during the control rol drop accident.

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [ ] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [ ] Containment isolation

d. [ ] Reactor heat removal

e. [X] 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? [X] Yes [ ] No
If "Yes", identify.

[ ] LOCA [ ] HELB [ ] MSLB

[X] Other Reactor Isolation and the Control Rod Drop Accident

4. Safety requirements:

[X] Intermittent Operation [X] 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.

N/A (e.g., hours, days, etc.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

General Valve Data (1E51-C002E)

a. Valve

Name Trip and Throttle Valve
Mfg. Gimpel
Model N/A
S/N 74-12218
Type Mechanical Plug
Size 4"
Weight 600 lbs.
Mounting Method Bolted to flange on Turbine inlet.
Required Torque N/A

b. Actuator (if not an integral unit)

Name Not applicable, doesn't perform safety function.
Mfg.
Model
S/N
Type
Size
Weight
Mounting Method
Torque

Ref.: Valve Data Sheet No.

Parameter	Design	Operating
Press	1250 psig	1135-135 psig
Temp	575 F	Ref. 10
Flow	Ref. 10	Ref. 10

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

Max ΔP across valve N/A Ref. N/A - Not critical to turbine operation

Closing time @ max dP 0.3 sec /Ref. Turbine Manual

Other: []Pneumatic []Hydraulic

Opening time @ max dP N/A /Ref. N/A

None

Power requirements for functional accessories, (if any) 120 VDC

List control signal inputs: 120 VDC trip signal, either automatic or manual

List functional accessories: Trip solenoid, position indicating limit switches

III. FUNCTION

1. Briefly describe components normal and safety functions: Normally mechanically latched in the open position. Safety function is to protect the turbine/system via automatic or remote manual trip signal.

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [ ] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [ ] Containment isolation

d. [ ] Reactor heat removal

e. [X] 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? [X] Yes [ ] No
If "Yes", identify.

[ ] LOCA [ ] HELB [ ] MSLB

[X] Other Reactor Isolation and the Control Rod Drop Accident

4. Safety requirements:

[X] Intermittent Operation [X] 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.

N/A (e.g., hours, days, etc.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [X] Fail open [ ] Fail closed [ ] Fail as

Is this the fail safe position? [X] Yes [ ] No

Is the valve used for throttling purposes? [ ] Yes [X] No

Is the valve part of the reactor coolant pressure boundary?
[ ] Yes [X] No

Does the valve have a specific limit for leakage?
[ ] Yes [X] No

If "Yes" give limit: _____

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: Notes 1, 2, &3 for the pump, turbine, and valve respectively of Attachment A.

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

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

Deleted:	Modified:
None	None

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [X] No [ ] Ref. Document: 3 and 4

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

6. Are the margins* identified in the qualification documentation? [x] Yes [ ] No
Ref. Documents: 3 and 4.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

7. Pump operability has been demonstrated by: [ ] Analysis
[ ] Test [x] Combination

Identify PUMP tests performed:

a. [ ] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [ ] Bearing temperature evaluations

c. [x] Seismic loading
Ref. 3.

d. [ ] Vibration levels

e. [ ] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [ ] Seal leakage @ hydro press

g. [ ] Aging: [ ] Thermal
[ ] Mechanical
Ref. Doc. _____.

h. [ ] Flow performance
Are curves provided [ ] Yes [ ] No
Ref. _____

i. [x] Pipe reaction end loads (nozzle loads)
Ref. Doc. 3.

j. [x] Others Pool Dynamics, Pressure, and Operating Loads

k. [ ] Extreme environment:
[ ] Humidity
[ ] Chemical
[ ] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [ ] Analysis
[ ] Test [x] Combination

Identify VALVE tests performed:

b. [ ] Shell hydrostatic (ASME Section III)
Ref. Doc. _____.

b. [ ] Cold cyclic
List times: Open _____
Closed _____
Ref. _____.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [x] Seismic loading

Ref. 3

d. [] Hot cyclic
Lists times: Open _____
Closed _____

Ref. _____

e. [x] Exploratory vibration (Fundamental Freq. 16 H_z)

Ref. 3

f. [] Main seat leakage

Ref. _____

g. [] Aging: [] Thermal [] Mechanical

Ref. _____

h. [] Back seat leakage

Ref. _____

i. [x] Pipe reaction end loading

Ref. 3

j. [ ] Disc hydrostatic

Ref. _____

k. [] Extreme environment

[] Humidity

[] Chemical

[] Radiation

Ref. _____

l. [] Flow interruption capability

Ref. _____

m. [] Flow characteristics
Are curves provided?
[] Yes [] No

Ref. _____

n. [x] Others Pool Dynamics, Pressure, and Operating Loads

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [x] Yes [] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

See Attachment A.

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [x] 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 Not applicable.

12. Is component orientation sensitive? [x] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [x] Yes [] No

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[x] Yes [] No [] Unknown

14. Were the qualification tests performed in sequence and on only one component? [] Yes [] No Not applicable.

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

15. If "aging"* was performed, identify the significant aging mechanisms: Not applicable

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

a. [] Plants (shutdown loads) b. [] Extreme environment

c. [x] Seismic load d. [x] Others Pool Dynamics, Pressure, Nozzle, and Operating Loads.

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [x] Yes [] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[] Yes [x] No

If "Yes", identify: _____

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

If "Yes", identify: _____

20. Is the qualified life for the component less than 40 years?
[] Yes [x] No If "Yes", what is the qualified life? _____

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
DRF E51-00101	New Loads Analysis Report	12/10/81	General Electric	S&L/CQD SQ-CL706
VPF 5507-12-1	Seismic Analysis Reactor Core Isolation Cooling Pump 6x6x10½ CP - 4-Stage ASME Section III, Class 2	08/23/78	Bingham-Willamette Company	S&L/CQD SQ-CL706
20458	Environmental Qualification Report For GS-2N RCIC Turbine Electrical Accessories And Electronic Control System	04/21/80	Terry Corporation	S&L/CQD SQ-CL617
20397	Environmental Qualification Test Specification For GS-Type RCIC Turbine Electrical Accessories And Electronic Control System	01/09/79	Terry Corporation	S&L/CQD SQ-CL617
781098-2	Qualification Test Plan Of Turbine And Related Control Panel For Terry Corporation	01/25/80	Wyle	S&L/CQD SQ-CL617
58412	Qualification Test Program On GS-2N Turbine Electronic Control System And Electrical Accessories For Terry Corporation	04/14/80	Wyle	S&L/CQD SQ-CL617

ATTACHMENT A

The following are the Anomalies due to seismic testing:

Anomaly #3: The turbine tripped during the SSE run. Investigation after the run revealed loose flange bolting at interface of the governor valve and turbine casing. This caused excessive displacement in the turbine throttle valve.

Resolution: The flange was secured and the SSE was repeated successfully.

Anomaly #4: During the resonance search and the first OBE test in the Z-Y axis, it was observed that the oil header to the coupling and bearing had excessive displacement.

Resolution: The piping was supported at Terry Corp. request. Testing continued.

Anomaly #7: Switch (temperature) would not function at any temperature set point. Also, the switch could not be calibrated.

Resolution: The temperature switch is not essential to the operation of the turbine. This switch serves an alarm function only. Note that the failure mode of the switch would not result in an erroneous alarm signal.

Notes: 1. ASME Code, Section III, Class II, NC-3400, Edition 1974, Winter 1975 Addenda

2. Applicable Sections of design codes and standards applicable to the component: None required, but the following codes were used (to the extent defined in the Equipment Spec.):
ASME B&P Code, Section III, VIII, and IX, ASTM E-71, E-94, E-142, E-186, and E-280

3. Applicable Sections of design codes and standards applicable to the component: None required, but the following codes were used (to the extent defined in the Equipment Spec.):
ASME B&P Code, Section III, VIII and IX, ASTM E-71, E-94, E-142, E-186, and E-280

Pump Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. A

System Engineer Review J Wolcika Date 11/8/85

Equipment Qual. Review Michael E. Hohmuth Date 11/8/85

Electrical Engineer Review Robert N Beaver Date 11-8-85

C&I Engineer Review Ozzie Kental Date 11-8-85

Reconcilation of IPC Walkdown Results

_____ Date _____

References

1. S&L Specification K-2873A, Amendment 4, (01-28-82)

2. S&L Drawing M06-1002, Sheet 15, Revision AL (10-15-84)

3. Anderson Greenwood & Co. Drawing No. 4-2508-530, Sheet 1, Revision B, (07-06-82)

4. G. E. Drawing 768E584, Revision 3, "Purchase Part Valve, Safety Relief, Nuclear Boiler System", (03-27-79)

5. S&L Drawing M05-1002, Sheet 1, Revision H (08-06-85)

6. IPC Record Package For Document Record Number: Baldwin Associates P.O. C38368, RIR Number S18172, Valve Serial Number N-18870.

7. GESSAR II, General Electric Document Number 22A7000, "Amendment 2 to the 238 Nuclear Island General Electric, Standard Safety Analysis Report, (06-15-81)

8. SQ-CL197, Dynamic Qualification of Anderson Greendwood & Co. Vacuum Breaker Valves.

9. MEQ-CL096, Environmental Qualification of Anderson Greenwood & Co. Vacuum Relief Valves.

10. Anderson Greenwood & Co. Report No. 5-9025-169, "Design Report-Type CV1B Wafer Check Valve 10 inch ANSI Class 3"(10/27/84)

11. Anderson Greenwood Co. Report N05-9025-173 "Resonance Search Report - 10" Vacuum Breaker Valve", (1/21/83)

12. Anderson Greenwood Co. Report N05-9005-128 "Test Report - 10" 300# Vacuum Breaker Valve, Clinton Power Station", (9/20/83)

Illinois Power Company
Clinton Power Station

PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461
3. Utility: Illinois Power Company
4. NSSS: General Electric Co. [ ] PWR [x] BWR
5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [ ] NSSS [X] BOP Specification K-2873A
2. Location:
   a. Building/Room Containment/Drywell (H-27)
   b. Elevation 761'-6" (Ref 2)
   c. System Nuclear Boiler
3. Component number on in-house drawings: 1B21-F037A
4. If component is a [ ] Pump complete II.5.
   If component is a [X] Valve complete II.6.
5. General Pump Data

a. Pump		b. Prime-mover	
Name	NA	Name	NA
Mfg.	NA	Mfg.	NA
Model	NA	Model	NA
S/N	NA	S/N	NA
Type	NA	Type	NA

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

a. Pump (continued)

Size NA
Weight NA

Mounting Method NA

Required B.H.P. NA

Parameter	Design	Operating
Press	NA	NA
Temp	NA	NA
Flow	NA	NA
Head	NA	NA

Required NPSH at maximum

Flow NA

Available NPSH NA

Operating Speed NA

Critical Speed NA /Ref. NA

List functional accessories:* NA

List control signal inputs: NA

b. Prime-mover (continued)

Size NA
Weight NA

Mounting Method NA

H.P. NA

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

Electrical NA

Other NA

If Motor list:

Duty cycle NA

Stall current NA

Class of insulation NA

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve (Ref. 3)

Name: Main Steam SRV Discharge Line Vacuum Relief Valve
Mfg. Anderson, Greenwood & Co.
Model CV1B-1030 SCR-N-8
S/N N-18870 (Ref 6)
Type Wafer Style Check Valve
Size 10 inch
Weight 300 lbs.
Mounting Method: Bolted to Flange in pipeline
Required Torque: NA-No Operator

b. Actuator (if not an integral unit)

NA: Valve is operated by ΔP across valve

Name NA
Mfg. NA
Model NA
S/N NA
Type NA
Size NA
Weight NA
Mounting Method NA
Torque NA

Ref.: Valve Data Sheet No.

Parameter	Design	Operating
Press	625 (Ref. 1)	563 (Ref. 4)
Temp(°F)	494 (Ref. 1)	494 (Ref. 4)
Flow(scfm)	4400@ 0.5 psid(Ref.1)	See Attachment A, Note 2

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

Max $\bar{\Delta}$ P across valve 563 psig Ref. NA

Closing time @ max $\bar{\Delta}$ P NA /Ref. NA

Opening time @ max $\bar{\Delta}$ P 0.2 sec /Ref. 1, p.3-3, Section 303.3b

Other: []Pneumatic[]Hydraulic NA

Power requirements for functional accessories, (if any) None

List control signal inputs: None

List functional accessories: None

III. FUNCTION

1. Briefly describe components normal and safety functions: The normal function is to be in the closed position. The safety function of the valve is to provide vacuum relief in the MSRV line if necessary following SRV discharge. In addition, this valve when closed is part of the pressure boundary during the next blowdown. The valve is shown in Reference 5.

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [X] 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? [X] Yes [ ] No
If "Yes", identify.

[X] LOCA [X] HELB [X] MSLB

[X] Other Prevents formation of high water leg in SRV discharge line following SRV discharge.

4. Safety requirements:

[X] Intermittent Operation [ ] During postulated event

[ ] Continuous Operation [X] 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.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [] Fail open [] Fail closed [] Fail as See Attachment A, Note 1

Is this the fail safe position? [] Yes [] No See Attachment A, Note 1

Is the valve used for throttling purposes? [] Yes [X] No

Is the valve part of the reactor coolant pressure boundary
[] Yes [X] No

Does the valve have a specific limit for leakage?
[X] Yes []No

If "Yes" give limit: 20cc/hr (Ref., P3.3-3, 303.3d)

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code Section III, Class 3 Subarticle ND-3500, Edition 1980, Addenda Summer 1981.

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

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

Deleted:	Modified:
None	None

4. Have acceptance criteria been established and documented in the test plan(s) for the component? N/A
Yes [] No [] Ref. Document: "N Qualification by Analysis"

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

6. Are the margins* identified in the qualification documentation? [X] Yes [] No
Ref. Documents: 9

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

NOT APPLICABLE

7. Pump operability has been demonstrated by: [] Analysis [] Test [] Combination NA

Identify PUMP tests performed: NA

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal [] Mechanical
Ref. Doc. _____.

h. [] Flow performance
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis [] Test [x] Combination

Identify VALVE tests performed:

a. [X] Shell hydrostatic (ASME Section III)
Ref. Doc. 10.

b. [ ] Cold cyclic
List times: Open _____
Closed _____
Ref. _____.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [ ] Seismic loading

d. [] Hot cyclic
Lists times: Open _____
Closed _____
Ref. _____.

e. [X] Exploratory vibration
(Fundamental freq. 145Hz)
Ref. 11.

f. [X] Main seat leakage
Ref. 10

g. [] Aging: [] Thermal
[] Mechanical
Ref. _____.

h. [] Back seat leakage
Ref. _____

i. [X] Pipe reaction end loading
Ref. NA - mounted by flange to pipe on one side only.

j. [ ] Disc hydrostatic
Ref. _____

k. [] Extreme environment
Ref. 9.
[] Humidity
[] Chemical
[] Radiation
Ref. _____

l. [] Flow interruption capability
Ref. _____

m. [] Flow characteristics
Are curves provided?
[] Yes [] No
Ref. _____.

n. [X] Others Impact Loads
Ref. 12

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [] Yes [X] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____

_____

_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [] No If "No", is installed component [] oversized or [] undersized? N/A "N/A QUALIFICATION BY ANALYSIS"

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 "N/A QUALIFICATION BY ANALYSIS"

12. Is component orientation sensitive? [X] *Yes [] No [] Unknown If "Yes", does installed orientation coincide with qualified orientation? [X] Yes [] No

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.) [X] Yes [] No [] Unknown

14. Were the qualification tests performed in sequence and on only one component? [] Yes [] No N/A "N/A Qualification by Analysis"

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

15. If "aging"* was performed, identify the significant aging mechanisms: N/A "N/A Qualification by Analysis"

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

c. [] Plants (shutdown loads)

b. [X] Extreme environment Ref. 9

c. [X] Seismic load Ref. 8

d. [X] Others Impact loads. Pressure Loads & Pool Dynamic Loads

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[] Yes [X] No

If "Yes", identify: _____

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

If "Yes", identify: Ref. 9

20. Is the qualified life for the component less than 40 years?
[] Yes [X] No If "Yes", what is the qualified life? _____

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* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organization Preparing Report	Company/Organization Reviewing Report
N05-9025-173	Resonance Search Report - 10" Vacuum Breaker Valve.	1/21/83	Anderson, Greenwood & Company.	S&L/CQD SQ-CL197
N05-9025-169	Design Report - Type CVIB Wafer Check Valve 10" ANSI Class 3.	10/27/82	Anderson, Greenwood & Company.	S&L/CQD SQ-CL197
N05-9005-128	Test Report - 10" 300# Vacuum Breaker Clinton Power Station.	09/20/83	Anderson, Greenwood & Company.	S&L/CQD SQ-CL197
N/A	Environmental Qualification of Anderson, Greenwood & Company Vacuum Relief Valves.	10/22/85	S&L/CQD	S&L/CQD MEQ-CL096

ATTACHMENT A

Note 1

There are two parallel vacuum relief valves connected to each MSRV discharge line. Vacuum relief is ensured even if one valve should fail close due to the use of redundant parallel vacuum relief valves.

If one of the vacuum relief valves fails open, some steam will be discharged into the drywell air space. Since the time the MSRV's are normally open is short, the steam discharge through the failed vacuum relief valve should present no significant problems. If the MSRV's are ever left continuously open, the presence of a stuck open vacuum relief valve on a MSRV discharge line could cause a sizeable steam release to the drywell. However, this release of steam to the drywell would be less severe than the design bases.

Note 2

The size of the SRVDL Vacuum Breakers were specified to conform with the requirements set forth in GESSAR-II (Reference 7, Subsection 3BA.4.2.3).

