SPECIFICATION NO. CNS-1205.00-00-0006

DATE February 25, 1974

DUKE POWER COMPANY

CATAWBA NUCLEAR STATION

UNIT 1 & 2

Title: Nuclear Safety Related Carbon Steel Valves

REVISION LOG

1 August 22,1975	6 December 14, 1978
2 August 6, 1976	7 February 14, 1979
3 May 11, 1977	8 May 9, 1979
4 May 24, 1978	9 January 4, 1983
5 March 31, 1978	10

Form 301.1/Rev 2

02548 (R9-82)
Form 301.2 Rev. 5

VERIFICATION OF SPECIFICATION

Station and Unit Number: Catawaba Nuclear Station Units 1 & 2

Title of Specification: Nuclear Safety Related Carbon Steel Valves

Specification Number: CNS-1205.00-00-0006

Revision: Addendum #9

This document specifies items related to QA CONDITION 1. In accordance with established procedures, its quality has been assured. Signatures certify that the above specification was originated, checked, approved and inspected (or waived) as noted below:

Prepared By: J. W. Henkel Date: 1-4-83

Checked By: R. L. Oakley Date: 1-7-83

Approved By: J. K. Date: 1-11-83

Inspection Waived By: R. E. Miller Date: 1/11/83

Inspection Waived For: ☒ ELECTRICAL ☐ M/N ☒ C/E ☐ PMD ☐ SRAL

Inspected By: Date:

Inspected By: Date:

Inspected By: Date:

Inspected By: Date:

QUALITY ASSURANCE T C Roberts Date: 1/13/83

.....

(FOR ASME CODE ITEMS)

Division Mechanical & Nuclear Date: Jan. 11, 1983
Design Engineering Department

This is to certify that the above specification has been reviewed by me, the undersigned, and is correct, complete, and in compliance with 1971 Edition including the Summer 1973 Addendum of ASME Code, Section III, Paragraph NA3250.

(SEAL)

Signature R. E. Miller

Name: R. E. Miller
Professional Engineer

No. & State South Caoline

SPECIFICATION: CNS-1205.00-00-0006
Addendum No.: 9
Date: January 4, 1983

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
UNITS 1 AND 2

Nuclear Safety Related Carbon Steel Valves

Reference Section 5.0 REFERENCE DRAWINGS AND/OR ATTACHMENTS

Add:

5.18 Duke Power Company Valve List Description, Rev. F dated July 16, 1982.

Reference Section 9.0 SPECIAL REQUIREMENTS

Add:

9.9.1 Attachment 5.7 "Seismic Design Requirements" references the Duke Power Seismic Design Manual for allowable stresses under upset (OBE) conditions. According to the Design Manual, non-pressure retaining parts are to be designed using upset allowables given in the AISC Manual for Steel Construction. Per the AISC Manual, non-pressure retaining bolting material allowables are to come from Table 1.5.2.1, "Allowable Stress for Fastners" which lists allowable stresses for various material specifications. For bolting materials not listed in Table 1.5.2.1, the upset allowable stress shall be taken as .6 Sy in tension and .4 Sy in shear, where Sy is the yield strength of the material per applicable material specification.

Reference Section 14.0 TEST AND INSPECTION

Add:

14.3.1 A seat leakage test shall be performed on the following Duke items in accordance with 14.3 except, the seat leakage shall be no more than 3cc/hr/in. of nominal valve size.

6J-211	ATP 156DAB1-001
6J-215	ATP 156CAA1-001
6J-216	ATP 156DAA1-001
6J-240	ATP 106BAD1-001

SPECIFICATION NO.: CNS-1205.00-00-0006
ADDENDUM NO.: 9
ATTACHMENT NO.: 5.18

GENERAL:

This valve list description will supply the vendor with the necessary information required to interpret Duke Power Company Valve Lists. Each column of the valve list and the abbreviations used are defined. Information defined by the following notes is not directly referenced to by the valve list but is, in fact, an extension of each valve list.

All valves are to meet Duke Power Company Valve Specifications as presented to vendor on award of contract.

NOTES:

A) Valve List Numbering System

Code

CN-1500-16

Body Material

10 Stainless Steel (Nuclear)
11 Stainless Steel 2 1/2" and larger (Conventional)
12 Carbon Steel (Nuclear)
13 Carbon Steel 2 1/2" and larger (Conventional)
14 Stainless 2 1/2" and larger (Nuclear)
15 Cast Iron
16 Stainless Steel 2 1/2" and larger (Nuclear)
17 Stainless Steel 2 1/2" and larger (Conventional)
18 Carbon Steel 2 1/2" and larger (Nuclear)
19 Carbon Steel 2 1/2" and larger (Conventional)
20 Carbon Steel 2 1/2" and larger (Nuclear)
21 Carbon Steel 2" and smaller (Conventional)
22 Carbon Steel 2" and smaller (Nuclear)
23 Stainless Steel 2" and smaller (Conventional)
24 Stainless Steel 2" and smaller (Nuclear)
25 Stainless Steel - Plug Valves (Conventional)
26 Stainless Steel - Plug Valves (Nuclear)
27 Carbon Steel - Diaphragm Valves (Conventional)
28 Carbon Steel - Plug Valves (Nuclear)
29 Aluminum - Diaphragm Valves (Conventional)
30 Stainless Steel - Diaphragm Valves (Nuclear)
31 Bronze Diaphragm Valves (Conventional)
32 Carbon Steel - Disphragm Valves (Nuclear)
33 Carbon Butterfly Valves (Conventional)
34 Carbon Steel Butterfly Valves (Nuclear)
35 Carbon Steel Butterfly Valves (Conventional)
36 Carbon Steel Butterfly Valves (Nuclear)
37
38 Solenoid Valves (Nuclear)
39 Carbon Steel Butterfly Valves (Conventional)
40 Stainless Steel-Ball Valves (Nuclear)
41 Carbon Steel-Ball Valves (Nuclear)
42 Carbon Steel - 2" and smaller (Conventional)
43 Stainless steel - 2" and smaller (Conventional)
44 Carbon Steel - 2" and smaller (Nuclear)
45 Stainless Steel - 2" and smaller (Nuclear)

CN-1500-16

46	Stainless Steel - 2" and smaller (Conventional)			
47	Stainless Steel - 2" and smaller (Nuclear)			
48	Carbon Steel - 2" and smaller (Nuclear)			
49	Carbon Steel - Ball Valves (Conventional			
50	Stainless Steel - Ball Valves (Conventional)			
76	Carbon Steel Wafer Check Valves (Nuclear)			
(Press. Class)	125#	400 #	1500#	4500#
	150#	600#	2500#	
	300#	900#	3500#	

Station Symbol

Valve list number will appear at the top of each sheet of the applicable valve list; along with the latest revision number and date revised.

B) Item Number (First Column of Valve List)

Each valve shall have a metal tag, permanently secured to the valve yoke or as otherwise defined and as called for in the valve specification, which will show the item number of the valve.

Item Number Code — Definition

02 A - 199

- 199 — Identification Number
- A — (Pres. Class)
  - A-125#
  - B-150#
  - C-Spare
  - D-300#
  - E-Spare
  - F-400#
  - G-600#
  - H-900#
  - J-1500#
  - K-2500#
  - L-3500#
  - M-4500#
- 02 — (Body Material)
  - 01. (Spare)
  - 02. Carbon Steel
  - 03. (Spare)
  - 04. Stainless Steel
  - 05. Stainless Steel
  - 06. Carbon Steel
  - 07. (Spare)
  - 08. (Spare)
  - 09. Stainless Steel
  - 10. Aluminum
  - 11. Bronze

* All materials required for use in DPCo classification A, B, C, D, E, F, G, and H (see item "C" this description) will be procured in accordance with the applicable Specification.

Item numbers succeeded by an asterisk denote valves located within the reactor building. Please refer to the applicable Duke Power Company Specification regarding these valves.

C) Duke Valve Class (Second Column of Valve List)

This note described the different Duke Class and applicable Design Criteria for each class of valves.

DPCo Class	Design Criteria	Seismic Loading
A	ASME Section III, Class 1	Yes
B	ASME Section III, Class 2	Yes
C	ASME Section III, Class 3	Yes
D	ASME Section III, Class 2	No
E	ANSI B31.1.0	No
F	ANSI B31.1.0	Yes
G	ANSI B31.1.0	No
H	Duke Power Specification	No

D) Type (Third Column of Valve List)

This note describes the different types of valves and is used by Duke Power Company.

Code	Definition
SN	Solenoid Valve
GT	Gate Valve
GL	Globe Valve
CK	Check Valve
DP	Diaphragm Valve
BF	Butterfly Valve
PV	Plug Valve
NV	Needle Valve

E) Quantity (Fourth Column of Valve List)

Column 4 of the valve list gives the quantity required. Each valve should be tagged with an item number as outlined in B) of this description.

F) Size (Fifth Column of Valve List)

All sizes are nominal pipe size (NPS) and will be given in inches.