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

System Engineer Review Richard Hall Date 11-11-85

Equipment Qual. Review NKmadan Date 11-08-85

Electrical Engineer Review Not Applicable Date

C&I Engineer Review Ogun Kantel Date 11-8-85

Reconcilation of IPC Walkdown Results

_____ Date

REFERENCES

1) Specification K-2882, Amendment 12

2) P&ID M05-1079 Sht 2 Rev. P

3) Valve Data Sheet CV-007 dated 3-08-79
Valve Data Table DT-009

4) Vendor Drawings:

Target Rock Drawing 71010-4 Sht 1
Target Rock Drawing 81DD-001 Rev. A

5) Seismic Qualification Package SQ-CL212 for Target Rock Regulating Valves, Model Nos. 81DD-001, 002, 003

6) Mechanical Environmental Package MEQ-CL099 for Target Rock Pressure Regulating Valves

7) Target Rock Production Test Data Sheet
Code Data Report Form NPV-1

8) P&ID M05-1079-1, Rev. S

9) Single Line Drawing M07-1079-1, Rev. W

10) Isometric Drawing RI-761, Rev. 14

11) General Electric Documents: 22A3124, Rev. 5
22A3124BK, Rev. 1
762E421AA, Rev. 0

12) Target Rock Corporation Letter C3721, dated June 9, 1983

Illinois Power Company
Clinton Power Station

PUMP AND VALVE
OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461
3. Utility: Illinois Power Company
4. NSSS: General Electric Co. [] PWR [x] BWR
5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [X] BOP Specification K-2882
2. Location: a. Building/Room Aux. Building
   b. Elevation 709'-0"
   c. System Reactor Core Isolation Cooling
3. Component number on in-house drawings: 1E51-F015
4. If component is a [] Pump complete II.5.
   If component is a [X] Valve complete II.6.
5. General Pump Data

a. Pump	b. Prime-mover
Name	Name
Mfg.	Mfg.
Model N/A	Model
S/N	S/N
Type	Type

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

a. Pump (continued)

Size _____
Weight _____

Mounting Method _____ N/A

Required B.H.P. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____
Head	_____	_____

Required NPSH at maximum

Flow _____

Available NPSH _____

Operating Speed _____

Critical Speed _____ /Ref. _____

List functional accessories:* _____

_____

_____

List control signal inputs: _____

_____

_____

b. Prime-mover (continued)

Size _____
Weight _____

Mounting Method _____

H.P. _____

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

Electrical _____

_____

_____

Other _____

_____

If Motor list:

Duty cycle _____

Stall current _____

Class of insulation _____

_____

_____

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve		b. Actuator (if not an integral unit)	
Name	Self-contained Pressure Regulator	Name	N/A
Mfg.	Target Rock Corp.	Mfg.	
Model	81 DD-001	Model	
S/N	01	S/N	
Type	Globe	Type	
Size	2"	Size	
Weight	22 lbs.	Weight	
Mounting Method	Socket weld to pipe	Mounting Method	
Required Torque	N/A	Torque	

Ref.: Valve Data Sheet No. CV-007

Parameter	Design	Operating	Power requirements: (include normal, maximum and minimum).
Press	1500 psig	181 psig to 1500 psig	Electrical N/A
Temp	170°F	140°F	
Flow	16 gpm	16 gpm	

Max ΔP across valve 1500 psi Ref.

Closing time @ max ΔP N/A Other: []Pneumatic []Hydraulic
/Ref. not required
Opening time @ max ΔP N/A N/A
/Ref. not required
Power requirements for functional
accessories, (if any) N/A

List control signal inputs: None

List functional accessories: None

III. FUNCTION

1. Briefly describe components normal and safety functions: Valve is normally isolated by valve 1E51-F046 and not operating. Safety function is to control downstream pressure and limit flow of cooling water to RCIC turbine oil cooler.

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [ ] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [ ] Containment isolation

d. [ ] Reactor heat removal

e. [X] 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? [X] Yes [ ] No
If "Yes", identify.

[ ] LOCA [ ] HELB [ ] MSLB

[X] Other Control-rod Drop Accident & Loss of F.W. Transient.

4. Safety requirements:

[X] Intermittent Operation [X] 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.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [X] Fail open [ ] Fail closed [ ] Fail a

Is this the fail safe position? [X] Yes [ ] No

Is the valve used for throttling purposes? [X] Yes [ ] No

Is the valve part of the reactor coolant pressure bounda
[ ] Yes [X] No

Does the valve have a specific limit for leakage?
[X] Yes [ ] No

If "Yes" give limit: 6cc/min.
Ref. Spec. K-2882-17,
Std. Form, ANSI B16.104.

IV. QUALIFICATION

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

ASME Code, Section III, 1974 Edition w/1974 Summer Addenda

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

IEEE-344-1975

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

Deleted:	Modified:
None	None

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [ ] No [X] Ref. Document: No test conducted

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

None

6. Are the margins* identified in the qualification documentation? [] Yes [] No N/A
Ref. Documents: Qualification is by analysis.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed: N/A

a. [] Shell hydrostatic (ASME Section III)
Ref. _____

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. ____)
Rev. _____

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal [] Mechanical
Ref. Doc. _____

h. [] Flow performance
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____

8. Valve operability has been demonstrated by: [] Analysis [] Test [x] Combination

Identify VALVE tests performed:

b. [x] Shell hydrostatic (ASME Section III)
Ref. Doc. Mfgr. Test Report .

b. [ ] Cold cyclic
List times: Open _____ Closed _____
Ref. _____

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c.** [ ] Seismic loading

d. [] Hot cyclic
Lists times: Open _____
Closed _____
Ref. _____.

e. [] Exploratory vibration
Ref. _____.

f. [X] Main seat leakage
Ref. _____.

g. [] Aging: [] Thermal
[] Mechanical
Ref. _____.

h. [] Back seat leakage
Ref. Mfgr. Test Report

i. [] Pipe reaction end loading
Ref. _____.

j. [ ] Disc hydrostatic
Ref. _____

k. [] Extreme environment
[] Humidity
[] Chemical
[] Radiation
Ref. _____

l. [] Flow interruption capability
Ref. _____

m. [] Flow characteristics
Are curves provided?
Ref. _____.
[] Yes [X] No

n. [X] Others 1) Diaphragm Hydro.
2) Operational Test.

9. As a result of any of the test (or analysis), were any deviations from design requirements identified? [] Yes [X] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____

_____

_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [X] Yes [] No If "No", is installed component [] oversized or [] undersized? (qualification by analysis)

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 qualified orientation? [] Yes [] No

13.** Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.) [] Yes [] No [] Unknown

**NOTE: NO SEISMIC TEST WAS CONDUCTED AND NO 1E COMPONENTS ARE INVOLVED. HENCE, SECTIONS 8.c, 8.e, 8.g, 8.i, 8.k and 11 to 15 ARE NOT APPLICABLE.

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"* was performed, identify the significant aging mechanisms: _____

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

c. [] Plants (shutdown loads) b. [] Extreme environment

c. [X] Seismic load d. [X] Others Pool Dynamic and Operating Loads

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[] Yes [X] No

If "Yes", identify: _____

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

If "Yes", identify: _____

20. Is the qualified life for the component less than 40 years?
[] Yes [X] No If "Yes", what is the qualified life? _____

---

* As outlined in Section 4.4.1 of IEEE-627 1980.

** SEE NOTE AT BOTTOM OF PAGE C9

21. Information Concerning Qualification Documents for the Component

	Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
1.	3091 Rev. A	Design & Seismic Report of the Target Rock Corporation Pressure Regulating Valves Model Nos. 81DD-001, 002 & 003.	7-19-82	Target Rock Corp.	S&L/CQD (SQ-CL 212)
2.	CQD-022270	Environmental Qualification of Target Rock Corp. Pressure Regulating valves.	10-25-85	S&L/CQD	S&L/CQD (MEQ-CL099)

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. A

System Engineer Review J Woreika Date 11-8-85

Equipment Qual. Review N Madan Date 11-8-85

Electrical Engineer Review Robert M Beaver Date 11-8-85

C&I Engineer Review Ogun Kantal Date 11-8-85

Reconciliation of IPC Walkdown Results

_____ Date _____

REFERENCES

1. Sargent and Lundy Specification K2866B, Amendment 5, Dated July 13, 1984.

   a. Paragraph 307.3a

   b. Form 1810Q

   c. Form 271-H

2. Sargent and Lundy Valve Data Sheet No. MO-912.

3. Sargent and Lundy Valve Data Table No. OT-001.

4. Sargent and Lundy Drawings:

   a. P&ID: MOS-1075, Sheet 1, Rev. U,

   b. Electrical Schematics: EO2-1RH99-003, Rev D; -027, Rev. L; -522, Rev. F.

5. Yarway Corporation Form NPV-1 Manufacturer's Data Report and Test Data Package for Valve 1E12-F073, S/N A9550.

6. Yarway Corporation Report No. 957373-04, Dated 10-18-78, "Seismic Analysis of Yarway Corporation 1-1/2" Welbond Motorized Valve Fig. 5515B-SA10SM Forged Carbon Steel Valves for Baldwin Associates" (S&L/CQD: SQ-CL039)

7. Yarway Corporation Report No. 952917-04, Dated 11-10-80, "Operability Assurance Test Report Yarway Welbond Motor Actuated Globe Type Stop Valves for Active ASME, Section III, Class 1, 2 and 3 Service, 1-1/2" Nominal Size." (S&L/CQD: SQ-CL039).

8. S&L/CQD Report CQD-000731, Dated 1-4-82, "Summary Report for Limitorque Valve Operators Testing Program (S&L/CQD: SQ-CL142)

9. Structural Dynamics Research Corporation Report No. 10959, Dated 12-24-81, "Dynamic Qualification Report on Two Valves" (S&L/CQD: SQ-CL142)

10. Limitorque Corporation Report No. B0058, Dated 1-11-80, "Limitorque Valve Actuator Qualification for Nuclear Service" (S&L/CQD: EQ-CL009)

11. S&L/CQD Report No. CQD-014423, Dated 10-4-85, "Mechanical Environmental Qualification of Yarway Welbond Valves," (S&L/CQD: MEQ-CL083.

12. CPS -FSAR, Subsection 5.4.7.2.6(2), Amendment 5, July 1981.

Illinois Power Company
Clinton Power Station

PUMP AND VALVE
OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461

3. Utility: Illinois Power Company

4. NSSS: General Electric Co. [] PWR [x] BWR

5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [x] BOP Specification K-2866B

2. Location: a. Building/Room Drywell
b. Elevation 755'-0"
c. System Residual Heat Removal

3. Component number on in-house drawings: 1E12-F073A

4. If component is a [] Pump complete II.5.
If component is a [x] Valve complete II.6.

5. General Pump Data

a. Pump	b. Prime-mover
Name N/A	Name N/A
Mfg.	Mfg.
Model	Model
S/N	S/N
Type	Type

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

a. Pump (continued)

Size

Weight

Mounting Method N/A

Required B.H.P.

Parameter	Design	Operating
Press		
Temp		
Flow		
Head		

Required NPSH at maximum

Flow

Available NPSH

Operating Speed

Critical Speed /Ref.

List functional accessories:*

List control signal inputs:

b. Prime-mover (continued)

Size

Weight

Mounting Method

H.P.

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

Electrical

If Motor list:

Duty cycle

Stall current

Class of insulation

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve	b. Actuator (if not an integral unit)
Name Yarway Welbond Valves	Name Actuator
Mfg. Yarway Corporation	Mfg. Limitorque Corporation
Model Fig. No. 5515B-SA105M	Model SMB-000
S/N A9550	S/N 300406
Type Globe	Type Electric
Size 1-1/2"	Size 5 Ft.-Lb., 0.33 HP
Weight 207 Lbs. (Total Wt. of Valve Assy.)	Weight 145 Lbs.
Mounting Method Socket Welding	Mounting Method Bolted to Yoke
Required Torque 75 ft-lbs (Ref. Dwg. No. 045758	Torque 178 ft-lbs Ref. SQ-CL039

Ref.: Valve Data Sheet No. MO-912

Parameter	Design	Operating
Press	500 psig	200 psig
Temp	480 °F	388 °F
Flow	(See Attachment B, Note 1)	

Power requirements: (include normal, maximum and minimum).
Electrical 460V AC ± 10%

Max ΔP across valve 500 psig Ref. 1.b

Closing time @ max ΔP 22.5 sec. /Ref. 1.a Other: []Pneumatic []Hydraulic

Opening time @ max ΔP 22.5 sec. /Ref. 1.a Not Applicable

Power requirements for functional accessories, (if any) Not Applicable

List control signal inputs: See Attachment B, Note 2

List functional accessories: None

III. FUNCTION

1. Briefly describe components normal and safety functions: Normal function is to be in closed position. Safety function is to open for venting RHR heat exchanger when RHR system is in the steam condensing mode, and to close for containment isolation.

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [ ] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [X] Containment isolation

d. [X] Reactor heat removal

e. [X] 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? [X] Yes [ ] No
If "Yes", identify.

[X] LOCA [ ] HELB [ ] MSLB

[X] Other Control Rod Drop Accident

4. Safety requirements:

[X] Intermittent Operation

[ ] Continuous Operation

[X] During postulated event

[X] 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.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [] Fail open [] Fail closed [X] Fail as

Is this the fail safe position? [X] Yes [] No

Is the valve used for throttling purposes? [] Yes [X] No

Is the valve part of the reactor coolant pressure boundary
[] Yes [X] No

Does the valve have a specific limit for leakage?
[X] Yes []No

If "Yes" give limit: 15cc/Hr. (Ref. 1.c)

IV. QUALIFICATION

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

ASME Code, Section III, 1974 Edition with Winter 1975 Addenda and Code Case No. 1516-2.

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

IEE 323-1974, IEEE 382-1972, IEEE 344-1975

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

Deleted: None

Modified: None

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [X] No [] Ref. Document: EQ-CL009 & SQ-CL142

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

None

6. Are the margins* identified in the qualification documentation? [x] Yes [] No
Ref. Documents: EQ-CL009 (Tab C).

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed: N/A

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. ____)
Rev. _____

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal [] Mechanical
Ref. Doc. _____.

h. [] Flow performance
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis [] Test [x] Combination

Identify VALVE tests performed:

a. [x] Shell hydrostatic (ASME Section III)
Ref. Doc. Ref. 5.

b. [ ] Cold cyclic
List times: Open _____
Closed _____
Ref. _____.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [x] Seismic loading
Ref. SQ-CL142

d. [] Hot cyclic
Lists times: Open _____
Closed _____
Ref. _____

e. [] Exploratory vibration
Ref. _____

f. [x] Main seat leakage
Ref. 5

g. [x] Aging: [x] Thermal
[x] Mechanical
Ref. EQ-CL009

h. [x] Back seat leakage
Ref. 5

i. [] Pipe reaction end loading
Ref. _____

j. [x] Disc hydrostatic
Ref. 5

k. [X] Extreme environment
[X] Humidity
[] Chemical
[X] Radiation
Ref. EQ-CL009

l. [] Flow interruption capability
Ref. _____

m. [] Flow characteristics
Are curves provided?
[] Yes [] No
Ref. _____

n. [] Others _____

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [] Yes [x] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____

_____

_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [x] No If "No", is installed component [] oversized or [x] undersized? (See Attachment A, Note 2.

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

12. Is component orientation sensitive? [x] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [] Yes [x] No (Test was conducted in the worst orientation, See Attachment A, Note 1

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[x] Yes [] No [] Unknown

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

If "Yes" identify sequence, (e.g., radiation, seismic, cyclic, thermal, etc.): Thermal, Cyclic, Radiation, Seismic and LOCA

15. If "aging"* was performed, identify the significant aging mechanisms: Thermal, Mechanical, Radiation

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

a. [ ] Plants (shutdown loads) b. [X] Extreme environment

c. [X] Seismic load d. [X] Others LOCA/HELB Operating Loads & Pool Dynamic Loads.

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[ ] Yes [X] No

If "Yes", identify:

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

If "Yes", identify:

20. Is the qualified life for the component less than 40 years?
[ ] Yes [X] No If "Yes", what is the qualified life?

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

	Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
1.	957373-04	Seismic Analysis of Yarway Corporation 1-1/2" Welbond Motorized Valve Fig. 5515B-SA10SM Forged Carbon Steel Valves for Baldwin Associates	10-18-78	Yarway Corporation	S&L/CQD (SQ-CL039)
2.	952917-04	Operability Assurance Test Report Yarway Welbond Motor Actuated Globe Type Stop Valves for Active ASME Sec. III Class 1, 2 & 3 Service 1-1/2" Nominal Size	11-10-80	Yarway Corporation	S&L/CQD (SQ-CL039)
3.	CQD-000731	Summary Report for Limitorque Valve Operators Testing Program	1-4-82	S&L/CQD	S&L/CQD (SQ-CL142)
4.	10959	Dynamic Qualification Report on Two Valves	12-24-81	Structural Dynamics Research Corp.	S&L/CQD (SQ-CL142)
5.	B0058	Limitorque Valve Actuator Qualification for Nuclear Service	1-11-80	Limitorque Corp.	S&L/CQD (EQ-CL009)
6.	CQD-014423	Mechanical Environment Qualification of Yarway Welbond Valves	10-4-85	S&L/CQD	S&L/CQD (MEQ-CL083)

ATTACHMENT A

NOTE 1: The valve assembly is not orientation-sensitive from a seismic point of view. However from the environmental viewpoint the valve assembly is sensitive to orientation. To prevent possible intrusion of lubricant into the motor, the motor should not be mounted vertically downward, it should be horizontally mounted. Also in order to prevent flooding of the limit switch, the limit switch compartment should not be oriented facing vertically down.

NOTE 2: A Limitorque Model SMB-0-25 actuator was tested (environmental qualification testing consisting of thermal, mechanical, radiation, seismic and LOCA) while Model SMB-000-5 is installed. A SMB-000 has been seismically qualified separately as documented in SQ-CL142.

ATTACHMENT B

NOTE 1: Flow (II, Subsection 6)

Flow is variable. Operator controls valve opening manually to prevent a build up of non-condensible gases in the RHR heat exchanger. For detailed discussion see Reference 12.

NOTE 2: Control Signal Inputs (II, Subsection 6)

Solely controlled by remote-manual switch (HS) 1E12AS040A. No automatic operation. (Reference 4).

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

System Engineer Review J. Worick Date 11-8-85

Equipment Qual. Review W. E. Helmrich Date 11/8/85

Electrical Engineer Review Robert W. Bowen Date 11-8-85

C&I Engineer Review Ogan Kartal Date 11-8-85

Reconcilation of IPC Walkdown Results

_____ _____ Date _____

REFERENCES

1) Dikkers SRV Outline Dwg. G-471-6/125.04.03, GE Document VPF 5529-1-7

2) Eugene Seitz Control Valve Outline Dwg. 0-108-562E, GE Document VPF 5529-6-5

3) Dikkers Bill of Material, G-471-6/125.04.02, GE Document VPF 5529-10-8

4) Eugene Seitz Solenoid Size 6 Assembly and Outlet Dwg. 3-108574E, GE Document VPF 5529-8-3

5) Eugene Seitz Parts List (for Ref. No. 2) Dwg. 3-4-108-563E, GE Document VPF 5529-14-5

6) EQ-CL065 Environmental Qualification of Eugene Seitz Solenoid Valve Model 6A39 (Seal Welded)

7) SQ-CL654, Dynamic Qualification of Eugene Seitz Solenoid Valves Mounted on SRVs

8) SQ-CL721, Dynamic Qualification of Main Steam Safety/Relief Valves

9) MEQ-CL073, Environmental Qualification of Dikkers Safety/ Relief Valves

10) GE Purchase Specification 21A9538, R/4

11) GE Purchase Specification - General Requirements for Valves, 21A8717 R/#

12) a) GE Nuclear Boiler System Design Specification 22A4622, R/7 and b) Data Sheet 22A4622AV, R/3.

13) GE Purchase Specification Data Sheet, 21A9538AB, R/4

14) GE Material Specification for Valves, 21A8760, R/4

15) GE Purchase Specification - General Requirements for Actuators, 21A3530, R/0

16) GE Test Specification for SRV Seismic Qualification, 22A5222, R/0

17) GE Purchased Part Drawing, 768E584, R/3

18) GE Safety/Relief Valve Design Certification DC21A9538AB R/

19) S&L P&ID Instr. Diagrams, M10-1002, sheet 2, R/G

20) S&L P&ID, M05-1002, sheet 1, R/J and sheet 6 R/D

21) Dikkens Final Test Report FTR-8000056/5

Illinois Power Company
Clinton Power Station

PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461
3. Utility: Illinois Power Company
4. NSSS: General Electric Co. [] PWR [x] BWR
5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [x] NSSS [] BOP Specification K-2801
2. Location:
   a. Building/Room Drywell/H-27
   b. Elevation 778'-0"
   c. System Main Steam
3. Component number on in-house drawings: 1B21-F041A
4. If component is a [] Pump complete II.5.
   If component is a [x] Valve complete II.6.
5. General Pump Data

a. Pump	b. Prime-mover
Name	Name
Mfg.	Mfg.
Model	Model
S/N	S/N
Type	Type

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

a. Pump (continued)

Size _____
Weight _____ N/A

Mounting Method _____

Required B.H.P. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____
Head	_____	_____

Required NPSH at maximum Flow _____ N/A

Available NPSH _____

Operating Speed _____

Critical Speed _____ /Ref.