G) Manufacturers Figure Number (Sixth Column of Valve List)

Column 6 of the valve list will give the manufacturer's drawing or figure number. This column will be completed when Duke knows the appropriate number required. When this column is left blank, the valve manufacturer will supply the valve most suitable for Duke's requirements as spelled out on the valve list.

H) Operator (Seventh Column of Valve List)

Code	Definition
HW	Manufacturer's standard handwheel
CW	Chainwheel Operated (valve will be installed with stem in horizontal position and arranged for chain wheel operation). Chainwheel only shall be furnished with valve and shall be mounted by the manufacturer prior to shipment (Chain by Duke Power Company).
EMO	Electric Motor Operated - Unless otherwise stated, Electric Motor Operators will be supplied in accordance with the Specification. EMO succeeded by an asterisk (*) indicates that valve has a safety-related function and must meet the Electric Valve Operator Acceptance Criteria as defined in valve specification.

Code	Definition
SOL	Solenoid Operated
AIR	Air Operated
XO	Special Operator (See Remarks - Item "N" of this description)

I) Operator Speed (Eighth Column of Valve List)

This note indicates speed of operation required. If left blank or otherwise unspecified, standard speed (12 in./min.) is to be supplied.

J) Valve Ends (Ninth Column of Valve List)

This note describes the different end preparation required on valves.

For butt welding ends, the following code will apply:

Code	Definition
B-160	Pipe Schedule
:	The particular Weld End Preparation Detail on Duke Drawing No. 1676-1

For socket weld, screwed, flanged and special ends, the following codes will apply:

Code	Definition
SW	Socket weld ends to be in accordance with ANSI B16.11.
SCR	Screwed ends to be in accordance with ANSI B16.11
F1	125# Cast Iron - Flat Face
F2	250# Cast Iron - 1/16" Raised Face
F3	150# Steel - Flat Face
F4	150# Steel - 1/16" Raised Face
F5	300# Steel - Flat Face
F6	300# Steel - 1/16" Raised Face
SE	Special Ends - See Remarks Item "N" this description
WAF	Wafer
FLN	Flanged ends - Diaphragm Valves

K) Seal Leak-Off (Tenth Column of Valve List)

This column will indicate when a valve requires a lantern gland leak-off connection.

Code	Definition
Yes	Valve shall have a lantern gland leak-off connection in accordance with the valve specification.
NA	Lantern gland leak-off not applicable.

L) Lock and Locking Device (Eleventh Column of Valve List)

This column will indicate when a valve requires a lock and locking device. (Mfg. standard)

Code	Definition
Yes	Valve to be equipped with lock and locking device. However, when valve has a chainwheel operator, lock and locking device will be supplied by Duke Power Construction Department.
NA	Lock and locking device not applicable.

M) Design Condition - PSIG and Temp (Twelth and Thirteenth Columns of Valve List)

The PSIG and Temperature (° F) column provides the vendor with the necessary information needed to supply the appropriate valve. Design temperature and pressure ratings will be furnished for the applicable pressure class regarding check and handwheel operated globe and gate valves. On air and motor operated vaives the differential pressure across the valve will be the pressure given in the PSIG column.

N) Remarks

Any additional or special information required by the manufacturer to produce the quality valves as required by Duke will be spelled out in the remarks area. (See attached sample of valve list for remarks area).

O) Revisions

Revisions to any valve list will be indicated in a cover letter transmittal with each valve list.

P) Delivery Schedule

The total quantity ordered of any one item may be divided into groups with different required delivery dates. The following code will give the vendor the essential information for the applicable delivery schedule:

Code: DELIVERY REQD: (000) AA/AA/AA

Definition: (000) - Quantity Required
AA/AA/AA - Date Required

LIST NUM
PLANT CODE = CAT
FILE ID = B4

DUKE POWER COMPANY
DESIGN ENGINEERING DATA BASE
CATAWBA NUCLEAR STATION
VALVE ITEM LIST

REV # 00 (Revision Number)

PAGE # 1
08/15/86 (Date)

VALVE LIST NUMBER CN-9999-99

ITEM NUMBER	CLASS	TYPE	QUANTITY	SIZE	MANUFACTURES DRAWING NUMBER	OPERATOR TYPE	OPERATOR SPEED	ENDS	SEAL LEAK-OFF	LOCK & LOCKING DEVICE	DESIGN PRESS PSIG	DESIGN TEMP. DEG.F
CD8-401	C	BF	50	4.00		HW		WAF	NR	YES	125	100
RMKS:MAX. OPERATING FLOW RATE - 450 GPM												
DELIVERY REQD: (02)03/01/77												
DELIVERY REQD: (02)03/01/78												
DSB-402	B	GT	24	3.00		EMO	10 SEC. MAX.	A-40	YES	NR	200	150
RMKS:ACTIVE VALVE												
DELIVERY REQD: (01)10/01/77												
DELIVERY REQD: (01)10/01/78												
CSD-403	A	SL	50	1.00		SO		SW	NR	NR	300	150
RMKS:CAPACITY - 1500 SCFM AT 330 PSIG. ENERGIZE OPEN. COIL 125V DC. REMOTE POSITION INDICATOR REQD. SERVICE - AIR												
DELIVERY REQD: (05C)01/01/80												
D6J-404	F	GL	1000	1.00		HW		SW	NR	NR	2465	650
DELIVERY REQD: (25C)06/01/79												
DELIVERY REQD: (05C)												

Delivery Schedule — See Note P

Valve List Number

1st Column - See Note B
2nd Column - See Note C
3rd Column - See Note D
4th Column - See Note E
5th Column - See Note F
6th Column - See Note G
7th Column - See Note H
8th Column - See Note I
9th Column - See Note J
10th Column - See Note K
11th Column - See Note L
12th Column - See Note M
13th Column - See Note M

Remarks - See Note N

REVISION		INITIALS	DATE
A	Revised and re-issued	DDM	12/15/77
B	Added Nuclear Diaphragm and Wafer Check List to Note "A"	RDJ	3/7/79
C	Added Nuclear Ball and a 3" and smaller list to Note "A"	D.D. King	11/18/80
D	Updated Note "A" to revise No. 41 to Carbon Steel Ball Valves and No. 42 to 2" and smaller conventional valves. Also added No.'s 43 & 45 thru 49 for new contract requirements.	David D. King	3/16/82
E	Updated Note "A" to revise No. 48 to Carbon Steel 2" and smaller Nuclear valves. Also added No.'s 44 and 50 for new contract requirements. Reivsed Note C to indicate DPCo Class H as Duke's own specification.	David D King	3/31/82
F	Updated Note "A" to revise No. 10 and No. 12 to allow for the use of all size valves.	David D. King	7/16/82

SPECIFICATION NO: CNS-1205.00-6

DATE February 25, 1974

DUKE POWER COMPANY

CATAWBA NUCLEAR STATION

UNIT 1 & 2

Title: Nuclear Safety Related Carbon Steel Valves

REVISION LOG

1 August 22, 1975

2 August 6, 1976

3 May 11, 1977

4 May 24, 1978

5 March 31, 1978

6 December 14, 1978

7 February 14, 1979

8 May 9, 1979

9

10

Form 301.1/Rev. 2

VERIFICATION OF SPECIFICATION

Station and Unit Number: Catawba Nuclear Station Units 1 & 2

Title of Specification: Nuclear Safety Related Carbon Steel Valves

Specification Number: CNS-1205.00-6

Revision: Addendum #8

This document specifies items related to nuclear safety. In accordance with established procedures, its quality has been assured. Signatures certify that the above specification was originated, checked, approved and inspected (or waived) as noted below:

Prepared By: C. A. Barrett Date: 5-9-79

Checked By: E. D. Lindsay Date: 5-10-79

Approved By: J. K. Berry Date: 5-11-79

Inspection Waived By: R. E. Miller Date: 5-11-79

Inspection Waived For: _____ ELECTRICAL _____ MECHANICAL X CIVIL

Inspected By: D. J. Drew Date: 5-15-79

Inspected By: _____ Date: _____

QUALITY ASSURANCE D. S. Millar Date: 5-17-79

****

(FOR ASME CODE ITEMS)

Mechanical & Nuclear Division Date: 5-11-79
Design Engineering Department

This is to certify that the above specification has been reviewed by me, the undersigned, and is correct, complete, and in compliance with 1971 Edition including the Summer Addendum of ASME Code, Section III, Paragraph NA3250.

(SEAL) 1973

SIGNATURE: R. E. Miller

NAME: R. E. Miller
Registered Professional Engineer

No. South Carolina #4237

Form 301.2/Rev 2

SPECIFICATION CNS-1205.00-6
Addendum #8
Date: May 9, 1979

DUKE POWER COMPANY

Catawba Nuclear Station

Units 1 & 2

Nuclear Safety Related Carbon Steel Valves

Reference Paragraph 8.5.2:

Revise to read, "Valve bodies and bonnets shall be a carbon steel acceptable to ASME Boiler and Pressure Vessel Code, Section III (reference Paragraph 4.4.1a). Valve gates or discs shall be a carbon steel or Owner approved equal material acceptable to ASME Boiler and Pressure Vessel Code, Section III. Gland flange and gland shall be considered part of the body."

CDB/sf

SPECIFICATION NO: CNS-1205.00-6

DATE February 25, 1974

DUKE POWER COMPANY

CATAWBA NUCLEAR STATION

UNIT 1 & 2

Title: Nuclear Safety Related Carbon Steel Valves

REVISION LOG

1	August 22, 1975	6	December 14, 1978
2	August 6, 1976	7	February 14, 1979
3	May 11, 1977	8	
4	May 24, 1978	9	
5	March 31, 1978	10	

Form 301.1/Rev. 2

VERIFICATION OF SPECIFICATION

Station and Unit Number: Catawba Nuclear Station Units 1 & 2

Title of Specification: Nuclear Safety Related Carbon Steel Valves

Specification Number: CNS-1205.00-6

Revision: Addendum #7

This document specifies items related to nuclear safety. In accordance with established procedures, its quality has been assured. Signatures certify that the above specification was originated, checked, approved and inspected (or waived) as noted below:

Prepared By: C. A. Bennett Date: 2-22-79

Checked By: Ed Lindsay Date: 2-23-79

Approved By: J. K. Berry Date: 2-28-79

Inspection Waived By: R. E. Miller Date: 2-28-79

Inspection Waived For: X ELECTRICAL ____ MECHANICAL X CIVIL

Inspected By: ____ Date: ____

Inspected By: ____ Date: ____

QUALITY ASSURANCE C. A. Bell Date: 3-2-79

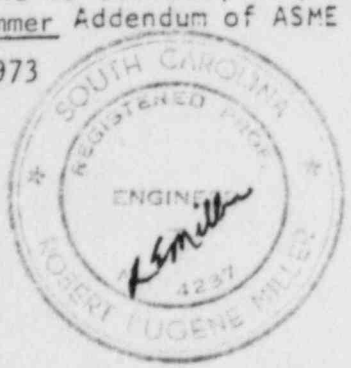
****

(FOR ASME CODE ITEMS)

Mechanical & Nuclear Division Date: 2-28-79
Design Engineering Department

This is to certify that the above specification has been reviewed by me, the undersigned, and is correct, complete, and in compliance with 1971 Edition including the Summer Addendum of ASME Code, Section III, Paragraph NA3250.

(SEAL) 1973



SIGNATURE: R. E. Miller

NAME: R. E. Miller
Registered Professional Engineer

No. South Carolina #4237

Form 301.2/Rev 2

SPECIFICATION CNS-1205.00-6
Addendum #7
Date: February 14, 1979

DUKE POWER COMPANY

Catawba Nuclear Station

Units 1 & 2

Nuclear Safety Related Carbon Steel Valves

Reference Paragraph 8.4.6:

Revise to read, "All electric motor operators and air operators, both active and passive, shall be tested against the design valve opening and closing load (valve load can be simulated). Reference Paragraphs 14.3 and 14.6."

Reference Paragraph 10.3:

Revise address to read,

Quality Assurance Manager, Engineering and Services
Duke Power Company
P. O. Box 33189
Charlotte, North Carolina 28242

Reference Paragraph 13:

Revise address to read,

Mr. S. K. Blackley, Jr., Chief Engineer
Mechanical & Nuclear Division
Duke Power Company
P. O. Box 33189
Charlotte, North Carolina 28242

Attention: H. E. Edwards

Reference Paragraph 14.6:

Add, "In addition to that defined in Paragraph 14.3, another main seat leakage test shall be performed on all active and passive electric motor and air operated valves. The test pressure shall be the design pressure defined on the valve list for the Duke item being tested. Test hold time shall be a minimum of five (5) minutes. Seat leakage shall be no more than 3cc/hr/in. of nominal seat diameter."

CDB/sf

SPECIFICATION NO: CNS-1205.00-6

DATE February 25, 1974

DUKE POWER COMPANY

Catawba Nuclear STATION

UNIT 1 & 2

Title: Nuclear Safety Related Carbon Steel Valves

REVISION LOG

1	August 22, 1975	6	December 14, 1978
2	August 6, 1976	7	
3	May 11, 1977	8	
4	May 24, 1978	9	
5	March 31, 1978	10	

Form 301.1/Rev. 2

VERIFICATION OF SPECIFICATION

Station and Unit Number: Catawba Nuclear Station Units 1 & 2

Title of Specification: Nuclear Safety Related Carbon Steel Valves

File Number: CNS-1205.00-6

Revision: Addendum #6

This document specifies items related to nuclear safety. In accordance with established procedures, its quality has been assured. Signatures certify that the above specification was originated, checked, approved and inspected (or waived) as noted below:

Prepared By: C D Braxton Date: 12/15/78

Checked By: E. D. Lindsay Date: 12/28/78

Approved By: J. K. Berry Date: 12/29/78

Inspection Waived By: R E Miller Date: 12/29/78

Inspection Waived For: X ELECTRICAL ____ MECHANICAL X CIVIL

Inspected By: _____ Date: _____

Inspected By: _____ Date: _____

QUALITY ASSURANCE D. S. Miller Date: 1-3-79

****

(FOR ASME CODE ITEMS)

Mechanical & Nuclear Division Date: 12/29/78
Design Engineering Department

This is to certify that the above specification has been reviewed by me, the undersigned, and is correct, complete, and in compliance with 1971 Edition including the Summer 1973 Addendum of ASME Code, Section III, Paragraph NA3250

(SEAL)

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER R E Miller NO. 4237 ROBERT EUGENE MILLER

SIGNATURE: R E Miller

NAME: R. E. Miller
Registered Professional Engineer

No. South Carolina #4237

Form 301.2/Rev 2

SPECIFICATION CNS-1205.00-6
Addendum #6
December 14, 1978

DUKE POWER COMPANY

Catawba Nuclear Station

Units 1 & 2

Nuclear Safety Related Carbon Steel Valves

Reference Paragraph 8.3.20:

Add, "All valve items designated on Duke valve lists as 'CONTAINMENT ISOLATION' shall have seat leakage tests performed at 15 psig of air pressure. Maximum allowable seat leakage shall be five (5) cubic centimeters per minute per inch of nominal seat diameter.

Reference Paragraph 10.2 b):

Revise to read, "Documentation of all hydrostatic and operational tests showing their results. Documentation for air seat tests performed on containment isolation valves shall specifically indicate test leakage rates."

Reference Paragraph 14.6:

Add, " In addition to seat leakage tests performed in accordance with MSS-SP-61, valve items designated on Duke valve lists as 'CONTAINMENT ISOLATION' requiring testing per Specification CNS-1205.00-6 shall have seat leakage tests performed at 15 psig of air pressure. Minimum hold time shall be five (5) minutes. Maximum allowable seat leakage shall be five (5) cubic centimeters per minute per inch of nominal seat diameter. Bi-directional valves shall be tested in both directions. Uni-directional valves shall be tested in the designated direction of flow only."

CDB/sf

SPECIFICATION NO. CNS-1205.00-6

DATE February 25, 1974

DUKE POWER COMPANY

CATAWBA NUCLEAR STATION

Units 1 & 2

CARBON STEEL CODE VALVES

REVISION LOG

1 August 22, 1975

2 August 6, 1976

3 May 11, 1977

4 May 24, 1978

5 March 31 1978

VERIFICATION OF SPECIFICATION

Station and Unit Number: Catawba Nuclear Station Units 1 & 2

Title of Specification: Carbon Steel Code Valves

Specification Number: CNS-1205.00-6

Revision: #5

This document specifies items related to nuclear safety. In accordance with established procedures, its quality has been assured. Signatures certify that the above specification was originated, checked, approved and inspected (or waived) as noted below:

Prepared By: C. D. Berndt Date: 3/31/78

Checked By: E. D. Lindsay Date: 4/3/78

Approved By: J. K. Berry Date: 4/5/78

Inspection Waived By: R. E. Miller Date: 4-6-78

Inspection Waived For: ✓ ELECTRICAL ____ MECHANICAL ✓ CIVIL

Inspected By: ____ Date: ____

Inspected By: ____ Date: ____

QUALITY ASSURANCE D. S. Miller Date: 5-4-78

****

(FOR ASME CODE ITEMS)

Mechanical & Nuclear Division Date: 4-6-78
Design Engineering Department

This is to certify that the above specification has been reviewed by me, the undersigned, and is correct, complete, and in compliance with 1971 Edition including the Summer 1973 Addendum of ASME Code, Section III, Paragraph NA-3250.