List functional accessories:* _____

_____

_____

List control signal inputs: _____

_____

_____

b. Prime-mover (continued)

Size _____
Weight _____

Mounting Method _____

H.P. _____

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

Electrical _____

_____

_____

Other _____

_____

If Motor list:

Duty cycle _____

Stall current _____

Class of insulation _____

_____

_____

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve	b. Actuator (if not an integral unit)
Name: Main Steam Safety Relief Valve	Name: Main Steam Safety Relief Valve Actuator
Mfg.: Dikkers	Mfg.: Sempress
Model: G471-6/125.04	Model: VB 300/235 EWVS
S/N: 160535 (Total assy.)	S/N: N/A
Type: Dual function SRV	Type: Electro-Pneumatic
Size: 8" inlet x 10" outlet	Size: 11.81" bore x 9.25" stroke
Weight: 3050 lbs (Dry)	Weight: 407 lbs
Mounting Method: Bolted to flanges in pipeline	Mounting Method: Bolted to SRV bonnet
Required Torque: N/A	Torque: N/A

Ref.: 10, para. 4.1 & 4.1.3.2

Parameter	Design	Operating
Press	1375 psig @ inlet 625 psig @ outlet	1025 psig
Temp	585 F@ inlet 500 F@ outlet	(1375 max. 550 F

Power requirements: (include normal, maximum and minimum).
Electrical 106 - 138 Vdc (125 nominal)

Flow 895,000-939,000 lb/hr @ 1165 psig (ASME Rated Flow)

Max ΔP across valve 1165 psi* Ref. 10, para. 4.3.2, & 12b, para. 4.6.2

Closing time @ max ΔP N/A* Other: [X] Pneumatic [ ] Hydraulic /Ref.

Opening time @ max ΔP ≤ 0.3 s. 100 to 150 psig /Ref. 12,b, para. 3.1.3.4

Power requirements for functional accessories, (if any) Ref. 12b, para. 3.1.7 N/A

*The SRV function is to open at the maximum ΔP (setpoint pressure) and to reclose when the inlet pressure reduces within 89 to 98% of the setpoint pressure. Closing time is not applicable.

List control signal inputs: This valve is actuated (to open) automatically by "High Reactor Pressure" signal, two divisional signals energized one or both of the pilot solenoids of the valve actuator. It can be activated remote-manually by either of the control switches (HS) 1B21CS016A or B.

List functional accessories: None

III. FUNCTION

1. Briefly describe components normal and safety functions: NORMAL: Valve normally remains closed unless required to provide its safety/relief function(s).

SAFETY: Provide overpressure protection for the main steam system when the system pressure exceeds the preset SRV setpoint safety/relief pressures

2. The components normal state is: [ ] Operating [x] Standby

3. Safety function:

a. [x] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [ ] Containment isolation

d. [x] 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? [x] Yes [ ] No
If "Yes", identify.

[ ] LOCA [ ] HELB [ ] MSLB

[x] Other Turbine trip without bypass or MSIV closure

4. Safety requirements:

[x] Intermittent Operation [x] During postulated event

[ ] Continuous Operation [x] Following postulated event

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

12 hours (Ref.: GE doc. 137C6117, Note 4) (e.g., hours, days, etc.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [] Fail open [] Fail closed [x] Fail as

Is this the fail safe position? [] Yes [x] No

Is the valve used for throttling purposes? [] Yes [x] No

Is the valve part of the reactor coolant pressure boundary
[x] Yes [] No

Does the valve have a specific limit for leakage?
[x] Yes []No

If "Yes" give limit: 20 lbs/hr per (internal leakage),
(Ref. 12b, para. 3.1.3.10.1)

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code, Section III, Class 1, Subarticle NB-3500, Edition 1974, Addenda Summer 1976

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

IEEE 323-1974; IEEE 382-1980

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

Deleted:	Modified:
None	None

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [x] No [] Ref. Document: EQ-CL065,SQ-CL721,SQ-CL654

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

6. Are the margins* identified in the qualification documentation? [x] Yes [] No
Ref. Documents: EQ-CL065, SQ-CL721, SQ-CL654.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed:

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal [] Mechanical
Ref. Doc. _____.

N/A

h. [] Flow performance
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis
[] Test [x] Combination

Identify VALVE tests performed:

b. [X] Shell hydrostatic (ASME Section III)
Ref. Doc. Form NV-1, ASME Code Data Report.

b. [X] Cold cyclic
List times: Open 0.14 sec.
Closed 0.90 sec.
Ref. Dikkers FTR-8000056/5 p. 172

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [x] Seismic loading
Ref. SQ-CL654,SQ-CL721

d. [x] Hot cyclic
Lists times: Open 0.15 sec.
Closed 0.73 sec.
Ref. FTR-8000056/5, p. 191

e. [x] Exploratory vibration
Fundamental Freq. 57 Hz
Ref. SQ-CL721 .

f. [x] Main seat leakage = 0
Ref. FTR-8000056/5, p. 191

g. [x] Aging: [x] Thermal
[x] Mechanical
Ref. EQ-CL065 .

h. [ ] Back seat leakage
Ref.

i. [x] Pipe reaction end loading
Ref. SQ-CL721 .

j. [ ] Disc hydrostatic
Ref.

k. [x] Extreme environment
[x] Humidity
[ ] Chemical
[x] Radiation
Ref. EQ-CL065

l. [ ] Flow interruption capability
Ref.

m. [x] Flow characteristics
Are curves provided?
Ref. FTR-8000056/5, p.180,181
[ ] Yes [x] No

n. [x] Others
1) Actuator Test
2) Relief Valve Perf.Test
3) Safety Valve Perf.Test
4) Pressure & Pool Dynamics (SQ-CL721).

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [x] Yes [ ] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

See Attachment A

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [x] 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?
[x] Yes [ ] No

12. Is component orientation sensitive? [x] Yes [ ] No [ ] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [x] Yes [ ] No

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[x] Yes [ ] No [ ] Unknown

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

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

15. If "aging"* was performed, identify the significant aging mechanisms: Radiation, thermal, cyclic, and seismic

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

a. [ ] Plants (shutdown loads) b. [X] Extreme environment

c. [X] Seismic load d. [X] Others Pool Dynamics and Pressure

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.) [X] Yes [ ] No

If "Yes", identify: Radiation resistant lubricant - Chestetron 10; also Raychem WCSF splice kit.

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

If "Yes", identify: Replace solenoid every 21 years.

20. Is the qualified life for the component less than 40 years? [ ] Yes [X] No If "Yes", what is the qualified life?

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
IPC-01-203	Final Test Report for the Qualification Testing of Seitz Solenoid/Control Valve Assemblies	8/23/85	Nutech Engineers	S&L/CQD EQ-CL065 SQ-CL654
43584-1	Seismic Simulation Test Program On An 8x10 Safety Relief Valve w/Air-Operated Actuator	11/18/77	Wyle	S&L/CQD SQ-CL721
N/A	Environmental Qualification of Dikkers Safety/ Relief Valves	7/19/85	S&L/CQD	S&L/CQD MEQ-CL073

ATTACHMENT A

Report 43584-1 by Wyle (SQ-CL721)

Anamoly #2: Seismic test sequence was changed as follows: Originally operability tests were to be conducted after the 2nd OBE test. They now will be conducted prior to any seismic testing.

Resolution: Change has no effect on qualification, along with the operability tests prior to seismic testing, this testing will be conducted after the 5th OBE, and after the SSE.

Anomaly #3: During the 5th OBE, the specimen would not self-actuate.

Resolution: Dikkers and General Electric decided to forego any further self-actuating. Power actuation will be used for remainder of testing. The specimen would not self-actuate for the following reason: Due to the test limitations at Wyle the steam supply was not large enough to makeup steam released by valve simmering. Thus, steam pressure could not be increased to the point at which the specimen would actuate. Valve was shown able to actuate by powering of solenoids.

Report IPC-01-203 by Nutech (EQ-CL065 & SQ-CL654)

Anomaly #1:

i) The control valves would not actuate when the solenoids were energized.

ii) Leakage occurred in the control valves.

i) The solenoids checked out electrically, thus the problem was with the control valves (which were not being qualified by this report). The problem ended up being the crystallization of the control valves lubrication. This lubrication has been changed at Clinton to Chestetron 10 (see Item 18 this checklist).

ii) Recommendations have been established for the leakage which includes a periodic inspection, and replacement program for the seals, lubricant and other critical components.

Anomaly #2: Overaging occurred during thermal aging tests.

Resoultion: None required.

ATTACHMENT A - continued

Anomaly #4:	TRS did not envelope RRS below 6.3 Hz.
Resolution:	Since lowest natural frequency determined for the equipment is 60 Hz, thus no resonance occur in the frequencies in question.
Anomaly #6:	Abnormal cycling of the seal welded solenoid during MSLB/LOCA testing, due to the deformation of the valve poppet.
Resolution:	This valve poppet was not changed out subsequent to Phase I testing, therefore, this valve poppet had been through the equivalent of 80 years of aging. Clinton maintenance programs which require periodic inspections and replacements of critical components will prevent this anomaly. (See MEQ-CL073 for maintenance schedule for replacement of gaskets and other nonmetallics in the poppet valve.)

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

System Engineer Review Richard Hall Date 11-8-85

Equipment Qual. Review [illegible] Date 11/08/85

Electrical Engineer Review NOT APPLICABLE Date _____

C&I Engineer Review Ogan Kartal Date 11-8-85

Reconciliation of IPC Walkdown Results

_____ Date _____

REFERENCES

1. General Electric Process Diagram 762E454, Rev. 5

2. Check Valve Test Data Report (see Tab D)

3. Anchor Darling Drawing 93-14597, sht 1, Rev. C and sht 2, Rev. C

4. Sargent & Lundy Drawing M05-1074-1, Rev. T

5. Sargent & Lundy Valve Data Sheet A0007, Rev. 0

Illinois Power Company
Clinton Power Station

PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461
3. Utility: Illinois Power Company
4. NSSS: General Electric Co. [ ] PWR [x] BWR
5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [ ] NSSS [x] BOP Specification K-2866A
2. Location:
   a. Building/Room DW/Zone H-27
   b. Elevation 769'
   c. System High Pressure Core Spray
3. Component number on in-house drawings: 1E22-F005
4. If component is a [ ] Pump complete II.5.
   If component is a [x] Valve complete II.6.
5. General Pump Data

a. Pump	b. Prime-mover
Name	Name
Mfg.	Mfg.
Model	Model
S/N	S/N
Type	Type

N/A

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

a. Pump (continued)

Size _____
Weight _____

Mounting Method _____

Required B.H.P. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____
Head	_____	_____

Required NPSH at maximum

Flow _____

Available NPSH _____

Operating Speed _____

Critical Speed _____ /Ref. _____

List functional accessories:* _____

_____

_____

List control signal inputs: _____

_____

_____

b. Prime-mover (continued)

Size _____
Weight _____

Mounting Method _____

H.P. _____

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

Electrical _____

_____

_____

Other _____

N/A _____

If Motor list:

Duty cycle _____

Stall current _____

Class of insulation _____

_____

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve

Name: HPCS Reactor Pressure Vessel Isolation Valve
Mfg.: Anchor/Darling
Model: N/A
S/N: E-6214-21-1
Type: Tilting Disc Check
Size: 10" - 900#
Weight: 1,020# excluding actuator weight from vendor Dwg.
Mounting Method: Butt Welded to Pipe
Required Torque: N/A

b. Actuator (if not an integral unit)

Name: Air Operator and Limitswitch Assy.
Mfg.: Anchor/Darling
Model: N/A
S/N: N/A
Type: Air Operated
Size: N/A
Weight: Air Operator Assy. 105# Limitswitch Assy. 75# From SQ-CL 092, Tab D
Mounting Method: Bolted to the Yoke
Torque: N/A

Ref.: Valve Data Sheet No. A0 007

Parameter	Design	Operating
Press	1250 psig	1170 psig
Temp	575° F.	550° F.
Flow	6400 gpm	Ref. 1

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

Max ΔP across valve 13 psid, when valve is fully open Ref. Data Sheet A0007
Closing time @ max ΔP ≤0.5 sec. /Ref. Data Sht A0007
Opening time @ max ΔP N/A /Ref.
Other: []Pneumatic []Hydraulic N/A
Power requirements for functional accessories, (if any) 120 VAC for the test solenoid Instrument Air 80-120 psig for the actuator

List control signal inputs: No control signal input. Free swing of the disc can be tested by remote-manual control switch (HS) 1E22AS005 which opens valve 1E22-F304 to establish zero differential across 1E22-F005 for the test.
List functional accessories: 1) air cylinder for remote test of the check valve, 2) Solenoid to control instrument air to the cylinder.
NOTE: Accessories listed are for test purposes only and have no direct participation in the active safety function of the component.

III. FUNCTION Valve 1E22-F005

1. Briefly describe components normal and safety functions: The valve is a testable check valve. Normal function is to be in closed position to isolate reactor pressure boundary. Safety function is for the valve to freely open to permit HPCS flow on initiation.

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [X] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [X] Containment isolation

d. [ ] Reactor heat removal

e. [X] 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? [X] Yes [ ] No
If "Yes", identify.

[X] LOCA [X] HELB [X] MSLB

[X] Other Loss of feedwater transient

4. Safety requirements:

[X] Intermittent Operation [X] During postulated event

[ ] Continuous Operation [X] 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.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [] Fail open [] Fail closed [] Fail as
N/A - See Attachment A, Note 2.
Is this the fail safe position? [] Yes [] No
N/A - See Attachment A, Note 2.
Is the valve used for throttling purposes? [] Yes [X] No

Is the valve part of the reactor coolant pressure boundary
[X] Yes [] No

Does the valve have a specific limit for leakage?
[X] Yes []No

If "Yes" give limit: 10 cc/hr/in of nominal valve size
Ref. 3 form 271

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code, Section III. Class 1, Subarticle NB-3500, Edition 1974, with addenda Summer 1975 and Code Cases 1516-1, 1567, 1622, 1635-1, 1677.

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

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

Deleted:	Modified:
N/A	N/A

4. Have acceptance criteria been established and documented in the test plan(s) for the component? Yes [X] No [] Ref. Document: SQ-CL092, SQ-CL041, MEQ-CL022

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None.

6. Are the margins* identified in the qualification documentation? [x] Yes [] No
Ref. Documents: SQ-CL092, SQ-CL041, MEO-CL022.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed:

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal
[] Mechanical
Ref. Doc. _____.

h. [] Flow performance
N/A
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis
[] Test *[x] Combination
* See Note 1 of Attachment A.
Identify VALVE tests performed:

b. [x] Shell hydrostatic (ASME Section III)
Ref. 2.

b. [x] Cold cyclic
List times: Open N/A
Closed N/A
Ref. 2.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [x] Seismic loading
Ref. SQ-CL092, SQ-CL041

d. [] Hot cyclic
Lists times: Open _____
Closed _____
Ref. _____

e. [] Exploratory vibration
Ref. _____

f. [x] Main seat leakage
Ref. 2

g. [] Aging: [] Thermal [] Mechanical
Ref. N/A, see Attachment A, Note 1.

h. [] Back seat leakage
Ref. _____

i. [] Pipe reaction end loading
Ref. _____

j. [x] Disc hydrostatic
Ref. 2

k. [] Extreme environment
[] Humidity
[] Chemical
[] Radiation
Ref. N/A, see Attachment A, Note 1.

l. [] Flow interruption capability
Ref. _____

m. [] Flow characteristics
Are curves provided?
Ref. _____
[] Yes [] No

n. [] Others _____

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [] Yes [x] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____

_____

_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [] No If "No", is installed component [] oversized or [] undersized?
N/A - qualification by analysis.

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 - qualification by analysis.

12. Is component orientation sensitive? X Yes No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? X Yes [] No

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[x] Yes [] No [] Unknown

14. Were the qualification tests performed in sequence and on only one component? [ ] Yes [ ] No
N/A - See Attachment A, Note 1.
If "Yes" identify sequence, (e.g., radiation, seismic, cyclic, thermal, etc.): N/A

15. If "aging"* 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. [X] Extreme environment

c. [X] Seismic load d. [X] Others Operating Loads & Pool Dynamics

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[ ] Yes [X] No

If "Yes", identify:

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

If "Yes", identify:

20. Is the qualified life for the component less than 40 years?
[ ] Yes [X] No If "Yes", what is the qualified life?

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
BTAD-19 Rev. D	Class 1 Valve Design Calculations	03/01/79	BESCO Technology Inc.	S&L/CQD SQ-CL092
N/A	Environmental Qualification Of Anchor Darling Valves	07/01/85	S&L/CQD	S&L/CQD MEQ-CL022
QTR-105 Rev. 4	Qualification Of EA180 Series Limitswitches For Use In Nuclear Power Plants In Compliance With IEEE	01/09/84	NAMCO	S&L/CQD SQ-CL113 and EQ-CL008A
AQS-21678/TR Rev. A	Qualification Tests Of Solenoid Valves By Environmental Exposure To Elevated Temperature, Radiation And Loss Of Coolant Accident Simulation	12/05/79	ASCO	S&L/CQD SQ-CL136
AQR-57368 Rev. 1	Report On Qualification Of ASCO Catalog NP-1 Solenoid Valves For Safety Related Application	08/19/83	ASCO	S&L/CQD SQ-CL136 and EQ-CL024
IPS-1079 Rev. D	Design Qualification Test Report For Electric Conductor Seal Assembly For Conax Corp.	05/21/84	Conax	S&L/CQD SQ-CL062 and EQ-CL094
IPS-1080 Rev. A	Design Qualification Test Plan For Electric Conductor Seal Assemblies	08/15/83	Conax	S&L/CQD SQ-CL062 and EQ-CL094

21. Information Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
IPS-325 Rev. D	Design Qualification Material Test Report For Materials Used In Conax Electric Penetration Assemblies And Electric Conductor Seal Assemblies	05/14/81	Conax	S&L/CQD EQ-CL094
R85.080	Supplemental Seismic Report No. 10" - 900# Tilt Disc Check Valve	07/25/85	Anchor Darling	S&L/CQD SQ-CL041

ATTACHMENT A

Note 1:

The valve and operator were qualified by analysis. The function of the air operator is not required for the safety function of the check valve; it is only required for periodic testing of the valve disc to verify its free movement.