(SEAL)

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER ROBERT EUGENE MILLER NO. 4237

SIGNATURE: R. E. Miller

NAME: R. E. Miller
Registered Professional Engineer

No. South Carolina #4237

Form 301.2/Rev 2

DUKE POWER COMPANY

Catawba Nuclear Station
Units 1 & 2

Carbon Steel Code Valves

Reference the specification title:

Revise to read, "NUCLEAR SAFETY RELATED CARBON STEEL VALVES."

Reference Paragraph 4.1:

Revise to read, "This specification covers the design fabrication, testing, quality assurance documentation, and delivery of both ASME Section III, Class 1, 2, and 3 (Duke Class A, B, and C, respectively) carbon steel valves and Duke Class F carbon steel valves with operators, as required, important to nuclear safety of Catawba Nuclear Station, Units 1 & 2."

Reference Paragraph 5.17:

Add, "Duke Power Spare Parts Form, Form SP-1, Revision 1."

Reference Paragraph 8.4.4:

Revise to read, "Electric valve operators in conjunction with Duke Class A, B, and C valves applied inside the Containment (so identified on valve list) must have successfully met and passed IEEE Standard 382-1972 (ANSI N41.6), IEEE Trial-Use Guide for Type test of Class 1 Electric Valve Operators for Nuclear Power Generating Stations. The seismic qualification aspects required by section 4.3 of IEEE Standard 382 shall be those given in specification section 5.7.

The following IEEE standards are invoked by IEEE Standard 382, and are applicable for Containment operators on Duke Class A, B, and C valves:

a) IEEE 112A-1964, Test Procedure for Polyphase Induction Motors and Generators.

b) IEEE 117-1956, Test Procedure for Evaluation of Systems of Insulating materials for Random-Wound Electric Machinery.

c) IEEE 323-1971, General Guide for Qualifying Class 1 Electric Equipment for Nuclear Power Generating Stations.

d) IEEE 334-1971, Trial Use Guide for Type Tests of Continuous-Duty Class 1 Motors installed inside the Containment of Nuclear Power Generating Stations.

e) IEEE 344-1971, Trial Use Guide for Seismic Qualification of Class 1 Electric Equipment for Nuclear Power Generating Stations.

Reference Paragraph 8.4.5:

Revise to read, "Electric valve operators in conjunction with Duke Class A, B, and C applied outside the Containment and with all Duke Class F valves must meet and pass the following standards referenced in 8.4.4:

a) IEEE 112A-1964

b) IEEE 117-1956

c) IEEE 344-1971

In addition all of these motor operators, including Duke Class F, must meet the seismic design requirements called out in attachment 5.7 for A, B, and C valves.

Reference note after Paragraph 8.5.6:

Revise to read, "It is the responsibility of the Bidder to advise the Owner if any of the above materials are not suitable for the intended service or will not satisfy the requirements of the ASME Boiler and Pressure Vessel Code, Section III for Duke Class A, B, and C valves and ANSI B31.1 for Duke Class F valves. This responsibility applies both prior to and following award of order."

Reference Paragraph 8.5.14:

Add, "Duke Class F valve bodies two inches (2") and smaller shall be forged."

Reference Paragraph 9.1:

Revise to read, "All Duke Class A, B, and C valves shall be tagged with metal tags showing Owner's valve item number and National Board Number. All Duke Class F valves shall also be tagged with metal tags showing Owner's valve item number and a unique serial number for traceability. All tags shall be permanently secured to the valve yoke as shown on the attached Duke Power Standard Orientation of EMO valves. Reference Paragraph 9.11 for additional tagging information."

Reference Paragraph 9.9:

Revise first sentence to read, "All Duke Class A, B, C, and F valves and valve operators must be seismically designed in accordance with Paragraph 5.7."

Reference Paragraph 10.2:

Revise to read, "Contractor shall submit to Owner no later than valve shipping date, a documentation package for each Duke Class A, B, and C valve consisting of one reproducible copy of the following:"

Reference Paragraph 10.5:

Add, "Contractor shall submit to Owner no later than valve shipping date, a documentation package for each valve item of Duke Class F valves. The number of valves per package shall be limited to 25. Each package shall consist of one reproducible copy of each of the following:

a) Documentation of all hydrostatic and operational test showing their results.

b) Record of wall thickness measurement.

c) Record of all deviations.

d) Completed Duke Power Company Design Engineering Department Vendor Quality Assurance Certification, form 930.1.

e) Where electric valve operators are supplied, a record of load test on operator (see 8.4.6). A comparison of actual torque required to operate the valve under design conditions vs. actual furnished available torque with percent margin will be supplied for each electric motor operated valve furnished.

f) Certification that packing material meets limit of 200 ppm chloride content.

g) Certification that valves meet the requirements of ANSI B31.1 and of this specification.

Reference Paragraph 14.1:

Revise first sentence to read, "Nondestructive and destructive testing of pressure boundary materials of Duke Class A, B, and C valves shall be in accordance with the procedures and acceptance standards set forth in reference code 4.4.1a.

Reference Paragraph 14.2:

Revise to read, "Hydrostatic testing of Duke Class A, B, and C valves shall be in accordance with reference code 4.4.1a. Hydrostatic testing of Duke Class F valves shall be in accordance with reference code 4.4.1c. The valve stuffing box shall have packing removed and subjected to hydrostatic test pressure. Demineralized water which is in accordance with specification section 4.4.3 shall be used as the hydrostatic test media. The hydrostatic test shall be performed prior to the seat leakage test.

SPECIFICATION NO. CNS-1205.00-6

DATE February 25, 1974

DUKE POWER COMPANY

CATAWBA NUCLEAR STATION

Units 1 & 2

CARBON STEEL CODE VALVES

REVISION LOG

1 August 22, 1975

2 August 6, 1976

3 May 11, 1977

4 May 24, 1978

5

VERIFICATION OF SPECIFICATION

Station and Unit Number: Catawba Nuclear Station Units 1 & 2

Title of Specification: Carbon Steel Code Valves

File Number: CNS-1205.00-6

Revision: Addendum #4

This document specifies items related to nuclear safety. In accordance with established procedures, its quality has been assured. Signatures certify that the above specification was originated, checked, approved and inspected (or waived) as noted below:

Prepared By: C. D. Barrett **Date:** 5-24-78

Checked By: E. D. Lindsay **Date:** 5-25-78

Approved By: J. K. Berry **Date:** 5-26-78

Inspection Waived By: R. E. Miller **Date:** 5-30-78

Inspection Waived For: ELECTRICAL MECHANICAL ✓ CIVIL

Inspected By: D. J. Allen **Date:** 6-6-78

Inspected By: **Date:**

QUALITY ASSURANCE D. S. Nelson **Date:** 6-7-78

****

(FOR ASME CODE ITEMS)

Mechanical & Nuclear Division **Date:** 5-30-78
Design Engineering Department

This is to certify that the above specification has been reviewed by me, the undersigned, and is correct, complete, and in compliance with 1971 Edition including the Summer 1973 Addendum of ASME Code, Section III, Paragraph NA3250.

(SEAL)

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER ROBERT EUGENE MILLER NO. 4237

SIGNATURE: R. E. Miller

NAME: R. E. Miller
Registered Professional Engineer

No. South Carolina #4237

Form 301.2/Rev 2

DUKE POWER COMPANY

Catawba Nuclear Station
Units 1 & 2

Carbon Steel Code Valves

Reference Paragraph 8.3.18:

Revise to read, "All safety-related ASME valves (Duke classes A-C) shall have the capability for having a set of position limit switches mounted directly on the valve and actuated by the valve stem. These limit switches, when required on electric motor operated valves, shall be in addition to and physically, mechanically, and electrically separate from, and independent of, the switches in the operator. After award of order, the Owner will indicate on the valve list those valves requiring the extra stem mounted limit switch package.

The stem mounted switches, when required on valves designated on the valve lists for outside Containment service, shall be Namco Controls type EA 170-302 or Owner approved equal. Limit switches, when required on valves designated on the valve lists for inside Containment service, shall be Namco Control type EA 180-302 or Owner approved equal.

Where the Namco equipment is used, the valve shall have two limit switch assemblies, each having DPDT electrical switch contacts. One switch assembly shall be actuated at the full open valve position; the other shall be actuated at the full closed position."

Reference Paragraph 8.4.4:

Revise first sentence to read, "Electric valve operators and associated limit switches applied inside the Containment (so identified on valve lists) must have successfully met and passed IEEE Standard 382-1972 (ANSI N41.6), IEEE Trial-Use Guide for Type Test of Class 1 Electric Valve Operators for Nuclear Power Generating Stations, as applicable."

Reference Paragraph8.4.5:

Revise first sentence to read, "Electric valve operators and associated limit switches applied outside the Containment must meet and pass the following standards, as applicable, referenced in 8.4.4:"

CDB/ah

VERIFICATION OF SPECIFICATION

Station and Unit Number: Catawba Nuclear Station Units 1 & 2

Title of Specification: Carbon Steel Code Valves

Specification Number: CNS-1205.00-6

Revision: Addendum #3

This document specifies items related to nuclear safety. In accordance with established procedures, its quality has been assured. Signatures certify that the above specification was originated, checked, approved and inspected (or waived) as noted below:

Prepared By: D Gardner Date: 5-11-77

Checked By: U.H. Skillman Date: 5-11-77

Approved By: J.K Berry Date: 5-12-77

Inspection Waived By: R E Miller Date: 5-12-77

Inspection Waived For: ____ ELECTRICAL ____ MECHANICAL X CIVIL

Inspected By: D Gaver Date: 5-18-77

Inspected By: ____ Date: ____

QUALITY ASSURANCE D.S. Miller Date: 5-23-77

****

(FOR ASME CODE ITEMS)

Mechanical & Nuclear Division Date: 5-12-77
Design Engineering Department

This is to certify that the above specification has been reviewed by me, the undersigned, and is correct, complete, and in compliance with 1971 Edition including the Summer 1973 Addendum of ASME Code, Section III, Paragraph NA-3250

(SEAL)

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER NO. 4237 ROBERT EUGENE MILLER

SIGNATURE: R E Miller

NAME: R. E. Miller
Registered Professional Engineer

No. South Carolina #4237

Form 301.2/Rev 2

SPECIFICATION CNS-1205.00-6
ADDENDUM #3
May 11, 1977

DUKE POWER COMPANY
Catawba Nuclear Station
Carbon Steel Code Valves

1. Under Section 14, "Tests and Inspections," revise as follows:

14.2 Hydrostatic testing of the valves shall be in accordance with reference code 4.4.1a. The valve stuffing box shall have packing removed and subjected to hydrostatic test pressure. Demineralized water which is in accordance with specification section 4.4.3 shall be used as the hydrostatic test media. The hydrostatic test shall be performed prior to the seat leakage test.

14.5 A stuffing box packing leakage test shall be performed. The test pressure shall be the shell hydrostatic test pressure except for 1500 lb. rated valves which shall be 110% of the 100°F pressure rating of the valve shell. Hold time shall be a minimum of 15 minutes. No leakage is permitted.

DGG/js

VERIFICATION OF SPECIFICATION

Station and Unit Number: Catawba Nuclear Station Units 1 & 2

Title of Specification: Carbon Steel Code Valves

Specification Number: CNS-1205.00-6

Revision: Addendum #2

This document specifies items related to nuclear safety. In accordance with established procedures, its quality has been assured. Signatures certify that the above specification was originated, checked, approved and inspected (or waived) as noted below:

Prepared By: C.H. Gardner Date: 8-16-76

Checked By: Jack D. Young Date: 8-16-76

Approved By: J K Dees Date: 8-27-76

Inspection Waived By: T.F. Wyke Date: 8-27-76

Inspection Waived For: _____ ELECTRICAL _____ MECHANICAL "WAIVED" CIVIL

Inspected By: By Owen Date: 8-30-76

Inspected By: _____ Date: _____

QUALITY ASSURANCE C.A. Bell Date: 9-1-76

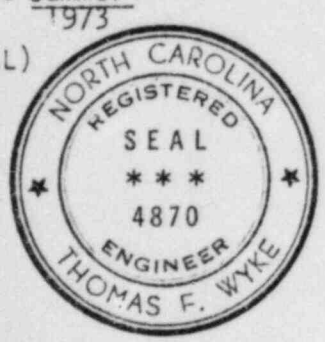
****

(FOR ASME CODE ITEMS)

Mechanical & Nuclear Division Date: 8-27-76
Design Engineering Department

This is to certify that the above specification has been reviewed by me, the undersigned, and is correct, complete, and in compliance with 1971 Edition including the Summer 1973 Addendum of ASME Code, Section III, Paragraph NA-3250

(SEAL)



SIGNATURE: Thomas F. Wyke

NAME: T. F. Wyke
Registered Professional Engineer

No. North Carolina #4870

Form 301.2/Rev 2

SPECIFICATION CNS-1205.00-6
ADDENDUM #2
August 6, 1976

DUKE POWER COMPANY

Catawba Nuclear Station

Carbon Steel Code Valves

I. Under Part III of Addendum #1, revise as follows:

8.4.2 Electric motor operated valves shall be Philadelphia Gear (Limitorque) or Rotork, at the Owner's option. Where Limitorque operators are specified, they shall be of the "Four Rotor-Double Torque" type with sixteen position limit switches and two torque switches. The operators shall be furnished with integral space heater but without motor contractors or control switches.

Where Rotork operators are specified, they shall be of the "Syncro SET 2 with Add-on-Pak 1" type with ten position limit switches and two torque/limit switches. The operators shall be furnished with integral space heater but without motor contactors or control switches. The Owner reserves the right to require that certain valves be furnished with Rotork operators similar to the above but with 12 position limit switches. After award of order, the Owner will indicate on the valve list those valves requiring the twelve position limit switches.

II. Under section 4, "General," revise as follows:

4.4.1c ANSI B16.5 (1968) Steel Pipe Flanges and Flanged Fittings.

4.4.1h ASME Code Case 1672, Nuclear Valves - Section III - Division 1, Classes 1, 2 and 3.

III. Under section 5, "Reference Drawings and/or Attachments," revise as follows:

5.14 Duke Power Company Standard Coating Specification CN-000-1-1 dated November 1, 1975 for valve motor operators.

5.15 Duke Power Company Standard Coating Specification CN-NNN-1 dated November 1, 1975 for valves located inside the Reactor Building.

5.16 Duke Power Company Standard Coating Specification NNN-11 revised on July 22, 1976 for valves located outside the Reactor Building.

IV. Under section 8, "General Design," refer to paragraph:

8.3.7 The design report for Class 1 (Duke Calss A) valves four inches and smaller may exclude the thermal cyclic loading requirements.

8.3.8 The thermal cyclic requirements for Class 2 and 3 (Duke Class B and C) valves may be deleted.

V. Under Section 8, "General Design," revise as follows:

8.3.17 Active valves shall be capable of withstanding an integrated radiation dose of 2×10^8 rads without loss of integrity of function. Active valves are noted on the valve lists. All other valves shall be capable of withstanding an integrated radiation dose of 1×10^6 rads without loss of integrity or function.

8.4.11 All normally painted exterior surfaces of motor operators shall be coated in accordance with the following requirements:

8.4.11.1 Limitorque Operators:

8.4.11.1.1 Inside the Reactor Building: Inorganic zinc Primer per Limitorque Special Paint Procedure LPS-102A

8.4.11.1.2 Outsite the Reactor Building: Standard coating per Limitorque Standard Paint System LPS-101

8.4.11.2 Rotork Operators:

8.4.11.2.1 Inside the Reactor Building: Duke Coating Specification CN-000-I-1

8.4.11.2.2 Outside the Reactor Building: Rotork standard coating

8.5.4 Bolts and studs shall be SA564, Type 630, Condition H-1100. Nut material shall conform to SA-194, Gr B8 or a similar material approved by the Owner.

VI. Under Section 9, "Special Requirements," add:

9.8 Carbon steel valves and valve parts, including air operators and gear boxes, shall be coated in accordance with Referenced Attachments 5.15 of 5.16 as applicable.

9.11 All valves that are not power operated shall utilize ASME Code Case 1672 for nameplate design condition listing. For all other valves, the nameplate shall show the design conditions as given in the valve lists. For Class 1 Valves, the 100°F pressure rating shall appear on the nameplate in addition to the above requirements.

DGG/ja

VERIFICATION OF SPECIFICATION

Station and Unit Number: Catawba Nuclear Station Units 1 & 2

Title of Specification: Carbon Steel Code Valves

File Number: CNS-1205.00-6

Revision: Addendum #1

This document specifies items related to nuclear safety. In accordance with established procedures, its quality has been assured. Signatures certify that the above specification was originated, checked, approved and inspected (or waived) as noted below:

Prepared By: D F Gardner Date: 8-26-75

Checked By: C. M. Myers Date: 8-27-75

Approved By: J. K. Berry Date: 8-28-75

Inspection Waived By: T. F. Wyke Date: 8-28-75

Inspection Waived For: _____ ELECTRICAL _____ MECHANICAL "WAIVED" CIVIL

Inspected By: D F Gardner Date: 8-28-75

Inspected By: _____ Date: _____

QUALITY ASSURANCE: [signature] Date: 9-10-75

****

(FOR ASME CODE ITEMS)

Mechanical & Nuclear Division Date: 8-28-75
Design Engineering Department

This is to certify that the above specification has been reviewed by me, the undersigned, and is correct, complete, and in compliance with 1971 Edition including the Summer 1973 Addendum of ASME Code, Section III, Paragraph NA-3250.