The engagement mechanism of the actuator shaft (outer shaft) and the valve disc (inner shaft) allows for failure of the electrical and/or air supply without restricting the valve disc from performing its intended safety function, i.e., swing freely between fully open and fully closed position. The specific aspects of the environmental and seismic qualification of the solenoid valves, conax seals and Namco Limitswitches are not addressed on this checklist since these items are not essential for the safety function of the check valve. However, these items were qualified by analysis and test to ensure integrity of the 1E power source. For maintenance and replacement of the non-organic materials for the solenoid valves and Namco Limitswitches see EQ-CL008A and EQ-CL024.

Note 2:

The valve is a free swinging check valve. It is not subject to actuator failure.

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

System Engineer Review Richard Hall Date 11-8-85

Equipment Qual. Review W. E. Schmuck Date 11/8/85

Electrical Engineer Review NOT APPLICABLE Date 11-8-85 RCH

C&I Engineer Review Ogun Kurtal Date 11-8-85

Reconcilation of IPC Walkdown Results

_____ Date _____

REFERENCES

1. Anchor/Darling Valve Company Drawing No. 2991-3, Rev. D

2. SQ-CL709, Dynamic Qualification of Limitorque Valve Actuators.

3. SQ-CL724, Dynamic Qualification of HPCS M.O. Gate Valve 16" - 150 lb.

4. EQ-CL009, Environmental Qualification of Limitorque Operators, Model Nos. SMB-0, SMB-00, SMB-000, SMB-1, SMB-3, SMB-4 and SMB/HBC.

5. MEQ-CL071, Environmental Qualification of General Electric Supplied Valves.

6. Anchor/Darling Valve Company, NPV-1, Form No. 2N954 and Vendor Test Report

7. S&L P&ID M05-1074, Sheet 1, Rev. T

8. S&L P&ID M05-1079, Sheet 2, Rev. S

9. General Electric Process Diagram 762E454, Rev. 5

Illinois Power Company
Clinton Power Station

PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461
3. Utility: Illinois Power Company
4. NSSS: General Electric Co. [] PWR [x] BWR
5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [] BOP Specification GE 21A8717
2. Location:
   a. Building/Room Fuel Bldg./Rm. H-6
   b. Elevation 713' - 0"
   c. System High Pressure Core Spray
3. Component number on in-house drawings: E22-F001
4. If component is a [] Pump complete II.5.
   If component is a [x] Valve complete II.6.
5. General Pump Data

a. Pump	b. Prime-mover
Name	Name
Mfg.	Mfg.
Model	Model
S/N	S/N
Type	Type

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

a. Pump (continued)

Size _____
Weight _____

Mounting Method _____

Required B.H.P. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____
Head	_____	_____

Required NPSH at maximum

Flow _____

Available NPSH _____

Operating Speed _____

Critical Speed _____ /Ref.

List functional accessories:* _____

_____

_____

List control signal inputs: _____

_____

_____

b. Prime-mover (continued)

Size _____
Weight _____

Mounting Method _____

H.P. _____

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

Electrical _____

_____

_____

Other _____

_____

If Motor list:

Duty cycle _____

Stall current _____

Class of insulation _____

_____

_____

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve

Name HPCS Condensate Storage Tank Suction Valve

Mfg. Anchor/Darling

Model 2991-3

S/N 2N954

Type Gate

Size 16" - 150 lb.

Weight 1300 lbs. (dry)

Mounting Method Butt weld to pipe

Required Torque 5.22 ft.-lbs. (motor)

b. Actuator (if not an integral unit)

Name Motor Actuator

Mfg. Limitorque

Model SMB-00-10

S/N 221390

Type Electric

Size 10 ft.-lb. motor

Weight 200 lbs.

Mounting Method Bolt to valve yoke

Torque 10 ft.-lbs. (motor)

Ref.: Valve Data Sheet No. GE VPF No. 3238-605-4.

Parameter	Design	Operating
Press	100 psig	100 psig (max)
Temp	212 F	120 F
Flow		

Power requirements: (include normal, maximum and minimum).
Electrical 460 Vac., 60 Hz. three phase, valve has 80% minimum voltage requirement

Max ΔP across valve 90 psid Ref. GE 105D5007K (DCD)

Closing time @ max ΔP 80 sec. Other: []Pneumatic[]Hydraulic
/Ref. GE 105D5007 (PPD)
Opening time @ max ΔP 80 sec. N/A
/Ref. GE 105D5007 (PPD)
Power requirements for functional accessories, (if any) N/A

List control signal inputs: This valve receives an automatic signal to close when the E22-F015 valve reaches the fully open position. (Continued on Page C6).
List functional accessories: Limit switches used for interlocking.

List of Control Signal Inputs (Continued)

This normally open valve can be closed by remote-manual control switch (HS) 1E22AS001. 'Valve 1E22-F015 is fully open' signal will automatically close 1E22-F001. It can be opened by (HS) 1E22AS001 if "Valve 1E22-F015 is fully open" signal is not present.

High pressure core spray system initiation signal (high drywell pressure and/or low RPV level [level 2]) will cause 1E22-F001 to open as soon as 1E22-F015 is proven 'closed' thru interlocks.

III. FUNCTION

1. Briefly describe components normal and safety functions: The E22-F001 valve is normally open. Upon receiving a closure signal within 24 hours following a DBE, it must close within 80 seconds and must then remain closed for the remainder of the 100 day DBE to provide condensate storage isolation.

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [ ] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [X] Containment isolation

d. [ ] Reactor heat removal

e. [X] 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? [X] Yes [ ] No
If "Yes", identify.

[X] LOCA [X] HELB [X] MSLB

[X] Other Loss of feedwater transient

4. Safety requirements:

[X] Intermittent Operation [ ] During postulated event

[ ] Continuous Operation [X] Following postulated event

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

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

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [ ] Fail open [ ] Fail closed [X] Fail as

Is this the fail safe position? [ ] Yes [ ] No
[X] Depends on mode of operation.

Is the valve used for throttling purposes? [ ] Yes [X] No

Is the valve part of the reactor coolant pressure boundary?
[ ] Yes [X] No

Does the valve have a specific limit for leakage?
[X] Yes [ ] No

If "Yes" give limit: 10 cc/hr/inch of nominal valve size (GE 21A8717)

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code, Section III, Class 2, Subarticle NC-3500, Edition 1971, Addenda Winter 1973, and Code Case 1637.

2. Reference those qualification standards, used as a guide to qualify the component: IEEE 344-1975; IEEE 323-1974; IEEE 382-1972.

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

Deleted:	Modified:
None	None

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [X] No [ ] Ref. Document: EQ-CL009, SQ-CL709

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

6. Are the margins* identified in the qualification documentation? [x] Yes [] No
Ref. Documents: EQ-CL009; SQ-CL709.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed:

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal
[] Mechanical
Ref. Doc. _____.

h. [] Flow performance
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis
[] Test [x] Combination

Identify VALVE tests performed:

a. [x] Shell hydrostatic (ASME Section III)
Ref. Doc. 6.

b. [x] Cold cyclic (Preoperational)
List times: Open 73 sec.
Closed 73 sec.
Ref. 6.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [x] Seismic loading
Ref. SQ-CL120

d. [ ] Hot cyclic
Lists times: Open _____
Closed _____
Ref. _____

e. [ ] Exploratory vibration
Ref. _____

f. [X] Main seat leakage
Ref. 6

g. [x] Aging: [X] Thermal
[X] Mechanical
Ref. EQ-CL009

h. [X] Back seat leakage
Ref. 6

i. [ ] Pipe reaction end loading
Ref. _____

j. [x] Disc hydrostatic
Ref. 6

k. [x] Extreme environment
[x] Humidity
[ ] Chemical
[x] Radiation
Ref. EQ-CL009

l. [ ] Flow interruption capability
Ref. _____

m. [ ] Flow characteristics
Are curves provided?
Ref. _____
[ ] Yes [ ] No

n. [x] Others Pool Dynamics and operating Loads
Packing Leakage Test

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [ ] Yes [x] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____

_____

_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [ ] Yes [x] No If "No", is installed component [ ] oversized or [X] undersized?

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

12. Is component orientation sensitive? [X] Yes [ ] No [ ] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [X] Yes [ ] No See Attachment A, Note 1

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[x] Yes [ ] No [ ] Unknown

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

If "Yes" identify sequence, (e.g., radiation, seismic, cyclic, thermal, etc.): Thermal Aging, Mechanical Aging, Radiation Aging, Seismic & LOCA

15. If "aging"* was performed, identify the significant aging mechanisms: Thermal, Mechanical & Radiation

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

c. [ ] Plants (shutdown loads) b. [X] Extreme environment

c. [X] Seismic load d. [X] Others Pool Dynamics and Operating Loads

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[ ] Yes [X] No

If "Yes", identify:

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

If "Yes", identify:

20. Is the qualified life for the component less than 40 years?
[ ] Yes [X] No If "Yes", what is the qualified life?

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
B0058	Limitorque Valve Actuator Qualification for Nuclear Service Report	1-11-80	Limitorque	S&L-CQD EQ-CL009
N/A	Environmental Qualification of General Electric Supplied Valves	7-23-85	S&L-CQD	S&L-CQD MEQ-CL071
10959	SDRC Report 10959 Rev. 0	12-15-81	SDRC	S&L-CQD SQ-CL709
2669	Design Calculations 16" - 150 lb. Gate Valve	3-10-74	Anchor Darling	S&L-CQD SQ-CL724

ATTACHMENT A

NOTE 1: The valve was seismically qualified for any direction. The operator though, is sensitive to orientation in regards to environmental condition, i.e., to prevent flooding of the limit switch rotor, the limit switch compartment should not face vertically down. To prevent the flow of lubricant into the motor, the motor should not be mounted vertically down.

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

System Engineer Review R L Waddington Date 11-8-85

Equipment Qual. Review [signature] Date 11-8-85

Electrical Engineer Review R R Beavers Date 11-8-85

C&I Engineer Review Oguz Kantal Date 11-8-85

Reconcilation of IPC Walkdown Results

_____ Date _____

REFERENCES

1. PVOP Checklist
2. Valve Data Sheet: MO-378, dated 9-27-77
3. P&ID Drawings: M05-1032, Sheet 2, Rev. L
4. Vendor Drawing: Posi-Seal Drawing #16204-5 , Rev. B
5. S&L Electrical Schematic Drawings: E02 1CC99-005, Rev. F
   1SX99-024, Rev. F
6. S&L Specification: K-2868, Miscellaneous Butterfly Valves
7. Seismic Qualification Report:
   a) Report #16205, Nuclear Seismic Analysis, 14" CL. 150 Valve Assembly with Limitorque Actuator, dated 2-20-79 (SQ-CL148)
   b) Report #5-6167-5, Report of Fragility Test on SMB-1-25/H4BC Operator for Limitorque Corporation, dated 12-17-75 (SQ-CL182)
8. Environmental Qualification Report: Report No. B-0058, Limitorque Valve Actuator Qualification for Nuclear Service Report (Environmental), dated 1-11-80 (EQ-CL009)
9. Mechanical EQ Report: Environmental Qualification of Posi-Seal Butterfly Valves, dated 3-23-84 (MEQ-CL084)
10. Code Data Report: Valve 1CC076B
11. Miscellaneous: Posi-Seal Transmittal dated October 22, 1985 and telex dated 11-1-85 to S&L

Illinois Power Company
Clinton Power Station

PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461
3. Utility: Illinois Power Company
4. NSSS: General Electric Co. [] PWR [x] BWR
5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [x] BOP Specification K-2868
2. Location:
   a. Building/Room Fuel/Env. Zone H-7
   b. Elevation 737'-0"
   c. System Component Cooling Water
3. Component number on in-house drawings: 1CC076B
4. If component is a [] Pump complete II.5.
   If component is a [x] Valve complete II.6.
5. General Pump Data

a. Pump		b. Prime-mover	
Name		Name	
Mfg.		Mfg.	
Model	N/A	Model	
S/N		S/N	
Type		Type	

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

a. Pump (continued)

Size _____
Weight _____

Mounting Method _____

Required B.H.P. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____
Head	_____	_____

Required NPSH at maximum

Flow _____

Available NPSH _____

Operating Speed _____

Critical Speed _____ /Ref. _____

List functional accessories:* _____

_____

_____

List control signal inputs: _____

_____

_____

b. Prime-mover (continued)

Size _____
Weight _____

Mounting Method _____

H.P. _____

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

Electrical _____

_____

_____

Other _____

N/A _____

If Motor list:

Duty cycle _____

Stall current _____

Class of insulation _____

_____

_____

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve #1CC076B
Isolation Valve for CCW Supply Line to FPC&C Heat Exch. 1B

Name Exch. 1B

Mfg. Posi-Seal International

Model 1144

S/N 16204-5-B

Type Butterfly

Size 14" - 150 lbs.

Weight 234 lbs. - excluding actuator weight - Ref. 4

Mounting Method Bolted to pipe flange

Required Torque 5,028 in.-lbs. Ref. 11

b. Actuator (if not an integral unit)

Name Motor Actuator

Mfg. Limitorque Corp.

Model H1BC-SMB-000

S/N 277593

Type Electrical

Size 2 ft. - lbs.

Weight 180 lbs. (Ref. 7a)

Mounting Method Bolted to mounting bracket on valve

Torque 14,112 in.-lbs. Ref. 11

Ref.: Valve Data Sheet No. M0-378

Parameter	Design	Operating
Press	200 psig	90 psig
Temp	150°F.	105°F.
Flow	4150 GPM	4150 GPM

Power requirements: (include normal, maximum and minimum).
Electrical
460 Vac ±10%

Max ΔP across valve 200 psi Ref. 6 Form 1810Q

Closing time @ max ΔP 60 sec. /Ref. 10

Opening time @ max ΔP 60 sec. /Ref. 10

Other: []Pneumatic[]Hydraulic
None

Power requirements for functional accessories, (if any) None

List control signal inputs:
Normally closed valve opens by remote-manual control switch 1HS-CC087 if valves 1CC075B is open and 1SX062B is closed. It can be closed by 1HS-CC087.
No automatic operation is involved.
Functional accessories -
Limit switches to provide interlocking with 1CC075B & 1SX062B.

III. FUNCTION

1. Briefly describe components normal and safety functions: Normal: Function to provide cooling water to and from the Fuel Pool Heat Exchanger via the component cooling water system. Safety: Function to isolate cooling water from CC and allow cooling water from SX which is a safety related piping system.

2. The components normal state is: [] Operating [x] Standby

3. Safety function:

a. [] Emergency reactor shutdown

b. [] Containment heat removal

c. [] Containment isolation

d. [] Reactor heat removal

e. [] Reactor core cooling

f. [x] 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? [x] Yes [] No
If "Yes", identify.

[x] LOCA [] HELB [] MSLB

[x] Other CC Line Break or LOOP

4. Safety requirements:

[] Intermittent Operation

[x] During postulated event

[] Continuous Operation

[x] 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.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [ ] Fail open [ ] Fail closed [X] Fail as is

Is this the fail safe position? [X] Yes [ ] No

Is the valve used for throttling purposes? [ ] Yes [X] No

Is the valve part of the reactor coolant pressure boundary? [ ] Yes [X] No

Does the valve have a specific limit for leakage? [X] Yes [ ] No

If "Yes" give limit: 140 ml./Hr.

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME B&PV Code Section III, Sub.Sec. ND (c1-3), 1974 Edition including the Winter 1976 Addenda.

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

IEEE: -323-1974, 382-1972, 344-1975

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

Deleted:	Modified:
None.	None.

4. Have acceptance criteria been established and documented in the test plan(s) for the component? Yes [X] No [ ] Ref. Document: 7b Tab-G; 8 Tab-F

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None.

6. Are the margins* identified in the qualification documentation? [x] Yes [ ] No
Ref. Documents: 7a & bTab. D; 8 & 9 Tabs. C & F .

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed:

a. [ ] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [ ] Bearing temperature evaluations

c. [ ] Seismic loading
Ref. _____.

d. [ ] Vibration levels

e. [ ] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [ ] Seal leakage @ hydro press

g. [ ] Aging: [ ] Thermal
[ ] Mechanical
N/A
Ref. Doc. _____.

h. [ ] Flow performance
Are curves provided [ ] Yes [ ] No
Ref. _____

i. [ ] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [ ] Others _____

k. [ ] Extreme environment:
[ ] Humidity
[ ] Chemical
[ ] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [ ] Analysis
[ ] Test [x] Combination

Identify VALVE tests performed:

a. [x] Shell hydrostatic (ASME Section III)
Ref. Doc. 10.

b. [x] Cold cyclic
List times: Open Not required for safety function
Closed 59.5 sec.
Ref. 10.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [x] Seismic loading
Ref. 7a Tab D; 8 Tab F

d. [] Hot cyclic
Lists times: Open _____
Closed _____
Ref. _____

e. [] Exploratory vibration
Ref. _____

f. [x] Main seat leakage
Ref. 10

g. [x] Aging: [x] Thermal
[x] Mechanical
Ref. 8 Tab F

h. [] Back seat leakage
Ref. _____

i. [] Pipe reaction end loading
Ref. _____

j. [x] Disc hydrostatic
Ref. 10

k. [x] Extreme environment
[x] Humidity
[] Chemical
[x] Radiation
Ref. 8 Tab F

l. [] Flow interruption capability
Ref. _____

m. [] Flow characteristics
Are curves provided?
Ref. _____
[] Yes [] No

n. [] Others _____

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [] Yes [x] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [x] No If "No", is installed component [] oversized or [x] undersized?

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

12. Is component orientation sensitive? [x] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [x] Yes [] No See Attachment A Note.

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[x] Yes [] No [] Unknown

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

If "Yes" identify sequence, (e.g., radiation, seismic, cyclic, thermal, etc.): Thermal, Mechanical, Radiation, Seismic, LOCA

15. If "aging"* was performed, identify the significant aging mechanisms: Thermal, Mechanical, Radiation, Seismic

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

a. [ ] Plants (shutdown loads) b. [X] Extreme environment

c. [X] Seismic load d. [X] Others Operational, Pool Dynamic

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[ ] Yes [X] No

If "Yes", identify:

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

If "Yes", identify:

20. Is the qualified life for the component less than 40 years?
[ ] Yes [X] No If "Yes", what is the qualified life?

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Item No.	Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
A	16204 Item #5	Nuclear Seismic Analysis, 14"CL.150 Valve Assembly with Limitorque Actuator	02-20-79	Posi-Seal International	S&L - CQD (Ref.-CQD-015255, SQ-CL148)
B	5-6167-5	Report on Fragility Test on SMB-1-25/ H4BC Operator for Limitorque Corporation	12-17-75	Aero Nav Laboratories, Inc.	S&L - CQD (Ref.-CQD-019751, SQ-CL182)
C	B-0058	Limitorque Valve Actuator Qualification for Nuclear Service Report (Environmental)	01-11-80	Limitorque Corp.	S&L - CQD (Ref.-CQD-002366, EQ-CL009)
D	N/A	Environmental Qualification of Posi-Seal Butterfly Valves	03-23-84	S&L - CQD	S&L - CQD (Ref.-CQD-013011, MEQ-CL084)

ATTACHMENT A

Note: The valve assembly is not orientation-Sensitive from a seismic point of view. However, from the environmental viewpoint, the valve assembly is sensitive to orientation. To prevent possible intrusion of lubricant into the motor, the motor should not be mounted vertically downward; it should be horizontally mounted. Also in order to prevent flooding of the limit switch, the limit switch compartment should not be oriented facing vertically down.

c. [x] Seismic loading

Ref. 7a Tab D; 8 Tab F

d. [] Hot cyclic
Lists times: Open _____
Closed _____

Ref. _____

e. [] Exploratory vibration

Ref. _____

f. [x] Main seat leakage

Ref. 10

g. [x] Aging: [x] Thermal
[x] Mechanical

Ref. 8 Tab F

h. [] Back seat leakage

Ref. _____

i. [] Pipe reaction end loading

Ref. _____

j. [x] Disc hydrostatic

Ref. 10

k. [x] Extreme environment

[x] Humidity

[] Chemical

[x] Radiation

Ref. 8 Tab F

l. [] Flow interruption capability

Ref. _____

m. [] Flow characteristics
Are curves provided?