(SEAL)

NORTH CAROLINA REGISTERED SEAL * * * 4870 ENGINEER THOMAS F. WYKE

SIGNATURE: Thomas F. Wyke

NAME: T. F. Wyke
Registered Professional Engineer

No. North Carolina #4870

Form 301.2/Rev 2

DUKE POWER COMPANY

Catawba Nuclear Station

Carbon Steel Code Valves

I. Under Section 5, "Reference Drawings and/or Attachments," revise as follows:

5.3 CN-1676-1, Duke Power Company Weld End Standards, dated June 20, 1974.

5.4 CN-1676-1.1 Duke Power Company Weld End Standards, dated June 20, 1974.

5.7 Duke Power Company - Seismic Design Requirements - Catawba 1 & 2, Gate, Globe, and Check Valves - Safety Classes 1, 2, and 3, revised June 9, 1975.

5.13 Drawing Requirements, revised July 9, 1975.

II. Under Section 5, "Reference Drawings and/or Attachments," add:

5.16 Wall Thickness Verification, dated July 30, 1974.

III. Under Section 8, "General Design," revise as follows:

8.3.6 Valve weld ends shall be machined in accordance with Duke Power Company drawings CN-1676-1 and CN-1676-1.1, Attachments 5.3 and 5.4.

8.3.10 All valves located in the Reactor Building (noted on valve lists) shall be suitable for high temperature service. Normal ambient temperature in the Reactor Building will be 120°F, and 100 percent relative humidity; however, all valves so designated on valve lists must be capable of operation for a period of at least 30 minutes during which the ambient temperature may reach 250°F and 100 percent steam saturation.

8.3.18 All safety-related ASME valves (Duke classes A-C) shall have the capability for having a set of position limit switches mounted directly on the valve and actuated by the valve stem. These limit switches, when required, shall be in addition to the limit switches provided in the electric motor operator and shall be physically, mechanically and electrically separate from, and independent of, the switches in the operator. After award of order, the Owner will indicate on the valve list those valves requiring the extra stem mounted limit switch package.

The stem mounted switches described above, when required, shall be Fisher Controls Type 304, Namco Controls Type EA170 or Owner approved equal. Where the Fisher equipment is used, the valve shall have one type 304 limit switch assembly containing two sets of SPDT electrical switch contacts. One set shall be actuated at the full open valve position; the other set shall be actuated at the full closed position.

Where the Namco equipment is used, the valve shall have two type EA170 limit switch assemblies, each having DPDT electrical switch contacts. One switch assembly shall be actuated at the full open valve position; the other shall be actuated at the full closed position.

8.4.2 Electric motor operated valves shall be Philadelphia Gear (Limitorque) or Rotork, at the Owner's option. Where Limitorque operators are specified, they shall be of the "Four Rotor-Double Torque" type with sixteen position limit switches and two torque switches. The operators shall be furnished with integral space heater but without motor contactors or control switches.

Where Rotork operators are specified, they shall be of the "Syncro SET 2 with Add-on-Pak 1" type with ten position limit switches and two torque/limit switches. The operators shall be furnished with integral space heater but without motor contactors or control switches. The Owner reserves the right to require that certain valves be furnished with Rotork operators similar to the above but with the additional "Add-on-Pak 2" limit switch package. After award of order, the Owner will indicate on the valve list those valves requiring the "Add-on-Pak 2" option.

8.4.10 Operators and topworks within the Reactor Building shall be suitable for high temperature service. Normal ambient conditions in the Reactor Building will be 120°F and 100% relative humidity; however, all valves and valve operators designated on valve lists must be capable of operation for a period of at least 30 minutes during which the ambient conditions may reach 250° and 100 percent steam saturation.

IV. Under Section 8, "General Design," delete paragraph 8.4.3.

V. Under Section 10, "Quality Assurance Requirements and Documentation," revise as follows:

10.2(j) Documentation of wall thickness as required by attachment 5.16, "Wall Thickness Verification."

10.3 The documentation package shall be sent to the Quality Assurance Manager, Engineering & Services, Duke Power Company, P. O. Box 2178, Charlotte, North Carolina 28292. One copy of the Duke Power Quality Assurance Certification (Item 10.2(f)) and a copy of Form NPV-1 shall be shipped with the valves.

DGG/sf

DUKE POWER COMPANY
SEISMIC DESIGN REQUIREMENTS
VALVES
CATAWBA 1 & 2
GATE, GLOBE, & CHECK VALVES
SAFETY CLASS 1, 2 & 3

1.0 Seismic Design Manual

The valve and appurtenances shall be qualified to meet the seismic design requirements of this specification in accordance with the procedures and guidelines of the Duke Power Company Seismic Design Manual. The Manual is intended to be utilized only as a reference to this section and not to be used alone. The sections of the Manual pertaining to particular portions of this specification are noted below. However, those sections should not be used directly without the background information provided in the remainder of the Manual.

2.0 Operating Conditions

2.1 Modes of Operation

Two modes of operation shall be considered (Manual Section 4.1.3). The upset mode includes the effects of the Operational Basis Earthquake (OBE), and the faulted mode includes the effects of the Safe Shutdown Earthquake (SSE). The seismic loads shall be considered in combination with all other concurrent loadings on the valve (Manual Section 4.1.3). The criteria for these loads are specified below.

2.2 Seismic Input Criteria

For the SSE, a Seismic Load Factor (SLF) of 3.0 g shall be applied in each of two orthogonal horizontal directions in combination with an SLF of 2.0 g in the vertical direction, all acting simultaneously (Manual Section 4.1.1.1). The SLF values for the OBE shall be taken as 8/15 of the respective values for the SSE.

2.3 Concurrent Loading Conditions

Other concurrent loadings to be considered are described in Manual Section 4.1.3. Any additional considerations are specified below.

2.3.1 For Class 1 valves, loadings resulting from operational transient conditions shall also be included.

3.0 Seismic Qualification

3.1 Procedure

One of the following procedures may be utilized for the seismic qualification:

3.1.1 Equivalent Static Analysis

An analysis shall be performed in accordance with Manual Section 4.2. The results shall be demonstrated to fulfill the acceptance criteria of Manual Section 6.0 for active valves.

3.1.2 Testing

A testing program shall be performed in accordance with Manual Section 5.0. Test procedures 5.2.1 to 5.2.8 shall be performed. It is to be noted that a preliminary report shall be submitted prior to any tests (Manual Section 7.1).

3.1.3 Combined Testing and Analysis

A testing program may be selected to satisfy only a portion of the seismic requirements. The remainder of the equipment shall be qualified by analysis. Complete documentation shall be presented demonstrating the correlation between the analysis and the test results (Manual Section 5.0).

3.2 Orientation

The valve shall be considered in the worst possible orientation (highest stress/deformation level in each valve component) with respect to the total combined loading conditions.

3.3 Support Conditions

The valve shall be considered to be supported only at the inlet and outlet ends.

3.4 Active Valves

For safety, relief, isolation, and all other active valves having extended operator structures:

3.4.1 Rigid Structure

The valves shall be designed such that there are no natural frequencies less than 33 Hz. This shall be demonstrated either via testing (Manual Section 5.2.4, Exploratory Scanning Test) or by analysis (Manual Section 4.2.1.2).

3.4.2 Static Deflection Test

A static deflection test shall be performed in accordance with Manual Section 5.2.9 to verify operability under the specified static loading conditions.

3.5 Piping Loads

The following two criteria shall be met to verify the capability of the valve with respect to piping loads.

3.5.1 To ensure that the torsional and bending moment capability of the valve body is greater than that of the adjacent piping, the product of the minimum section modulus of the valve body perpendicular to the run of the valve and the yield strength of the valve body material shall be at least 1.2 times the same product for the adjacent piping. Required data for the piping is as follows:

Pipe Size: _____
Yield Strength: Sy = _____ psi
Section Modulus: Z = _____ in^3

3.5.2 To ensure operability of the valve while subjected to maximum piping loads, valve operation shall not be impaired due to a bending moment, M = Z x Sy, or a torsional moment, T = 1.2 Z x Sy, each applied singly at the ends of the valve.

4.0 General Considerations

4.1 In addition to these seismic criteria, all requirements of ASME Section III shall be met.

5.0 Reporting Requirements

A fully documented report on the seismic qualification shall be submitted in accordance with Sections 7.0 and 8.0 of the Seismic Design Manual. This report must be approved by Duke Power Company prior to shipment of any items of equipment.

DRAWING REQUIREMENTS

1.0 The Contractor shall prepare and submit six prints each of all drawings to Mr. S. K. Blackley, Jr., Duke Power Company, P. O. Box 2178, Charlotte, North Carolina, 28242, Attention: C. M. Myers. These prints are to be full size and legible with uniform background density suitable for microfilming and subsequent reproduction from microfilm. These prints will be reviewed by the Owner and, if satisfactory, will be approved and one so marked will be returned to the Contractor. If not satisfactory, the prints will be appropriately marked and one returned to Contractor for correction after which six (6) prints of the drawings as corrected shall again be submitted to the Owner for approval. Contractor shall make any corrections required by the Owner and appropriately note any changes by dating revisions on the drawing and indicating, through use of symbols, exactly where drawing revised.