Ref. _____

[] Yes [] No

n. [] Others _____

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [] Yes [x] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____

_____

_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [x] No If "No", is installed component [] oversized or [x] undersized?

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

12. Is component orientation sensitive? [x] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [x] Yes [] No See Attachment A Note.

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[x] Yes [] No [] Unknown

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. A

System Engineer Review J. Voreiko Date 11/6/85

Equipment Qual. Review Michael E. Kenausis Date 11/6/85

Electrical Engineer Review R.R. Beaver Date 11-6-85

C&I Engineer Review Ozgur Kartal Date 11-6-85

Reconcilation of IPC Walkdown Results

_____ Date _____

REFERENCES

1. G.P.E. Controls, Drawing LD246-25, Sheet 1, Revision AC, (09/11/80).

2. S&L Drawing M06-1075, Sheet 4, Revision V, (06/26/84).

3. G.E. Document 22A3731, Revision 6, "Design Pressures for Piping Systems (04/22/85).

4. IPC Record Package for Document Record Number: (Baldwin P. O. Number, Not indicated, RIR Number S-11993, Valve Serial Number 7712-0526-19.

5. S&L Drawing M05-1075, Sheet 4, Revision 5, (06/28/85).

6. S&L Specification K-2873, Amendment 6, "Vacuum Relief Valves," (07/09/85).

7. S&L, NSLD Calculation No. 3C10-1082-003, Revision 0, (11/15/83).

8. MEQ-CL097, Environmental Qualification of Vacuum Relief Valves 2" and 10", (10/16/85).

9. SQ-CL196, Seismic Qualification of 2" and 10" Vacuum Relief Valves.

10. G.E. Memorandum MNK-83-03 (07/03/83).

Illinois Power Company
Clinton Power Station

PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461
3. Utility: Illinois Power Company
4. NSSS: General Electric Co. [ ] PWR [x] BWR
5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [ ] NSSS [X] BOP Specification K-2873
2. Location: a. Building/Room Auxiliary/A.1.9 (H-12)
   b. Elevation 754'-6" (Ref. 2)
   c. System Residual Heat Removal
3. Component number on in-house drawings: 1E12-F103A
4. If component is a [ ] Pump complete II.5.
   If component is a [X] Valve complete II.6.
5. General Pump Data NOT APPLICABLE

a. Pump		b. Prime-mover	
Name	NA	Name	NA
Mfg.	NA	Mfg.	NA
Model	NA	Model	NA
S/N	NA	S/N	NA
Type	NA	Type	NA

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

a. Pump (continued)

Size NA
Weight NA

Mounting Method NA

Required B.H.P. NA

Parameter	Design	Operating
Press	NA	NA
Temp	NA	NA
Flow	NA	NA
Head	NA	NA

Required NPSH at maximum

Flow NA

Available NPSH NA

Operating Speed NA

Critical Speed NA /Ref. NA

List functional accessories:* NA

List control signal inputs: NA

b. Prime-mover (continued)

Size NA
Weight NA

Mounting Method NA

H.P. NA

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

Electrical NA

Other NA

If Motor list:

Duty cycle NA

Stall current NA

Class of insulation NA

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve		b. Actuator (if not an integral unit) NA: Valve is operated by ΔP across valve.	
Name	RHR Discharge Line Vacuum Relief Valve	Name	NA
Mfg.	Vapor Corporation GPE Controls Division	Mfg.	NA
Model	LD246-25	Model	NA
S/N	7712-0526-19	S/N	NA
Type	Vacuum Relief Valve	Type	NA
Size	2"	Size	NA
Weight	160 lbs. (Ref. 1)	Weight	NA
Mounting Method	Bolted to Flange in pipe	Mounting Method	NA
Required Torque	NA - No Operator	Torque	NA

Parameter	Design	Operating	Power requirements: (include normal, maximum and minimum).
Press (psig)	220 (Ref. 6)	220 (Ref. 3)	Electrical NA
Temp ($^{\circ}$F)	395 (Ref. 6)	395 (Ref. 3)	
Flow (scfm)	700 @ 2 psid (Ref. 4)	See Attachment A, Note 2	

Max ΔP across valve 220 Ref. NA

Closing time @ max ΔP NA /Ref. NA

Other: []Pneumatic []Hydraulic

Opening time @ max ΔP NA /Ref. NA

NA

Power requirements for functional accessories, (if any) NA

List control signal inputs: None

List functional accessories: None

III. FUNCTION

1. Briefly describe components normal and safety functions: The normal function of this vacuum relief valve is in the closed position. The safety function is to relieve the vacuum in the RHR safety/relief valve discharge line (1RH30BA12) following discharge through this line into the suppression pool. The valve is shown on Reference 5.

2. The components normal state is: [] Operating [X] Stand

3. Safety function:

a. [] Emergency reactor shutdown

b. [] Containment heat removal

c. [] Containment isolation

d. [] Reactor heat remov

e. [] Reactor core cooling

f. [] Prevent significa release of radio- active material t environment

g. Does the component function to mitigate the consequences of one or more of the following events? [X] Yes [] No
If "Yes", identify.

[] LOCA [] HELB [] MSLB

[X] Other See Section III.1 above.

4. Safety requirements:

[X] Intermittent Operation [] During postulated event

[] Continuous Operation [X] Following postulated ev

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

See Attachment A, Note 3. (e.g., hours, days, etc

* Functional accessories are those sub-components not supplied by t manufacturer that are required to make the valve assembly operationa (e.g., limit switches).

5. For VALVES:

Does the component [] Fail open [] Fail closed [] Fail
See Attachment A Note 1
Is this the fail safe position? [] Yes [] No
See Attachment A Note 1
Is the valve used for throttling purposes? [] Yes [X]

Is the valve part of the reactor coolant pressure boun
[] Yes [X] No

Does the valve have a specific limit for leakage?
[X] Yes [] No

If "Yes" give limit: 2cc/hr (Ref. 6, p. 3-6, 303.4c)

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code, Section III, Class 2, Subarticle NC-3500, Edition 1977, Addenda Summer 1977.

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

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

Deleted:	Modified:
None	None

4. Have acceptance criteria been established and documented in the test plan(s) for the component? NA Yes [] No [] Ref. Document: NA Qualification by Analysis

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

11-7

6. Are the margins* identified in the qualification documentation? [X] Yes [] No
Ref. Documents: 8.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed:

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal
[] Mechanical
Ref. Doc. _____.

h. [] Flow performance
NA Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis
[] Test [x] Combination

Identify VALVE tests performed:

b. [X] Shell hydrostatic (ASME Section III)
Ref. Doc. 4.

b. [ ] Cold cyclic
List times: Open _____
Closed _____
Ref. _____.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [ ] Seismic loading

d. [] Hot cyclic
Lists times: Open _____
Closed _____

Ref. _____.

Ref. _____.

e. [] Exploratory vibration

f. [X] Main seat leakage

Ref. _____.

Ref. 4

g. [] Aging: [] Thermal
[] Mechanical

h. [] Back seat leakage

Ref. _____.

Ref. _____

i. [] Pipe reaction end loading

j. [ ] Disc hydrostatic

Ref. _____.

Ref. _____

k. [] Extreme environment

l. [] Flow interruption capability

Ref. _____

[] Humidity

[] Chemical

[] Radiation

Ref. _____

m. [] Flow characteristics
Are curves provided?

n. [] Others _____

Ref. _____.
[] Yes [] No

9. As a result of any of the test (or analysis), were any deviati from design requirements identified? [] Yes [X] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____
_____
_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [] No If "No", is installed component [] oversized or [] undersized? NA
"QUALIFICATION BY ANALYSIS" 11/7/85

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 NA "NA QUALIFICATION BY ANALYSIS" 11/7/85

12. Is component orientation sensitive? [X] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [X] Yes [] No

13. Is the component mounted in the same manner in-plant in which i was qualified (i.e., welded, same number and size bolts, etc.)
[X] Yes [] No [] Unknown

14. Were the qualification tests performed in sequence and on only one component? [ ] Yes [ ] No ~~NA~~ "NA QUALIFICATION BY ANALYSIS" 11/7/85

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

15. If "aging"* was performed, identify the significant aging mechanisms: ~~NA~~ "NA QUALIFICATION BY ANALYSIS" 11/7/85

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

a. [ ] Plants (shutdown loads) b. [X] Extreme environment

c. [X] Seismic load d. [X] Others Pool Dynamics and Pressure Loads.

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[ ] Yes [X] No

If "Yes", identify: _____

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

If "Yes", identify: _____

20. Is the qualified life for the component less than 40 years?
[ ] Yes [X] No If "Yes", what is the qualified life? _____

* As outlined in Section 4.4.1 of IEEE-627 1980.

Information Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
LA241-158	Design Analysis for Seismic and Operating Conditions 2" GPE Models LD246-23, -24,-25, -26, -27, Vacuum Relief Valve.	05/17/79	GPE Controls	S&L/CQD SQ-CL196
NA	Environmental Qualification of Vacuum Relief Valves 2" and 10"	10/16/85	S&L/CQD	S&L/CQD MEQ-CL097

ATTACHMENT A

Note 1

Two series mounted vacuum relief valves are attached to each RHR SRV discharge line. If one of the valves fails open, the redundant valve in the pair prevents suppression pool bypass when steam is discharged in the RHR system.

If one of the valves fails close, the potential exists for water to be siphoned from the suppression pool up the RHR discharge line. Reflood of the RHR system discharge line following the plant normal first actuation of the RHR SRV was calculated to be 12.95 feet above the end of the RHR discharge line (Reference 10). Since the vacuum breakers are located more than 15.33 feet above the end of the RHR discharge lines, the RHR discharge lines will not be flooded to the height of the vacuum breakers. Bubble dynamics for subsequent actuation RHR SRV air clearing and subsequent actuation air clearing loads were calculated and addressed in response to Humphreys' Concerns (Reference 7).

During a LOCA, the initial functional modes of the RHR system are low pressure coolant injection (LPCI) and suppression pool cooling. In these modes, steam is not discharged through the RHR heat exchanger discharge lines, and therefore vacuum relief on the lines is not required. Steam may be discharged through the RHR heat exchanger discharge lines when the RHR system is in the steam condensing mode. However, the likelihood of using the RHR steam condensing mode in a post-LOCA environment coincident with failure of one of the vacuum relief valves in the closed position is judged to be remote and is not considered in the design.

ATTACHMENT A
(CONT'D)

Therefore, based on the previous discussion, the fail safe position for these valves may be postulated as fail open, fail close, or fail as-is without adverse effect on system function.

Note 2

The operating flow rate of this valve will vary with the differential pressure across the valve. The sizing of the RHR SRV Discharge Line Vacuum Relief Valves was based on General Electric Company recommendations. The sizing of this valve is judged to be not critical since this valve may fail open or closed as described in Note 1.

Note 3

This valve should operate intermittently to relieve the vacuum following an RHR SRV discharge until the steam in the discharge line has condensed. A rough estimate of the cool down time of the discharge line is 8 hours, when the surrounding environment is less than 122^{o}F.

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. A

System Engineer Review J Woerika Date 11-7-85

Equipment Qual. Review R G Bowen Date 11-7-85

Electrical Engineer Review R A Beavers Date 11-7-85

C&I Engineer Review Ogun Kantal Date 11-7-85

Reconcilation of IPC Walkdown Results

_____ Date _____

REFERENCES FOR VALVE 1RF019

1. Fisher Controls Report No. FQP-16-6, "Group VI Control Valves Qualification Report, Rev. B, dated 3-3-83 (S&L/CQD: SQ-CL055).

2. NAMCO Controls Report No. QTR-105, Rev. 4, "Qualification of EA180 Limit Switches, dated 1-9-84 (S&L/CQD: SQ-CL046).

3. Isomedix Report No. ABS21678/TR, Rev. A, dated July 1979 and ASCo Report No. AQR-67368, Rev. 1, dated 8-19-83, "Qualification of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Vibration Endurance, Radiation and LOCA" (S&L/CQD: SQ-CL060).

4. Conax Report Nos. IPS-1079, Rev. D, dated 5-21-84 and IPS-1080, Rev. A, dated 8-15-83, "Design Qualification Test Report for Electrical Conductor Seal Assy. (ECSA) for CONAX Corp." (S&L/CQD: SQ-CL062).

5. S&L Analysis of Fisher Control Valves (S&L/CQD: EQ-CL082).

6. NAMCO Controls Report No. QTR-109, Rev. 0, "Qualification of EA180 Series Limit Switches," dated 10-3-83 (S&L/CQD: EQ-CL008).

7. ASCo Report No. AQR-6738, Rev. 1, "Qualification of ASCo CatNP-1 Solenoid Valves," dated 8-19-83 (S&L/CQD: EQ-CL024).

8. Conax Report No. IPS-1079, Rev. D, "Design Qualification Test Report for Conax Seal," dated 5-21-84 (S&L/CQD: EQ-CL094).

9. Sargent & Lundy Control Valve Data Sheet No. CV-850, Sheets 1 and 2, dated February 28, 1979.

10. Sargent & Lundy Valve Data Table No. DT-001.

11. Sargent & Lundy Drawings:

    a. P&ID: M05-1047, Sht. 3, Rev. F
    b. LOGIC: M15-1047, Sht. 2, Rev. B
    c. Electrical Schematic: E02 1RF99-008, Rev. M; -010, Rev. J

12. Fisher Controls Drawing No. 35A6351, Rev. C, dated 9-25-84.

13. Specification K-2864, Amendment 9, dated July 23, 1985, Form 273-D, Paragraph 8.2.1d.

REFERENCES FOR VALVE 1RF019 (CONT'D)

14. Fisher Controls Test Certification Data , Tag No. 1RF019, S/N 7418774.

15. Sargent & Lundy Mechanical Department Piping Line List.

Illinois Power Company
Clinton Power Station

PUMP AND VALVE
OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461

3. Utility: Illinois Power Company

4. NSSS: General Electric Co. [] PWR [x] BWR

5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [X] BOP Specification K-2864

2. Location: a. Building/Room Drywell/Zone H-16

b. Elevation 738'

c. System Containment Building Floor Drain

3. Component number on in-house drawings: 1RF019

4. If component is a [] Pump complete II.5.

If component is a [X] Valve complete II.6.

5. General Pump Data

a. Pump	b. Prime-mover
Name	Name
Mfg.	Mfg.
Model	Model
S/N	S/N
Type	Type

NA

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

a. Pump (continued)

Size _____
Weight _____

Mounting Method _____

Required B.H.P. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____
Head	_____	_____

Required NPSH at maximum

Flow _____

Available NPSH _____

Operating Speed _____

Critical Speed _____ /Ref. _____

List functional accessories:* _____

_____

_____

List control signal inputs: _____

_____

_____

b. Prime-mover (continued)

Size _____
Weight _____

Mounting Method _____

H.P. _____

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

Electrical _____

_____

_____

Other _____

NA

_____

If Motor list:

Duty cycle _____

Stall current _____

Class of insulation _____

_____

_____

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve	b. Actuator (if not an integral unit)
Name RF Drywell Penetration Inboard Isolation	Name Pneumatic Actuator
Mfg. Fisher Controls	Mfg. Fisher Controls
Model ES	Model N/A
S/N 7418774	S/N N/A
Type Globe	Type 667 NS
Size 3" - 150#	Size 45
Weight 127.4# (excluding Actuator) from Vendor Dwg.	Weight 132.6# (including appurtenances SQ-CL055, Tab D
Mounting Method Butt Welded to Pipe	Mounting Method Bolted to the Bonnet
Thrust ~~Torque~~ Required 1,470# SQ-CL055, Tab D	Thrust ~~Torque~~ 3,136# SQ-CL055, Tab D

Ref.: Valve Data Sheet No. CV-850

Parameter	Design	Operating
Press	50 psig (Ref. 15)	25 psig
Temp	150°F	150°F
Flow	50-150 GPM	50-150 GPM

Power requirements: (include normal, maximum and minimum).
Electrical None

Max ΔP across valve 50 psig Ref.

Closing time @ max ΔP /Ref. See Att. B, Note 1

Opening time @ max ΔP /Ref. See Att. B, Note 1

Other: [X] Pneumatic [ ] Hydraulic
Ref: Valve Data Sheet No. CV-850
90-120 psig Supply Air Pressure

Power requirements for functional accessories, (if any) 120V ac +10%, -10% (Solenoid)
Spec. K-2864, Form 1999

List control signal inputs: See Att. B, Note 2

List functional accessories: See Att. B, Note 3

III. FUNCTION

1. Briefly describe components normal and safety functions: Normal function is for valve to be in open position to allow drainage through drywell penetration. Safety function is to close for containment isolation. Flow control air valve solenoid is de-energized in safety function mode.

2. The components normal state is: [X] Operating (Energized) [] Standby

3. Safety function:

a. [] Emergency reactor shutdown

b. [] Containment heat removal

c. [X] 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? [X] Yes [] No
If "Yes", identify.

[X] LOCA [] HELB [] MSLB

[] Other

4. Safety requirements:

[X] Intermittent Operation

[] Continuous Operation

[X] During postulated event

[] Following postulated event

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

N/A (e.g., hours, days, etc.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [ ] Fail open [X] Fail closed [ ] Fail as

Is this the fail safe position? [X] Yes [ ] No

Is the valve used for throttling purposes? [ ] Yes [X] No

Is the valve part of the reactor coolant pressure boundary?
[ ] Yes [X] No

Does the valve have a specific limit for leakage?
[X] Yes [ ] No

If "Yes" give limit: 0.01% of maximum valve capacity

Reference 13

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code, Section III, Class 2, Subarticle NC3500 Edition 1974 with Addenda Summar 1976.

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:

None

Modified:
Valve body design calcs. were done in accordance with ANSI B16.34-1977 instead of ANSI B16.5-1968 (Design Requirements of B16.34 satisfied or exceeded all Design requirements of B16.5. In addition B16.34 is now accepted by the ASME Code)

4. Have acceptance criteria been established and documented in the test plan(s) for the component? Yes [X] No [ ] Ref. Document: Attachment A, Note 1

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

6. Are the margins* identified in the qualification documentation? [X] Yes [] No
Ref. Documents: SQ-CL055, SQ-CL046, SQ-CL060, EQ-CL008, EQ-CL094.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

NA

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

Identify PUMP tests performed:

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal [] Mechanical
Ref. Doc. _____.

h. [] Flow performance
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis [] Test [x] Combination

Identify VALVE tests performed:

b. [X] Shell hydrostatic (ASME Section III)
Ref. Doc. Ref. 14.

b. [x] Cold cyclic
List times: Open OK
Closed OK
Ref. Ref. 14.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [X] Seismic loading

Ref. See Note 2, Att. A.

d. [] Hot cyclic
Lists times: Open _____
Closed _____

Ref. _____

e. [] Exploratory vibration

Ref. _____

f. [X] Main seat leakage

Ref. 14

g. [X] Aging: [X] Thermal
[X] Mechanical

Ref. EQ-CL008, 24, 94.

h. [] Back seat leakage

Ref. _____

i. [] Pipe reaction end loading

Ref. _____

j. [X] Disc hydrostatic

Ref. 14

k. [X] Extreme environment

[X] Humidity

[] Chemical

[X] Radiation

Ref. EQ-CL008, 24, 94

l. [] Flow interruption capability

Ref. _____

m. [] Flow characteristics
Are curves provided?
[] Yes [] No

Ref. _____

n. [X] Others Diaphragm to Case Leak Test, Seal Ends; Ref. 14

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [X] Yes [] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

See Attachment A, Note 3

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [X] No If "No", is installed component [X] oversized or [] undersized? See Att. A, Note 5

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

12. Is component orientation sensitive? [X] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [X] Yes [] No

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[X] Yes [] No [] Unknown

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

If "Yes" identify sequence, (e.g., radiation, seismic, cyclic, thermal, etc.): Thermal Aging, Mechanical Aging, Radiation Aging, Seismic & LOCA

15. If "aging"* was performed, identify the significant aging mechanisms: Thermal, Mechanical & Radiation Aging. These apply for NAMCO Limit switches, ASCo Solenoid Valves, & Conax Seal

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

a. [ ] Plants (shutdown loads) b. [X] Extreme environment

c. [X] Seismic load d. [X] Others Pool Dynamics & Operating Loads

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[ ] Yes [X] No

If "Yes", identify:

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

If "Yes", identify: See Attachment A, Note 4

20. Is the qualified life for the component less than 40 years?
[ ] Yes [X] No If "Yes", what is the qualified life? See Att. A, Note 4.

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
FQP-16-6	Group VI Control Valves Qualification Report Revision B	03/03/83	Fisher Controls	S&L/CQD SQ-CL055
QTR-105 Ref. 4	Qualification of EA180 Limit Switches	01/09/84	NAMCO Controls	S&L/CQD SQ-CL046
ABS21678/ TR Rev. A & AQR-67368 Rev. 1	Qual. of Solenoid Valves by Environmental Exposure to Elevated temperature, Radiation Wear Aging Seismic Vibration Endurance, Radiation & LOCA	07/79 08/19/83	Isomedix ASCo	S&L/CQD SQ-CL060
IPS-1079 Rev. D IPS-1080 Rev. A	Design Qualification Test Report for Electric Conductor Seal Assy. (ECSA) for Conax Corp.	05/21/84 08/15/83	Conax	S&L/CQD SQ-CL062
N/A	Analysis of Fisher Control Valves		S&L	S&L/CQD EQ-CL082
QTR-109 Rev. 0	Qual. of EA180 Series Limit Switches	10/03/83	NAMCO Controls	S&L/CQD EQ-CL008
AQR-6738 Rev. 1	Qual. of ASCo CatNP-1 Solenoid Valves	08/19/83	ASCo	S&L/CQD EQ-CL024
IPS-1079 Rev. D	Design Qual. Test Report for Conax Seal	05/21/84	Conax	S&L/CQD EQ-CL094

ATTACHMENT A

Note 1 (IV Subsection 4)

Seismic Qualification Report SQ-CL055, Tab D (Page 12). Environmental & Seismic Report No. AQR-6738, Rev. 1 for ASCo Solenoid Valves (contained in Qualification Packages SQ-CL060, Tab D, Page 62, Table 5.2 and EQ-CL024, Tab F1, Att. A, P. A4-A10 and Tab C, Page C6). Seismic Qualification Package SQ-CL046 for the NAMCO limit switches (Tab D, P. 7-5) & Environmental Qualification Package EQ-CL008, Tab F-2, P. 9-24. Environmental Qualification Package EQ-CL094, Tab F-2, P. 6&7.

Note 2 (IV Subsection 8.C)

The valve was qualified by analysis. A static load test was performed on a representative Parent Valve (see Note 5 of this attachment for further information) to demonstrate operability. The other appurtenances such as NAMCO limit switches, Solenoid Valves, and Conax Seals were individually qualified by test and analysis (See SQ-CL055, Tab D, Qualification Summary P. 5-13 for further information.)

Note 3 (IV Subsection 9)

The following items were noted for the Qualification Documentation:

1) SQ-CL046, Tab D, P. 5-7, identifies a test failure for maintained contact short travel type limit switches. This is not a concern; standard travel series limit switches are the only type used for 1RF019.

2) SQ-CL060: The required OBE G level was not enveloped. However, the magnitude and duration of the SSE testing more than fulfills the OBE Excitation requirements for the subject test. See comment #4 on P. A10 of the SQ-CL Package for further explanation.

3) EQ-CL008: See Tab C, Page C30.9, for identification and disposition of abnormalities.

4) EQ-CL024: See P. 56-60. Also see Section I5 of Tab A, Checklist for disposition.

5) EQ-CL094: Abnormalities identified and justified in Sections 6.9.3 and 6.10 of Report IPS-1079.

ATTACHMENT A (CONT'D)

Note 4 (IV Subsection 19)

Item	Environmental Maintenance Frequency	Maintenance Activity	Reference
Valve & Actuator	4 Years	Replace Nitrile Diaphragms	MEQ-CL082
NAMCO Limitswitches	4.13 Years	Replace the EPDM O-Rings (Lever Shaft, Cover Screws)	EQ-CL008
NAMCO Limitswitches	27.79 Years	Replace Silicone Rubber (boot lever shaft, top & bottom cover gasket)	EQ-CL008
ASCO Solenoid Valves 1HSV-FC110 & 1FSV-FC110	3.5 Years	Replace Solenoid Coil	EQ-CL024
	3.5 Years	Replace Elastometers (Gasket & Seats)	EQ-CL024

Conax seals must be used in the electrical installation of the Limitswitches and Solenoid Valves. In addition, the solenoid must be installed vertical and upright.

Note 5

To prove operability of the valve assembly a static pull test was performed on Parent Valve 3A (1-1/2" - 600#, ED-667 NS 45). Parent Valve 3A was chosen because the actuator is the same design and size and also the valve body is the same design and is within the generic family of valve 1RF019. Seismic loading on the Parent Valve was greater than specified for 1RF019 thus providing operability conservatism.

ATTACHMENT B

Note 1: Valve Closing and Opening Times (II Subsection 6)

Air operated valves by design are fast closing, therefore valves were ordered with normal vendor opening and closing times. Exact tolerances were not specified.

Note 2: Control Signal Inputs (II Subsection 6)

This valve can be opened by remote-manual control switch 1HS-RF028, if there are no "RPV Level Low (Level 2)" or "Drywell Pressure High" LOCA signals present. It can be closed by 1HS-RF028 or automatically by the above mentioned LOCA isolation signals. (References 11 and 12)

Note 3: Functional Accessories (II Subsection 6)

Solenoid valve - ASCO No. 206-832-3U. (References 9, 11.a and 12)

CHECKLIST(S)

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. A

System Engineer Review Ozgur Kartal Date 11-1-85

Equipment Qual. Review N Kmedan Date 11-1-85

Electrical Engineer Review R A Beamer Date 11-1-85

C&I Engineer Review Ozgur Kartal Date 11-1-85

Reconcilation of I.C Walkdown Results

_____ Date _____

REFERENCES

1. Valve Data Sheet: SO934 (Dated 1-20-83)
2. Valve Data Table: DT001
3. P&ID: M05-1041, Sheet 4, Rev. D
4. Vendor drawings: Valcor Engineering Corporation, drawing 333170001, Rev. A
5. S&L Electrical schematics: E02 1LD99-007, E02 1VG99-014, E02 1VG99-015
6. S&L Specification: K-2882-16
7. Seismic Qualification reports: QR 52600-5940-2, Rev. C,
   MR-526-5960-1-1, Rev. A
   IPS-1079, Rev. D
8. Environmental Qualification Report: SKA 11129, Rev. D
   MR-526-5960-1-2, Rev. A
   S-1441, Rev. B
9. Mechanical EQ Report: IPS-1079, Rev. D
10. Code Data Reports: N19384 (Dated 6-1-84)

Illinois Power Company
Clinton Power Station

PUMP AND VALVE
OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461

3. Utility: Illinois Power Company

4. NSSS: General Electric Co. [] PWR [x] BWR

5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [x] BOP Specification K-2882

2. Location: a. Building/Room Drywell

b. Elevation 764'-0"

c. System Leak Detection

3. Component number on in-house drawings: 1E31-F014

4. If component is a [] Pump complete II.5.

If component is a [x] Valve complete II.6.

5. General Pump Data

a. Pump	b. Prime-mover
Name	Name
Mfg.	Mfg.
Model	Model
S/N	S/N
Type	Type

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

a. Pump (continued)

Size _____
Weight _____

Mounting Method _____

Required B.H.P. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____
Head	_____	_____

Required NPSH at maximum Flow _____

Available NPSH _____

Operating Speed _____

Critical Speed _____ /Ref. _____

List functional accessories:* _____

_____

_____

List control signal inputs: _____

_____

_____

b. Prime-mover (continued)

Size _____
Weight _____

Mounting Method _____

H.P. _____

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

Electrical _____

_____

_____

Other _____

_____

If Motor list:

Duty cycle _____

Stall current _____

Class of insulation _____

_____

_____

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve 1E31-F014

Name: Solenoid Valve (Position Indicating)
Mfg.: Valcor Engineering Corp.
Model: V526-5940-1
S/N: 2
Type: Gate
Size: 1"
Weight: 48 lbs. (max.)
Mounting Method: Socket weld ends pipe mounted
Required Torque: N/A

b. Actuator (if not an integral unit)

Name: N/A
Mfg.:
Model:
S/N:
Type:
Size:
Weight:
Mounting Method:
Torque: N/A

Ref.: Valve Data Sheet No. S0934

Parameter	Design	Operating
Press	50 psig	-0.5" WC to 30 psig
Temp	350°F	330°F
Flow	13.2 SCFM	13.2 SCFM

Power requirements: (include normal, maximum and minimum). +10 Electrical 120 -15 % VAC

Max dP across valve 1.0"WC Ref.

Closing time @ max dP * /Ref.

Opening time @ max dP * /Ref. N/A

Power requirements for functional accessories, (if any) None

List control signal inputs: 1E31-F014 can be closed manually by local control switch 1HS-LD001. It will also close automatically on containment isolation signals of high drywell pressure and/or low RPV level (Level 2) when 1HS-LD001 is in auto position (valve energized and open). It can be opened by 1HS-LD001 if neither of the isolation signals referenced above is present.

*By design solenoid valves are fast closing. No special closing requirements necessary to accomplish safety function.

III. FUNCTION

1. Briefly describe components normal and safety functions: 1E31-F014 is a normally open (energized) solenoid valve providing drywell fission products monitoring samples to iodine and particulate analysis systems. Safety function of 1E31-F014 is to close on isolation signal or at operator's discretion based on monitored values.

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [ ] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [ ] Containment isolation

d. [ ] Reactor heat removal

e. [ ] Reactor core cooling

f. [X] 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? [X] Yes [ ] No
If "Yes", identify.

[X] LOCA [ ] HELB [ ] MSLB

[ ] Other

4. Safety requirements:

[X] Intermittent Operation [X] During postulated event

[ ] Continuous Operation [X] Following postulated event

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

100 days Post-LOCA (e.g., hours, days, etc.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [] Fail open [X] Fail closed [] Fail as i

Is this the fail safe position? [X] Yes [] No

Is the valve used for throttling purposes? [] Yes [X] No

Is the valve part of the reactor coolant pressure boundary?
[] Yes [X] No

Does the valve have a specific limit for leakage?
[X] Yes []No

If "Yes" give limit: 47.2 SCC/Min (Air)

IV. QUALIFICATION

Reference: Article 8, form 273D, per Article 202.1.d of Specification K2882.

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code Section III, Div. I, 1977 Edition with 1978 Summer Addenda (Class 2 valve)* ANSI B16.34

2. Reference those qualification standards, used as a guide to qualify the component: IEEE-317-1976, IEEE-323-1974 and IEEE-344-1975

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

Deleted:	Modified:
None	None

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [X] No [] Ref. Document:

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

*Although this valve is ASME Class 2 valve, it has been qualified as per the requirements of ASME Code, Section III, Subsection 'NB'. (See SQ-CL423)

6. Are the margins* identified in the qualification documentation? [x] Yes [] No
Ref. Documents: Inherent margins are discussed in detail in TAB-C of EQ-CL012.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed:

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal [] Mechanical
Ref. Doc. _____.

h. [] Flow performance
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis [] Test [x] Combination

Identify VALVE tests performed:

b. [X] Shell hydrostatic ** (ASME Section III)
Ref. Doc. Valcor Engineering Corp. Test Report.

b. [ ] Cold cyclic
List times: Open _____
Closed _____
Ref. _____.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

** Pneumatic

c. [x] Seismic loading
Ref. SQ-CL218

d. [] Hot cyclic
Lists times: Open _____
Closed _____
Ref. _____

e. [x] Exploratory vibration
50 Hz (by test) SQ-CL218
Ref. SQ-CL218

f. [] Main seat leakage (*)
Ref. _____

g. [x] Aging: [X] Thermal
[X] Mechanical
Ref. EQ-CL012

h. [] Back seat leakage
Ref. _____

i. [] Pipe reaction end loading
Ref. _____

j. [X] Disc hydrostatic**
Valcor Engineering Corp.
Ref. Test Report

k. [x] Extreme environment
Ref. EQ-CL012
[x] Humidity
[] Chemical
[x] Radiation

l. [] Flow interruption capability
Ref. _____

(*) Represented in Disc Leakage Test

m. [] Flow characteristics
Are curves provided?
Ref. _____
[] Yes [] No

n. [] Others _____

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [] Yes [X] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____

_____

_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [X] No If "No", is installed component [] oversized or [x] undersized?

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

12. Is component orientation sensitive? [] Yes [X] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [] Yes [] No

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[] Yes [x] No [] Unknown
The choke clamps were used to fix the valves on both ends during testing. This serves the same purpose as the socket welding which is in-plant mounting condition (Ref. SQ-CL218).

**Pneumatic

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

If "Yes" identify sequence, (e.g., radiation, seismic, cyclic, thermal, etc.): Thermal, cyclic, radiation, seismic, operation under LOCA condition. (Ref. EQ-CL012)

15. If "aging"* was performed, identify the significant aging mechanisms: Thermal, Mechanical, Radiation

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

a. [ ] Plants (shutdown loads) b. [X] Extreme environment

c. [X] Seismic load d. [X] Others Pool dynamic loads, combination of LOCA/HELB

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[ ] Yes [X] No

If "Yes", identify:

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

If "Yes", identify: See below: **

20. Is the qualified life for the component less than 40 years?
[ ] Yes [X] No If "Yes", what is the qualified life?

---

* As outlined in Section 4.4.1 of IEEE-627 1980.

** The EPR Bonnet o-ring and EPR flange o-ring of solenoid are qualified for 1.5 yearsand are required to be replaced with silicon o-rings during the first fuel outage. After that, the silicon o-rings must be replaced regularly every 5 years.
Note: The valve is provided with a qualified seal 'Conax' to prevent moisture intrusion at the conduit connection. For qualification of 'Conax' seal see SQ-CL062 and EQ-CL094.

21. Information Concerning Qualification Documents for the Component

	Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
1.	QR52600-5940-2, Rev. C	Qualification Test Report on Snupps Solenoid Valves	4-21-81	Valcor Engineering Corp.	S&L/CQD (SQ-CL218)
2.	SKA 11129 Rev. D	Similarity Qualification Test Report	Transmittal Date 3-28-85	" " "	S&L/CQD (EQ-CL012)
3.	MR526-5960-1-2 Rev. A	Qualified Life	9-11-85	" " "	" "
4.	S-1441 Rev. B	Qualification Analysis	10-5-82	" " "	" "
5.	MR526-5960-1-1 Rev. A	Stress Analysis Report on Valves, Solenoid 1 Inch, Sch. 40, Class 150, A.C., N.C. Nuclear Service P/N 333170001 333170002 & 333170003	9-6-84	" " "	S&L/CQD (SQ-CL423)
6.	IPS-1079 Rev. D	Design Qualification Test Report for Electrical Conductor Seal Assembly (ECSA) for Conax Corporation	5-21-84	Conax Corporation	S&L/CQD (SQ-CL062 & EQ-CL094)

CHECKLIST(S)

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. A

System Engineer Review [signature] Date 10.28.85

Equipment Qual. Review [signature] Date 10-28-85

Electrical Engineer Review [signature] Date 10-29-85

C&I Engineer Review [signature] Date 10-29-85

Reconcilation of IPC Walkdown Results

_____ Date _____

REFERENCES

1. PVOP Checklist

2. Valve Data Sheet #CV-761

3. P&ID's
   -M05-1052-4R/M
   -M05-1115-1R/J

   -M10-1115-3R/G

   -M10-1115-7R/E

   -M15-1115-3R/E

4. Vendor Drawings

   -Ball Valve (Jamesbury) Carrier Corporation
   0500H2072-V2-4 Sheets 1&2

   -Milliampere Hydromotor Actuator (ITT General Controls)
   Carrier Corporation
   0500H2072-V6-2 Sheets 1&2

5. S&L Electrical Schematics

   -E02-1SX99-049R/D

   -E02-1VX99-024R/H

6. S&L Specification

   K-2905B

7. Seismic Qualification Reports

   a. JHA-81-167
      Rev. 0 & Addendum Dated 8/25/82
      (SQ-CL319) S&L/CQD

   b. 5480-8230
      (SQ-CL265) S&L/CQD

8. Code Data Report

   a. Carrier Certificate of Compliance

   b. Nuclear Projects Quality Checklist - Valve Serial No. ND-6584-01

   c. Form NPV-IN Sheets 1&2

Illinois Power Company
Clinton Power Station

PUMP AND VALVE
OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461

3. Utility: Illinois Power Company

4. NSSS: General Electric Co. [ ] PWR [x] BWR

5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [ ] NSSS [X] BOP Specification K-2905B

2. Location: a. Building/Room Aux. Building

b. Elevation 781'-0"

c. System Shut Down Service Water

3. Component number on in-house drawings: 1SX025B

4. If component is a [ ] Pump complete II.5.

If component is a [X] Valve complete II.6.

5. General Pump Data

a. Pump	b. Prime-mover
Name N/A	Name N/A
Mfg.	Mfg.
Model	Model
S/N	S/N
Type	Type

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

a. Pump (continued)

Size N/A
Weight

Mounting Method

Required B.H.P.

Parameter	Design	Operating
Press		
Temp		
Flow		
Head		

Required NPSH at maximum

Flow

Available NPSH

Operating Speed

Critical Speed /Ref.