2.0 Drawings will be microfilmed by the Owner and should adhere to the following Drafting Lettering Standards:

Minimum character height (A, B, C size dwgs)	- 0.125 in. (1/8)
Minimum character height (D & E size dwgs)	- 0.156 in. (5/32)
Minimum spacing between lines of characters	- height of characters
Machine & guide generated characters	- 12 point size min.
Density of characters and lines	- Dense, sharp, uniform
Background density of drawing	- uniform

2.1 If drawings are not acceptable to Owner for microfilming, Contractor shall furnish 15 copies of all drawings for Owner's records within 14 days of receipt of drawing approval. Bidder to state drafting lettering standards that will apply.

2.2 On all drawings larger than 11" x 17" in size, a blank space 4" x 6" in size and located near the title block should be reserved for use by the Owner.

2.3 On all drawings and correspondence concerning this order, the Contractor shall show the following numbers: Mill Power Supply Company's Order Number and Duke Power Company's Item Number. Material is not to be fabricated until drawings have been approved. All drawings will be due six weeks after award of order.

2.4 Drawings submitted for equipment designated by Owner as safety related (Duke Classification A, B, C & D) shall have the words "Nuclear Safety Related" printed in a character size equal to or larger than the largest size used on the drawing and shall be located directly above the title block.

3.0 The following information shall be included on the certified prints of outline and cross-section drawings.

3.1 Support anchor bolt hole size ($\frac{1}{4}$" larger diameter than required bolt size) and location. Indicate anchored end and slotted end, if applicable.

3.2 Owner foundation requirements including: (Refer to specification Sections 7, 8 and 16 for additional information).

3.2.1 Anchor bolt projection and grouting requirements.
3.2.2 Anchor bolt pattern dimensions.
3.2.3 Anchor bolt diameters and material type.
3.2.4 Resultant moments and forces at the base of the equipment upon which anchor bolt designs are based, including a list of loading conditions considered when deriving these resultant moments and forces. The specific stress criteria (allowable stress values, code and specification references) used shall be listed.

3.3 Overall dimensions and center-of-gravity of equipment, including equipment centerline to face of all piping connections requiring Owner connection and any disassembly clearances required, such as tube pulling clearances, etc.

3.4 All nozzle orientations with size and rating of all suction and discharge flanges, and ID/OD if not nominal for weld end nozzles. If more than one nozzle orientation is allowable, so indicate.

3.5 Nozzle list on drawing including all information on attached sheet tabulated in a similar format. List should include all connections including vents, drains, and instrument connections.

3.6 Each piece of equipment will be modeled by Owner; consequently, detailed dimensional information will be required, such as dimensional information on contractor supplied piping, location of manways, etc.

3.7 Equipment weight, empty and full of water, and baseplate weight, if applicable. For valves, weight of valve and weight of operator should be shown.

3.8 Lifting lugs shown for tanks as required by Duke Power specification and/or as normally furnished by the Contractor.

3.9 Information shown on equipment nameplate including design conditions.

3.10 Allowable nozzle loadings on equipment if applicable.

3.11 Electrical drawings to be furnished shall consist of complete elementary diagrams, wiring diagrams, interconnection wiring diagrams, outlined, bills of materials, full descriptions of operations and recommended trouble shooting procedures.

3.12 Contractor shall include in proposal or in supplemental data after order (not necessarily to be included on separate drawing).

3.12.1 Sketch of weld end detail for each nozzle connection per Owner's weld end standard.

3.12.2 List of all lifting lugs or eyes, with ASME or ASTM material specification, and sketch of handling method.

3.12.3 List of all miscellaneous valves, plugs, etc. included as part of Contractor's scope of supply and sketch of diagram of any special piping, valves, controls, etc. required and to be furnished by Owner. All diagrammatic connections must be identifiable by nomenclature or connection number to the connection as shown on the equipment drawing.

11-9-72
Rev. 7-11-73
Rev. 1-31-74
Rev. 12-13-74 CMM/sf
Rev. 7-9-75 JKB sr

INFORMATION REQUIRED ON CONTRACTOR'S DRAWINGS

Listing of Nozzles for - (Name of Equipment)

Nozzle Notation	Use (vent, drains, and spares, etc.)	Nominal size in inches	Type of Connection- Butt Weld, Socket Weld, Flanged, or Threaded.	A.For butt welds list pipe sch. for which weld end preps are designed* B.Note type of thread for threaded connections C.For flanged connections note the pressure class and whether raised or flat face. Also note standard to which flange is layed out or note as special layout**	A. For butt and socket welds list ASME or ASTM specification and grade. of material. B. For flanged connections note whether flange is S.S., C.S., C.I., etc.
A	Inlet (Example)	6"	BW	Sch. 40	SA-106-B

For butt welds made to Contractor standard, (as approved by Owner) note the standard (drawing) to which the weld prep will be made. For butt welds made per Duke drawings, a sketch will be required for each different weld end preparation.

For flanges made to a special layout, a sketch will be required for each different design noting the layout of the flange.

WALL THICKNESS VERIFICATION

1.0 The valve manufacturer must document and provide a record of wall thickness measurements on all pressure boundary items showing actual measurements and corresponding wall thickness required by the applicable ASME Code and manufacturers design. All such documented records should state the measurement accuracy. Measurement error when subtracted from the measured wall shall result in wall thickness equal to or greater than the required minimum wall thickness. A written procedure for verifying specified minimum wall thickness shall be submitted for owners approval and must be approved before use. The procedure shall provide for the following information dependent upon which measurement method is utilized.

1.1. Direct Physical Measurement Method

1.1.1 Tools used for measurement including manufacturing tolerence of each.

1.1.2 Cross section sketch of valve identifying areas that will be verified.

1.1.3 Identify methods of recording data.

1.2 Ultrasonic Measurement Method

1.2.1 Identify the equipment by manufacturer and model.

1.2.2 State how equipment will be calibrated and operated.

1.2.3 Cross section sketch of valve identifying areas that will be verified.

1.2.4 State how error repeatability and accuracy is applied to verification measurements.

1.2.5 Identify method of recording data.

2.0 Wall thickness measurements and inspection shall be accomplished after final machining.

3.0 The valve manufacturer shall notify owner's Quality Assurance Department at the start of wall thickness inspection and verification. Owner may elect to witness wall thickness verification; however, manufacturer may proceed with inspection without owner's representative's presence.

VERIFICATION OF SPECIFICATION

Station and Unit Number: Catawba Nuclear Station Units 1 & 2

Title of Specification: Carbon Steel Code Valves

File Number: CNS-1205.00-6

Revision:

This document specifies items related to nuclear safety. In accordance with established procedures, its quality has been assured. Signatures certify that the above specification was originated, checked, approved and inspected (or waived) as noted below:

Prepared By: J R Anderson Date: 3-7-74

Checked By: C. M. Myers Date: 3-7-74

Approved By: Wm F Fulcher Date: 3-8-74

Inspection Waived By: T. F. Hyde Date: 3-8-74

Inspection Waived For: ____ ELECTRICAL ____ MECHANICAL X CIVIL

Inspected By: D J Green Date: 3-12-74

Inspected By: ____ Date: ____

DIVISION QUALITY ASSURANCE D. R. D Brien Date: 3/8/74

****

(FOR ASME CODE ITEMS)

Mechanical & Nuclear Division Date: 3-8-74
Design Engineering Department

This is to certify that the above specification has been reviewed by me, the undersigned, and is correct, complete, and in compliance with 1971 Edition of ASME Code, Section III, Paragraph NA-3250.

(SEAL)

3-8-74

SIGNATURE: Wm F Fulcher

NAME: Wm. F. Fulcher
Registered Professional Engineer

State & No. N.C. #5123

Form 301.2 Rev. 1

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
UNITS 1 & 2

CARBON STEEL CODE VALVES

1. COVER SHEET

Attached.

2. VERIFICATION SHEET

Attached.

3. TABLE OF CONTENTS

Not applicable.

4. GENERAL

4.1 This specification covers the design, fabrication, testing, quality documentation and delivery of certain carbon steel code valves important to Nuclear Safety (Duke Classes A through C only) and required valve operators for the Catawba Nuclear Station, Units 1 & 2. Commercial quality valves (Duke Class E through H) are not included.

4.2 The following definitions shall apply to this specification:

Owner - Duke Power Company
Bidder - Person or Corporation who bids on the work.
Contractor - Person or Corporation to whom work is awarded.
Purchaser - Mill Power Supply Company

4.3 The attached General conditions of Contract, revised August 1, 1973, shall form a part of this specification.

4.4 The equipment covered by this specification is important to nuclear safety and shall be designed, fabricated, inspected and tested in accordance with the requirements of the following codes as well as any special requirements stated in this specification.