List functional accessories:*

List control signal inputs:

b. Prime-mover (continued)

Size
Weight

Mounting Method

H.P.

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

Electrical

Other

If Motor list:

Duty cycle

Stall current

Class of insulation

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve	b. Actuator (if not an integral unit)
Name Switchgear Heat Removal SX Control Valve	Name Milliampere Hydramotor Acutator
Mfg. Jamesbury Corp.	Mfg. ITT General Controls
Model BWS 2236PP	Model NH 91 CD302
S/N ND-65846-01B	S/N 253768-01-001
Type Ball	Type Hydromotor
Size 2"	Size N/A
Weight 14 lbs.	Weight 95 lbs.
Mounting Method Socket Weld (Welded to Pipe)	Mounting Method Bolted to the Valve
Required Torque 20 foot pounds	Torque 65 ft-lbs (SQ-CL319)

Ref.: Valve Data Sheet No. CV-761

Parameter	Design	Operating
Press	200 psig	88 psig
Temp	120°F	105°F
Flow	180 GPM	180 GPM

Ref. 2, CV-761

Max ΔP across valve 200 psig Ref. 6, Form 1800Z

Closing time @ max ΔP _____ /Ref. _____

Opening time @ max ΔP _____ /Ref. _____

Power requirements: (include normal, maximum and minimum).
Electrical
460V ± 10%

Other: []Pneumatic []Hydraulic
See Note 1
Attachment "A"

Power requirements for functional accessories, (if any) None

List control signal inputs: See Note 7 Attachment "A"

List functional accessories: None

III. FUNCTION

1. Briefly describe components normal and safety functions: The valve does not operate normally except during testing or the loss of non-safety-related system. During the abnormal mode, the valve modulates the shutdown service water flow (SSW) to the condenser of the condensing unit VX06CB to maintain the head pressure at the set point.

2. The components normal state is: [ ] Operating [X] 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? [X] Yes [ ] No
If "Yes", identify.

[X] LOCA [ ] HELB [ ] MSLB

[X] Other Auxiliary System (See Note 2 Attachment A)

4. Safety requirements:

[ ] Intermittent Operation [X] During postulated event

[X] Continuous Operation [X] 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.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [ ] Fail open [X] Fail closed [ ] Fail a

Is this the fail safe position? [ ] Yes [X] No See Note 3 Attachment A

Is the valve used for throttling purposes? [X] Yes [ ] N

Is the valve part of the reactor coolant pressure bounda
[ ] Yes [X] No

Does the valve have a specific limit for leakage?
[X] Yes [ ] No

If "Yes" give limit: No visible leakage (spec. K-2905

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code, Section III, Div. 1, 1974 edition with Summer '76 Addenda (Class 3 valve)

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

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

Deleted: None

Modified: None

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [X] No [ ] Ref. Document: SQ-CL 265 (for actuator only)
valve qualified by analysis

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

6. Are the margins* identified in the qualification documentation? [X] Yes [] No
Ref. Documents: SQ-CL265

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed: N/A

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal [] Mechanical
Ref. Doc. _____.

h. [] Flow performance
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis [] Test [x] Combination

Identify VALVE tests performed:

b. [X] Shell hydrostatic (ASME Section III)
Ref. Doc. Vendor Data.

b. [ ] Cold cyclic N/A (See Note Attachment "A"
List times: Open _____
Closed _____
Ref. _____.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [X] Seismic loading
Ref. SQ-CL265

d. [] Hot cyclic
Lists times: Open
Closed
N/A , See Note 1 Attachment "A"
Ref.

e. [] Exploratory vibration
Ref.

f. [X] Main seat leakage
Ref. Vendor Data

g. [] Aging: [] Thermal [] Mechanical
Ref.

h. [] Back seat leakage
Ref.

i. [] Pipe reaction end loading
Ref.

j. [ ] Disc hydrostatic
Ref.

k. [] Extreme environment
[] Humidity
[] Chemical
[] Radiation
Ref.

l. [] Flow interruption capability
Ref.

m. [] Flow characteristics
Are curves provided?
Ref.
[] Yes [] No

n. [] Other

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [] Yes [X] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [X] No If "No", is installed component [] oversized or [] undersized?
See Note 4, Attachment "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 See Note 5, Attachment "A"

12. Is component orientation sensitive? [X] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [X] Yes [] No See Note 6, Attachment "A"

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[] Yes [X] No [] Unknown See Note 4, Attachment "A"

14. Were the qualification tests performed in sequence and on only one component? [] Yes [] No N/A See Note 5, Attachment A

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

15. If "aging"* was performed, identify the significant aging mechanisms: N/A See Note 5, Attachment A

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

c. [] Plants (shutdown loads) b. [] Extreme environment

c. [X] Seismic load d. [X] Others Pool Dynamic Loads and Operating Loads

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[] Yes [X] No

If "Yes", identify: _____

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

If "Yes", identify: _____

20. Is the qualified life for the component less than 40 years?
[] Yes [X] No If "Yes", what is the qualified life? _____

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

	Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
1.	JHA-81-167 Rev. 0 and Addendum Dated 8/25/82	Seismic qualification of the valves covered by Carrier Corp. purchase Order No. 774, 537-FD for the Clinton Power Station Unit 1 and processed under Jamesbury Order No. ND-65846	12/28/81	John Henry Associates, Inc.	S&L/CQD (SQ-CL319)
2.	5480-8230	Seismic Qualification Test Report on Damper Assemblies. Part numbers, serial numbers, and peripheral equipment as listed in Table I for Clinton Nuclear Power Station Units 1 and 2, Contract K-2903, Project 4536-00	2/11/80	Approved Engineering Test Laboratories	S&L/CQD (SQ-CL265)

ATTACHMENT "A"

Notes

1. The valve is used for modulating duty, therefore, closing and opening times are not required.

2. Provide cooling for the Essential Switchgear Room to maintain acceptable environment for the electrical equipment.

3. Standby system is available. Also, manual by-pass is provided. Fail open position can cause condenser pressure to drop considerably making the operation of the cooling coil uncertain.

4. The ITT actuators (Model No. NH95) were tested along with damper assemblies (Ref. 2 of Item 21, Pg. 9). The damper assemblies are flexible while the valve assemblies are more rigid than the damper assemblies. Moreover, these valves have been provided with additional supports to make them even more rigid. Therefore, it is conservative to use these test results for valve assemblies. The testing was conducted with The operator mounted (Horizontal & Vertical)(Model No. NH95). These operators were operated before, during and after the seismic testing and no damage to the operator was noticed at any stage.

   Model No. NH91 has same weight, C.G. location, and mounting configuration (same linear convertor, mounting bolts, bracket and weld) as Model No. NH95 (Ref. telecon memo in Tab G of SQ-CL 265).

   Hence, Model No. NH91 is qualified on the basis of similarity.

5. The valve is located in the mild zone, environmental qualification is not required.
6. When mounting the actuator
   A. in a vertical position - The control plate compartment must face upward.
   B. in a horizontal or intermediary position - Electric compartment must be in an upward position. (Ref. ITT Manual)
7. The valve is interlocked with the supply fan 1VX03CB of Switchgear Heat Removal System condensing serial 1VX06CB. Once the flow is proven, permissive is given to valve 1SX025B to modulate per output signal of controller IPC-VX114 to maintain 1VX06CB condenser pressure at a preset point. When supply fan is off 1SX025B closes. On loss of power, the valve will fail close by spring action.

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. -

System Engineer Review J Worcka Date 11-1-85

Equipment Qual. Review [signature] Date 11-1-85

Electrical Engineer Review R Beavers Date 11-4-85

C&I Engineer Review [signature] Date 11-6-85

Reconcilation of IPC Walkdown Results

_____ Date _____

REFERENCES

1. Anchor/Darling Company Drawing No. 9314658, Revision B, 14"-300# welded-end carbon steel globe valve, with SMB-2 limitorque operator.

2. Specification K-2866A, "ASME Section III Valves," Amendment 2, 08-22-85.

3. S&L drawing M06-1075, Sheet 15, Rev. AJ

4. S&L P&ID drawing M05-1075, Sheet 3, Rev. P

5. S&L Electrical Schematics E02 1RH99-003, Rev. D; E02-1RH99-015, Rev. G and E02-1RH99-016, Rev. H.

6. Valve Data Sheet: MØ-008

7. Valve Data Table: DT009

8. Limitorque valve actuator qualification for Nuclear Service Report, S&L/CQD EQ-CL009.

9. Analysis of environmental qualification of valves under Specification K-2866A, S&L/CQD MEQ-CL022.

10. SDRC Report No. 10959, Rev. o, S&L/CQD SQ-CL120.

11. Category I Seismic analysis of 14"-300# globe valve with SMB-2-40 motor operator, S&L/CQD SQ-CL111.

12. IPC record package, Baldwin Associates P.O. No. C-2513, RIR No. S-4681, dated 11-06-78, valve serial No. E6214-85-1.

13. Residual Heat Removal System design specification, G.E. document No. 22A3139, Rev. 5.

Illinois Power Company
Clinton Power Station

PUMP AND VALVE
OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461
3. Utility: Illinois Power Company
4. NSSS: General Electric Co. [] PWR [x] BWR
5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [x] BOP Specification K2866A
2. Location: a. Building/Room Aux. Bldg./Zone H-9
   b. Elevation 722'
   c. System Residual Heat Removal
3. Component number on in-house drawings: 1E12-F021
4. If component is a [] Pump complete II.5.
   If component is a [x] Valve complete II.6.
5. General Pump Data

a. Pump	b. Prime-mover
Name	Name
Mfg.	Mfg.
Model	Model
S/N	S/N
Type	Type

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

a. Pump (continued)

Size _____
Weight _____

Mounting Method _____

Required B.H.P. _____

Parameter	Design	Operating
Press		
Temp		
Flow		
Head		

Required NPSH at maximum

Flow _____

Available NPSH _____

Operating Speed _____

Critical Speed _____ /Ref. _____

List functional accessories:* _____

_____

_____

List control signal inputs: _____

_____

_____

b. Prime-mover (continued)

Size _____
Weight _____

Mounting Method _____

H.P. _____

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

Electrical _____

_____

_____

Other _____

_____

If Motor list:

Duty cycle _____

Stall current _____

Class of insulation _____

_____

_____

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve

Name Loop C Test Line Shut-off & Throttling

Mfg. Anchor/Darling

Model N/A

S/N E6214-85-1

Type Globe

Size 14"-300#

Weight 1,705# from Vendor dwg. (Excluding wt. of actuator)

Mounting Method Butt welded to pipe

Required Torque 11,120 In-# (From SQ-CL111, TAB D, P. 8)

b. Actuator (if not an integral unit)

Name Motor Operator

Mfg. Limitorque

Model SMB-2

S/N 260712

Type Electric

Size 40 ft.-#

Weight 535# (from SQ-CL111 TAB D, P.7)

Mounting Method Bolted to the yoke

Required Torque 23,328 In-# (From SQ-CL111, TAB D, P. 8)

Ref.: Valve Data Sheet No. MO-008

Parameter	Design	Operating
Press	500 psig	130 psig
Temp	200°F	120°F
Flow	6060 gpm	6060 gpm

Power requirements: (include normal, maximum and minimum).
Electrical 460 VAC ± 10%

Max dP across valve 330 psi Ref. K-2866A, FOrm 1810Q

Closing time @ max dP 210 sec. max. /Ref. K-2866A

Opening time @ max dP 210 sec. max. /Ref. K-2866A

Other: []Pneumatic []Hydraulic

None

Power requirements for functional accessories, (if any) None

List control signal inputs: The valve can be opened ~~remote~~ manually by control switch 1E12AS012C only if RHR has not been initiated by way of switch 1E12AS021 and there is no "high drywell pressure" and/or "RPV level low (Level 2)" LOCA signals present. It can be closed by switch 1E12AS012C, or by 1E12AS021, or automatically by the above mentioned LOCA signals.

List functional accessories: * None

6. General Valve Data

a. Valve

Name _____

Mfg. _____

Model _____

S/N _____

Type _____

Size _____

Weight _____

Mounting Method _____

Required Torque _____

b. Actuator (if not an integral unit)

Name _____

Mfg. _____

Model _____

S/N _____

Type _____

Size _____

Weight _____

Mounting Method _____

Torque _____

Ref.: Valve Data Sheet No. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____

Max dP across valve _____ Ref. _____

Closing time @ max dP _____ /Ref. _____

Opening time @ max dP _____ /Ref. _____

Power requirements for functional accessories, (if any) _____

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

_____

_____

Other: []Pneumatic []Hydraulic

_____

_____

_____

List control signal inputs: _____

_____

List functional accessories: _____

III. FUNCTION

1. Briefly describe components normal and safety functions: Normal function is test line isolation from the main LPCI injection line. Normally on standby in closed position. Safety function is to return to closed position in case it is in open position in testing mode. The closing action is signalled by LOCA initiation.

2. The components normal state is: [ ] Operating [x] Standby

3. Safety function:

a. [ ] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [ ] Containment isolation

d. [x] Reactor heat removal

e. [x] 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? [x] Yes [ ] No
If "Yes", identify.

[x] LOCA [ ] HELB [ ] MSLB

[ ] Other _____

4. Safety requirements:

[x] Intermittent Operation [x] 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.

N/A (e.g., hours, days, etc.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [] Fail open [] Fail closed [x] Fail as

Is this the fail safe position? [x] Yes [] No

Is the valve used for throttling purposes? [x] Yes [] No

Is the valve part of the reactor coolant pressure boundary?
[] Yes [x] No

Does the valve have a specific limit for leakage?
[x] Yes [] No

If "Yes" give limit: 140 mL/hr

Ref. K-2866A (MSS-SP61)

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code, Section III, Class 2 Subarticle NC3500, Edition 1974 with Addenda Summer 1975 and Code Cases 1516-1, 1567, 1622, 1635-1, 1677

2. Reference those qualification standards, used as a guide to qualify the component: IEEE344-1975, IEEE323-1974, IEEE382-1972

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

Deleted:	Modified:
None	None

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [x] No [] Ref. Document: EQ-CL009, SQ-CL120

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

6. Are the margins* identified in the qualification documentation? [X] Yes [] No
Ref. Documents: EQ-CL009, SQ-CL120.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed:

a. [] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [] Bearing temperature evaluations

c. [] Seismic loading
Ref. _____.

d. [] Vibration levels

e. [] Exploratory vibration
(Fundamental freq. _____)
Rev. _____.

f. [] Seal leakage @ hydro press

g. [] Aging: [] Thermal [] Mechanical
Ref. Doc. _____.

h. [] Flow performance
Are curves provided [] Yes [] No
Ref. _____

i. [] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [] Others _____

k. [] Extreme environment:
[] Humidity
[] Chemical
[] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [] Analysis [] Test [x] Combination

Identify VALVE tests performed:

a. [x] Shell hydrostatic (ASME Section III)
Ref. Doc. Globe Valve Test Data Report for A/DV Ser.No.E6214-85-1.

b. [x] Cold cyclic
List times: Open 82 Secs.
Closed 82 Secs.
Ref. As in 8(a).

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [x] Seismic loading

Ref. SQ-CL111 & 120

d. [] Hot cyclic
Lists times: Open _____
Closed _____

Ref. _____

e. [] Exploratory vibration

Ref. _____

f. [x] Main seat leakage

Ref. As in 8(a)

g. [x] Aging: [x] Thermal
[x] Mechanical

Ref. EQ-CL009

h. [x] Back seat leakage

Ref. As in 8(a)

i. [] Pipe reaction end loading

Ref. _____

j. [x] Disc hydrostatic

Ref. As in 8(a)

k. [x] Extreme environment

Ref. EQ-CL009

[x] Humidity

[] Chemical

[x] Radiation

l. [] Flow interruption capability

Ref. _____

Ref. _____

m. [] Flow characteristics
Are curves provided?
[] Yes [] No

Ref. _____

n. [] Others _____

_____

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [] Yes [x] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____

_____

_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [x] No If "No", is installed component [x] 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?
[x] Yes [] No

12. Is component orientation sensitive? [x] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [x] Yes [] No See Attachment A, Note 1.

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[x] Yes [] No [] Unknown

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

If "Yes" identify sequence, (e.g., radiation, seismic, cyclic, thermal, etc.): Thermal aging, mechanical aging, radiation aging seismic & LOCA

15. If "aging"* was performed, identify the significant aging mechanisms: thermal, mechanical and radiation

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

a. [ ] Plants (shutdown loads) b. [X] Extreme environment

c. [X] Seismic load d. [X] Others Pool dynamics plus operating loads

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[ ] Yes [X] No

If "Yes", identify:

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

If "Yes", identify:

20. Is the qualified life for the component less than 40 years?
[ ] Yes [X] No If "Yes", what is the qualified life?

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
B0058	Limitorque Valve Actuator Qualification for Nuclear Service Report	1-11-80	Limitorque	S&L/CQD EQ-CL009
N/A	Analysis of Environmental Qualification of Valves Under Spec. K2866A	11-18-83	S&L/CQD	S&L/CQD MEQ-CL022
10959	SDRC Report No. 10959 Rev. D	12-15-81	SDRC	S&L/CQD SQ-CL120
78.004	Category I Seismic Analysis of 14"-300# Globe Valve With SMB-2-40 Motor Operator	6-1-78	Anamet Labs	S&L/CQD SQ-CL111

ATTACHMENT A

Note 1 (IV Subsection 12)

The valve was seismically qualified with the valve body in a horizontal axis and the stem vertical up. The operator is sensitive to orientation in regards to environmental condition, i.e., to prevent flooding of the limit switch rotor. The limit switch compartment should not face vertically down. To prevent the flow of lubricant into the motor, the motor should not be mounted vertically downward.

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. _____

System Engineer Review K.E. Waddington Date 11-1-85

Equipment Qual. Review W.G. Bohon Date 11-1-85

Electrical Engineer Review R.R. Beavers Date 11-4-85

C&I Engineer Review Agnes Carter Date 11-1-85

Reconcilation of IPC Walkdown Results

_____ Date _____

REFERENCES

1. PVOP Checklist

2. Valve Data Sheet: MO-519

3. P&ID Drawings: M05-1032, Sheet 3

4. Vendor Drawing: A/DV Drawing #93-14769, Rev. B

5. S&L Electrical Schematic Drawings: E02-1CC99-009 & E02-1CC99-016

6. S&L Specification: K-2866, ASME Section III, Valves

7. Seismic Qualification Report:

   a) Report No. 10959, SDRC, Rev. D, dated 12-15-81 (SQ-CL120)

   b) Report No. 78.047, Category I Seismic Analysis of 6"-150# Flex Wedge Gate Valve with SMB-000-5 Motor Operator, dated 05-27-78 (SQ-CL104)

8. Environmental Qualification Report: Report No. B0058, Limitorque Valve Actuator Qualification for Nuclear Service Report dated 01-11-80 (EQ-CL009)

9. Mechanical EQ Report: Analysis of Environmental Qualification of Valve under Specification K-2866A (MEQ-CL022)

10. Code Data Reports: Valve 1CC050; Identification No. E-6214-137-1

11. Miscellaneous: A/DV Information transmittal to S&L dated 10-18-85

Illinois Power Company
Clinton Power Station

PUMP AND VALVE
OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461

3. Utility: Illinois Power Company

4. NSSS: General Electric Co. [] PWR [x] BWR

5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [x] BOP Specification K-2866A

2. Location: a. Building/Room Drywell/Zone H-16

b. Elevation 737'-0"

c. System Component Cooling Water

3. Component number on in-house drawings: 1CC050

4. If component is a [] Pump complete II.5.

If component is a [x] Valve complete II.6.

5. General Pump Data

a. Pump	b. Prime-mover
Name	Name
Mfg.	Mfg.
Model	Model
S/N	S/N
Type	Type

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

a. Pump (continued)

Size _____
Weight _____

Mounting Method _____

Required B.H.P. _____

Parameter	Design	Operating
Press	_____	_____
Temp	_____	_____
Flow	_____	_____
Head	_____	_____

Required NPSH at maximum

Flow _____

Available NPSH _____ _____

Operating Speed _____ _____

Critical Speed _____ /h>f. _____

List functional accessories: _____

_____

_____

List control signal inputs: _____

_____

_____

b. Prime-mover (continued)

Size _____
Weight _____

Mounting Method _____

H.P. _____

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

Electrical _____

_____

_____

Other _____

_____

If Motor list:

Duty cycle _____

Stall current _____

Class of insulation _____

_____

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve

Name CCW Supply Inside Drywell Isolation Valve

Mfg. Anchor/Darling Valve Co.

Model N/A

S/N E6214-137-1

Type Flex Wedge Gate

Size 6"-150#

Weight 350# (excluding actuator, from vendor dwg)

Mounting Method Butt welded to pipe

Required Torque 325.8 in-# (From SQ-CL104, Tab D)

b. Actuator (if not an integral unit)

Name Motor Operator

Mfg. Limitorque Corporation

Model SMB-000

S/N 271910

Type Electric

Size 5 ft.-lbs. (from SQ-CL068

Weight 130# Tab D, P.7)

Mounting Method Bolted to yoke

Torque 1,005 in-# (From SQ-CL104, Tab D)

Ref.: Valve Data Sheet No. M0519

Parameter	Design	Operating
Press	140 psig	100 psig
Temp	150°F	105°F
Flow	1245 GPM	1245 GPM

Power requirements: (include normal, maximum and minimum).
Electrical 460 V ± 10%

Max dP across valve 140 PSID Ref. Spec. K-2866A, Form 1810Q

Closing time @ max dP 32 sec. Other: []Pneumatic[]Hydraulic
/Ref. M0519

Opening time @ max dP 32 sec. None
/Ref. M0519

Power requirements for functional accessories, (if any) None

List control signal inputs: Normally open valve closes by remote-manual control switch 1HS-CC009, or automatically on "high drywell (level 2) pressure" and/or "RPV level low (level2)" signal. It can be opened by 1HS-CC009 if neither one of these containment isolation signals is present.

List functional accessories:* None

III. FUNCTION

1. Briefly describe components normal and safety functions: Normal: Function is to remain in the open position to provide CC Water to equipment located inside containment.

Safety: Function is to provide containment isolation on containment isolation signal.

2. The components normal state is: [] Operating [X] Standby

3. Safety function:

a. [] Emergency reactor shutdown

b. [] Containment heat removal

c. [X] 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? [X] Yes [] No
If "Yes", identify.

[X] LOCA [] HELB [] MSLB

[] Other

4. Safety requirements:

[X] Intermittent Operation

[X] During postulated event

[] Continuous Operation

[X] 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.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [] Fail open [] Fail closed [X] Fail as

Is this the fail safe position? [X] Yes [] No

Is the valve used for throttling purposes? [] Yes [X] No

Is the valve part of the reactor coolant pressure boundary
[] Yes [X] No

Does the valve have a specific limit for leakage?
[X] Yes [] No

If "Yes" give limit: 60 mL/hr

IV. QUALIFICATION

Ref.: Per Specification K-2866A

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME Code, Section III, Class 2, Subarticle NC3500 Edition 1974 with Addenda Summer 1975 and Code Cases 1516-1, 1567, 1622, 1635-1 & 1677.

2. Reference those qualification standards, used as a guide to qualify the component: IEEE 344-1975, IEEE-323-1974 and IEEE 382-1972.

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

Deleted: None

Modified: None

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [X] No [] Ref. Document: EQ-CL009, SQ-CL120

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None

6. Are the margins* identified in the qualification documentation? [X] Yes [ ] No
Ref. Documents: EQ-CL009, SQ-CL120.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

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

Identify PUMP tests performed:

a. [ ] Shell hydrostatic (ASME Section III)
Ref. _____.

b. [ ] Bearing temperature evaluations

c. [ ] Seismic loading
Ref. _____.

d. [ ] Vibration levels

e. [ ] Exploratory vibration
(Fundamental freq. ____)
Rev. _____.

f. [ ] Seal leakage @ hydro press

g. [ ] Aging: [ ] Thermal
[ ] Mechanical
Ref. Doc. _____.

h. [ ] Flow performance
Are curves provided [ ] Yes [ ] No
Ref. _____

i. [ ] Pipe reaction end loads (nozzle loads)
Ref. Doc. _____.

j. [ ] Others _____

k. [ ] Extreme environment:
[ ] Humidity
[ ] Chemical
[ ] Radiation
Ref. Doc. _____.

8. Valve operability has been demonstrated by: [ ] Analysis [ ] Test [x] Combination

Identify VALVE tests performed:

a. [X] Shell hydrostatic (ASME Section III)
Ref. Doc. E.

b. [X] Cold cyclic
List times: Open 30 sec
Closed 30 sec
Ref. E.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [X] Seismic loading

Ref. SQ-CL104,120

d. [] Hot cyclic
Lists times: Open _____
Closed _____

Ref. _____

e. [] Exploratory vibration

Ref. _____

f. [X] Main seat leakage

Ref. E

g. [X] Aging: [X] Thermal
[X] Mechanical

Ref. EQ-CL009

h. [X] Back seat leakage

Ref. E

i. [] Pipe reaction end loading

Ref. _____

j. [X] Disc hydrostatic

Ref. E

k. [X] Extreme environment
[X] Humidity
[] Chemical
[X] Radiation

Ref. EQ-CL009

l. [] Flow interruption capability

Ref. _____

m. [] Flow characteristics
Are curves provided?
[] Yes [] No

Ref. _____

n. [] Others _____

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [] Yes [X] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

_____

_____

_____

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [X] No If "No", is installed component [] oversized or [X] undersized?

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

12. Is component orientation sensitive? [X] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [X] Yes [] No (See Attachment Note 1)

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[X] Yes [] No [] Unknown

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

If "Yes" identify sequence, (e.g., radiation, seismic, cyclic, thermal, etc.): Thermal aging, mechanical aging, radiation aging, seismic and LOCA.

15. If "aging"* was performed, identify the significant aging mechanisms: Thermal, mechanical, and radiation.

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

a. [ ] Plants (shutdown loads) b. [X] Extreme environment

c. [X] Seismic load d. [X] Others Pool dynamics plus operating loads.

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [ ] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[ ] Yes [X] No

If "Yes", identify:

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

If "Yes", identify:

20. Is the qualified life for the component less than 40 years?
[ ] Yes [X] No If "Yes", what is the qualified life?

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Item Number	Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report	
A.	B0058	Limitorque Valve Actuator Qualification for Nuclear Service Report	1-11-80	Limitorque	S&L/CQD	EQ-CL009
B.	N/A	Analysis of Environmental Qualification of Valves Under Spec. K-2866A	11-18-83	S&L/CQD	S&L/CQD	MEQ-CL022
C.	10959	SDRC Report No. 10959 Rev. D	12-15-81	SDRC	S&L/CQD	SQ-CL120
D.	78.047	Category I Seismic Analysis of 6" 150# FLEX Wedge Gate Valve with SMB-000-5 Motor Operator	05-27-78	ANAMET Labs	S&L/CQD	SQ-CL104

ATTACHMENT A

Note 1

The valve and actuator are seismically qualified with the valve body in a horizontal axis and the stem vertical up. The operator is sensitive to orientation in regards to environmental condition, i.e., to prevent flooding, the limitswitch compartment should not face vertically down. Also to prevent the flow of lubricant into the motor, the motor should not be mounted vertically downward.

PVOP NO. 200D
REVISION A
PUMP 1SX01PA

Pump & Valve Operability Assurance Review Checklist

SIGNATURE PAGE

Revision No. A

System Engineer Review R E Wadlington Date 11-7-85

Equipment Qual. Review [signature] Date 11-7-85

Electrical Engineer Review Robert M Beaver Date 11-7-85

C&I Engineer Review [signature] Date 11-7-85

Reconcilation of IPC Walkdown Results

_____ Date _____

REFERENCES

1. PVOP CHECKLIST

2. P&ID DRAWING: M05-1052, Sheet 1, Rev. W
   M10-1052, Sheet 2, Rev. C
   M15-1052, Sheet 6, Rev. C
   M15-1068, Sheet 2, Rev. B

3. VENDOR DRAWINGS:

   a) T-38303-1, Certified Pump Curve, Rev. 0

   b) T-38303-2, Pump Test Data, Rev. 0

   c) 2E-2548, Rev. D; Pump Outline, Rev. D

4. S&L ELECTRICAL SCHEMATIC DRAWINGS: E02-1SX99-001, Rev. V

5. S&L SPECIFICATIONS: K-2828A, Amend. 3

6. EQUIPMENT FOUNDATION DRAWING:
   S22-1018, Rev. AB
   S22-1011, Rev. R
   S22-1017, REv. V
   S21-1610, Rev. AB

7. SEISMIC QUAL REPORT:

   a) Report No. DC1502, Seismic Analysis for Essential Service Water Pumps, dated 08/28/78 (CQD-019841, SQ-CL015)

   b) Report No. EL-8-5017-90307-01, Dynamic Qualification of A.C. Induction Motors, dated 05/30/79 (CQD-013414, SQ-CL016)

8. CODE DATA/HYDROSTATIC TEST/PUMP PERFORMANCE REPORTS

9. MISCELLANEOUS

   a) Contract - Specification K-2828A (PD Page Section)

   b) Byron-Jackson's Code Data Report/Hydrostatic Test Report

   c) **Byron-Jackson Pump Performance Test**

Illinois Power Company
Clinton Power Station

PUMP AND VALVE
OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Clinton Unit No. 1 2. Docket No.: 50-461

3. Utility: Illinois Power Company

4. NSSS: General Electric Co. [] PWR [x] BWR

5. A/E: Sargent & Lundy

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [x] BOP Specification K-2828A

2. Location: a. Building/Room Circulating Water Screen House/Env. Zone M-25

b. Elevation 699'-0"

c. System Shutdown Service Water

3. Component number on in-house drawings: 1SX01PA

4. If component is a [x] Pump complete II.5.

If component is a [] Valve complete II.6.

5. General Pump Data

a. Pump	b. Prime-mover
Name Shutdown Service Water Pump	Name Motor
Mfg. Byron Jackson	Mfg. Siemens-Allis
Model 37KXL 2-stage VCT	Model Frame 3754
S/N 761-C-0091	S/N 8-5017-90307-1
Type 2-stage, VCT	Type Vertical, Single Speed, Squirrel-cage induction ODP

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

a. Pump (continued)

Size 37KXL, 2-stage, VCT
Weight 22,800 lbs. (dry)

Mounting Method Anchored to floor through mounting plate by bolts

Required B.H.P. 1317

Parameter	Design	Operating
Press	200 psig	120 psig
Temp	32-95° F.	32-95° F.
Flow	16,500 GPM	16,500 GPM
Head	275 ft. H_2O	275 ft. H_2O

Required NPSH at maximum Flow 7 ft. Submergence

Available NPSH 12'-10" Submergence

Operating Speed 890 RPM

Critical Speed 1405 /Ref. C

List functional accessories:* None.

List control signal inputs: See Attachment B.

b. Prime-mover (continued)

Size Frame 3754, 1500HP, 890 RPM
Weight 11,100 lbs.

Mounting Method Bolted to the pump supporting disc

H.P. 1500

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

Electrical
4000 ± 10% Volts
-25% - 1 minute

Other

If Motor list:

Duty cycle Continuous

Stall current 1170

Class of insulation F

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, etc.)

6. General Valve Data

a. Valve

Name _____

Mfg. _____

Model _____

S/N _____

Type _____

Size _____

Weight _____

Mounting Method _____

Required Torque _____

b. Actuator (if not an integral unit)

Name _____

Mfg. _____

Model _____

S/N _____

Type _____

Size _____

Weight _____

Mounting Method _____

N/A

Torque _____

Ref.: Valve Data Sheet No.

Parameter	Design	Operating
Press		
Temp		
Flow		

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

Electrical _____

Max ΔP across valve _____ Ref. _____

Closing time @ max ΔP _____ Other: []Pneumatic []Hydraulic
/Ref. _____

Opening time @ max ΔP _____
/Ref. _____

Power requirements for functional accessories, (if any) _____

List control signal inputs: _____

List functional accessories: _____

III. FUNCTION

1. Briefly describe components normal and safety functions: Normal: Function is to be on standby. Safety: Function is to operate to provide cooling water to equipment served by Division 1 Shutdown Service Water System as a result of remote-manual initiation or automatic initiation start signals. Pump will stop with operator's remote-manual initiation.

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [X] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [ ] Containment isolation

d. [X] 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? [X] Yes [ ] No
If "Yes", identify.

[X] LOCA [ ] HELB [ ] MSLB

[X] Other Loss of Offsite Power (LOOP)

4. Safety requirements:

[ ] Intermittent Operation [X] During postulated event

[X] Continuous Operation [X] 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.)

* Functional accessories are those sub-components not supplied by the manufacturer that are required to make the valve assembly operational, (e.g., limit switches).

5. For VALVES:

Does the component [] Fail open [] Fail closed [] Fail as

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

N/A

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

If "Yes" give limit: _____

IV. QUALIFICATION

1. Reference by specific number those applicable sections of the design codes and standards applicable to the component: ASME B&PV Code, Section III, Class -3, 1974 Edition with Winter 1975 Addenda.

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

IEEE: -344 - 1975

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

Deleted: None.

Modified: None.

4. Have acceptance criteria been established and documented in the test plan(s) for the component?
Yes [] No [] Ref. Document:

N/A - Qualification by analysis.

5. What is the expected failure mode that would keep the pump or valve assembly from performing its safety function? None.

6. Are the margins* identified in the qualification documentation? [x] Yes [ ] No
Ref. Documents: Ba & Bb, Tab D.

If component is a PUMP, complete IV.7.

If component is a VALVE, complete IV.8.

7. Pump operability has been demonstrated by: [ ] Analysis
[ ] Test [x] Combination

Identify PUMP tests performed:

a. [x] Shell hydrostatic (ASME Section III)
Ref. D.

b. [ ] Bearing temperature evaluations

c. [ ] Seismic loading
Ref.

d. [ ] Vibration levels

e. [ ] Exploratory vibration
(Fundamental freq.)
Rev.

f. [ ] Seal leakage @ hydro press

g. [ ] Aging: [ ] Thermal
[ ] Mechanical
Ref. Doc.

h. [x] Flow performance
Are curves provided [x] Yes [ ] No
Ref. E

i. [ ] Pipe reaction end loads (nozzle loads)
Ref. Doc.

j. [ ] Others

k. [ ] Extreme environment:
[ ] Humidity
[ ] Chemical
[ ] Radiation
Ref. Doc.

8. Valve operability has been demonstrated by: [ ] Analysis
[ ] Test [x] Combination

Identify VALVE tests performed:

b. [ ] Shell hydrostatic (ASME Section III)
Ref. Doc. N/A

b. [ ] Cold cyclic
List times: Open
Closed
Ref.

*. Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

c. [ ] Seismic loading

Ref. _____

d. [] Hot cyclic
Lists times: Open _____
Closed _____

Ref. _____

e. [] Exploratory vibration

Ref. _____

f. [] Main seat leakage

Ref. _____

g. [] Aging: [] Thermal
[] Mechanical

Ref. _____

h. [] Back seat leakage

Ref. _____

i. [] Pipe reaction end loading

Ref. _____

j. [ ] Disc hydrostatic

Ref. _____

k. [] Extreme environment

[] Humidity

[] Chemical

[] Radiation

Ref. _____

N/A

l. [] Flow interruption capability

Ref. _____

m. [] Flow characteristics
Are curves provided?

Ref. _____
[] Yes [] No

n. [] Others _____

9. As a result of any of the test (or analysis), were any deviation from design requirements identified? [X] Yes [] No If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

10. Was the test component precisely identical (as to model, size, etc.) to the in-plant component? [X] Yes [] No If "No", is installed component [] oversized or [] undersized? Qualification by analysis.

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
See Attachment A Note.

12. Is component orientation sensitive? [X] Yes [] No [] Unknown
If "Yes", does installed orientation coincide with qualified orientation? [X] Yes [] No

13. Is the component mounted in the same manner in-plant in which it was qualified (i.e., welded, same number and size bolts, etc.)
[X] 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"* 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. [X] Seismic load d. [X] Others Operational

17. Have component design specifications been reviewed in-house to assure they envelope all expected operating, transient, and accident conditions? [X] Yes [] No

18. Does the component utilize any unique or special materials? (Examples are special gaskets or packing, limitations on nonferrous materials, or special coatings or surfaces.)
[] Yes [X] No

If "Yes", identify: _____

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

If "Yes", identify: _____

20. Is the qualified life for the component less than 40 years?
[] Yes [X] No If "Yes", what is the qualified life? _____

* As outlined in Section 4.4.1 of IEEE-627 1980.

21. Information Concerning Qualification Documents for the Component

Item No.	Report Number	Report Title	Date	Company/Organizaton Preparing Report	Company/Organization Reviewing Report
A	DC-1502 Rev. A	Seismic Analysis for Essential Service Water Pumps	08/28/78	Byron Jackson	S&L - CQD (CQD-019841, SQ-CL015)
B	EL-8-5017-90307-01	Dynamic Qualification of A.C. Induction Motors	05/30/79	Siemens-Allis	S&L - CQD (CQD-013414, SQ-CL016)

ATTACHMENT A

Note: The pump is located in a mild zone; Environmental Qualification is not required.

ATTACHMENT B

Shutdown Service Water Pump 1A will start with the following signal inputs:

1. Pump start has been initiated by remote-manual control switch 1HS-SX007 in the presence of permissive A, or

2. Pump start has been initiated by remote shutdown panel control switch (HS) 1C61HS503 in the presence of permissive B, or

3. Strainer 1SX01FA outlet pressure below setpoint signal in the presence of permissive A, or

4. No pump stop action has been initiated by pump remote-manual control switch 1HS-SX007 and there is either "high drywell pressure" or "RPV level low (level 2)" signal present along with permissive A.

The pump will stop with the following signal inputs:

1. Pump stop has been initiated by remote shutdown panel control switch (HS) 1C61HS503 in the presence of permissive B, or

2. Pump stop has been initiated by 1HS-SX007 in the presence of permissive A.

PERMISSIVES (1SX01PA)

A - Remote shutdown transfer switch (HS) 1C61HS501 is in "NORMAL" position.

B - Remote shutdown transfer switch (HS) 1C61HS501 is in "EMERGENCY" position.