4.4.1 Valves

a. ASME Boiler & Pressure Vessel Code Section III, Classes 1, 2 or 3 (dated July 1, 1971 with all addenda through Summer 1973). Code addenda that are mandatory on the purchase order date shall be used. The use of non-mandatory addenda may be negotiated at the Owner's option. Code case special rulings shall not be used except where written approval is granted by the Owner.

b. ANSI B31.1 American National Standard Code for Power Piping. (1973 edition plus applicable Addenda).
c. ANSI B16.5 Steel Pipe Flanges and Flanged Fittings (1973 edition).
d. Manufacturer's Standardization Society Standard Practice for Hydrostatic Testing of Steel Valves MSS-SP-61.
e. ASME Boiler & Pressure Vessel Code Section IX, Welder Qualification (1971 edition with all addenda through summer 1973).
f. ANSI B-16.11 American Standard for Steel Socket Weld Fittings.
g. Duke Power Weld-end Preparation Standards CN-1676.1 and CN-1676.1-1 dated 10-2-73 (attached).

4.4.2 Operators

a. IEEE Standard 382-1972, IEEE Trial-Use Guide for Type Test of Class 1 Electric Valve Operators for Nuclear Power Generating Stations.
b. IEEE-112A-1964, Test Procedure for Polyphase Induction Motors and Generators.
c. IEEE-117-1956, Test Procedure for Evaluation of Systems of Insulating Materials for Random-Wound Electric Machinery.
d. IEEE 323-1971, General Guide for Qualifying Class 1 Electric Equipment for Nuclear Power Generating Stations.
e. IEEE 334-1971, Trial Use Guide for Type Tests of Continuous-Duty Class 1 Motors Installed inside the Containment of Nuclear Power Generating Stations.
f. IEEE 344-1971, Trial Use Guide for Seismic Qualification of Class 1 Electric Equipment for Nuclear Power Generating Stations.

4.4.3 For hydrotesting and cleaning, ANSI N45.2.1 (1973) Cleaning of Fluid Systems During Construction Phase of Nuclear Power Plants.

4.4.4 For vendor's Quality Assurance Program, ANSI N45.2 (1971).

4.4.5 Packaging, shipping, receiving, storage, and handling of valves shall be in accordance with ANSI N45.2.2 (1972).

4.5 The attached Duke Power Company Valve Classification defines the Duke valve classes in terms of the ASME Code and seismic requirements.

5. Reference Drawings and/or Attachments

The following references and attachments shall form a part of this specification:

5.1 Duke Power Valve Classifications.

5.2 Duke Power Company Standard Orientation Electric Motor Operated Valves.

5.3 CN-1676-1, Duke Power Company Weld End Standards, dated October 2, 1973.

5.4 CN-1676-1.1, Duke Power Company Weld End Standards, dated October 2, 1973.

5.5 Deleted.

5.6 Estimated Valve Delivery Schedule By Sytem.

5.7 Duke Power Company Seismic Design Requirements Valves Catawba 1 & 2 Gate, Globe, & Check Valves Safety Class 1, 2, & 3, January 24, 1974.

5.8 Class 1 Valve Transients.

5.9 Estimated Valve List for Specification CNS-1205.00-6.

5.10 General Terms and Conditions of Contract, revised August 1, 1973.

5.11 General Requirements Applicable to Specification, November 9, 1972.

5.12 Duke Power Packaging and Shipping Requirements (form 301.4).

5.13 Drawing Requirements, November 9, 1972.

5.14 Duke Standard Coating Specification MMM, dated 6-8-72.

5.15 Duke Standard Coating Specification KKK, dated 9-14-72.

6. OPERATING CONDITIONS

The complete itemized valve list (see specification section 8.1) will give the valve operating conditions.

7. EQUIPMENT TO BE FURNISHED

The complete itemized valve lists (see specification section 8.1) will list the specific design parameters for the equipment to be furnished. Any special tool needed for proper installation of valve components shall be supplied by Contractor.

8. GENERAL DESIGN

8.1 The attached valve list, gives an estimated number of valves required by type, size, and pressure class. It is emphasized that these are estimated quantities and are subject to change. Complete itemized valve lists, with the specific design parameters for each valve, will be issued to the successful Bidder after the award of the order for manufacturing purposes. These complete, itemized valve lists shall be considered a part of the specification and their receipt will authorize the successful Bidder to finalize his engineering for manufacturing.

8.2 This specification outlines the Owner's minimum requirements for the design, fabrication, testing, quality documentation, cleaning and packaging of the subject valves. The Bidder is expected to supplement these with his own design and quality requirements.

8.3 VALVES

8.3.1 Gate valves shall be the flexible disc type. All gate valve shall be provided with outside screw and yoke construction. Gland shall be one piece construction and separate from the gland follower. All gate valves shall be of the back seating type and shall be capable of being repacked while open and under pressure.

8.3.2 Globe valves shall be full-ported and shall have outside screw and yoke construction. Globe valves shall be capable of performing their intended function when the valve is mounted with the stem in either the vertical or horizontal plane. All globe valves shall be of the backseating type and shall be capable of being repacked while open and under pressure.

8.3.3 Check valves of the tilting disc type are preferred. Alternate bid may be submitted for swing disc type design if so noted in exceptions to specification. Check valves shall have no body penetrations except inlet, outlet and bonnet. Servicing of the check hinge shall be performed through the bonnet.

8.3.4 Where indicated on the valve lists, the gate and globe valves shall have a lantern gland leakoff connection with a half set of packing above the lantern ring and a full set of packing below the lantern ring. (Full set is defined as a depth of packing equal to 1-1/2 times stem diameter.) A 1/2 inch Schedule 80, A-106 Gr B carbon steel pipe nipple approximately 6 inches long, with a squared end, shall be welded to the leakoff connection to carry away any leakage. Screwed connection may be used if required for disassembly.

8.3.5 The following body bonnet joints shall be acceptable for all valves as follows:

a) Bolted body-to-bonnet joint. These valves shall have a flexitallic type gasket. A canopy seal ring shall be provided on these valves for seal welding in the field.

b) Pressure-seal body-to-bonnet joint. These valves shall have the gasket assembly design which will not require retightening after field hydrotest.

c) Check valves may be bolted bonnet with canopy seal provisions.

8.3.6 Valve ends shall be machined in accordance with the attached Duke Power Company Dwg CN-1676-1 and CN-1676-1.1, dated October 2,1973.

8.3.7 Duke Class A valves shall be capable of withstanding the design transients covered in Specification Section 5.8. Section 1 of this attachment divides the valve transients for Duke Class A valves into four groups. These transients are to be applied to the Duke Class A valves as follows:

a. Group 1 plus Group II for valves 3" and under.
b. Group 1 plus Group III for valves 3" and under.
c. Group 1 plus Group IV for valves 4" and larger.

Valves 3" and under in size should be checked separately for both (a) and (b) above. Valves 4" and over are required to meet only (c) above. For Group III transients, a valve is not required to meet all five transients (a through e) since it is not physically possible for a valve to see all the transients. A valve can only be subjected to (a) plus (b) and (c), or (a) plus (d) and (e). If a valve is found suitable for the more severe of these two sets of transients in conjunction with the Group I transients, then the valve is acceptable.

8.3.8 Duke class B and C valves shall be capable of operating while being heated and cooled at a rate of 100 F per hour between 40 F and 560 F, without limitation on number of cycles. In addition, these valves shall be capable of sustaining, without adverse effects, step changes in the temperature of the working fluid from 40 F to 560 F for 200 cycles during the design life of the valves and from 500 F to 40 F for 10 cycles during the design life of the valves. The design life of the valves shall be forty years.

8.3.9 For all valves, the design with the seat ring screwed or slipped into body and then seal welded is preferred. Any deviations from this design must be noted in the exceptions to specification.

8.3.10 All valves located in the Reactor Building (Noted on valve lists) shall be suitable for high temperature service. Normal ambient conditions in the Reactor Building will be 110 F and 100 percent relative humidity; however, all valves so designated on valve lists must be capable of operation for a period of at least 30 minutes during which the ambient conditions may reach 250 F and 100 percent steam saturation.

8.3.11 Valves located within the Reactor Building will be subjected to and shall suffer no adverse effects from periodic application of external pressure during Reactor Building leakage rate tests. Once a year these tests will be conducted at pressures no greater than 19 psig.

8.3.12 All parts shall be made to American Standard Gauge so as to facilitate replacement and repairs.

8.3.13 Like parts of valves in the same grouping shall be interchangeable except for valve discs, stems and body seat rings which are lapped for a particular valve.

8.3.14 Parts subject to wear, erosion, corrosion, or other deterioration or requiring adjustment, inspection or repair shall be accessible and capable of reasonably convenient removal, easy replacement and repair. All such parts shall be made of suitable materials for minimizing maintenance.

8.3.15 Valve designs shall avoid low point pockets where material suspended in the fluid could settle out and collect. This stipulation does not preclude provision of clearance to allow seating of the disc or plug.

8.3.16 Gate and globe valves shall be packed in the shop with John Crane 187-1 packing (See paragraph 8.5.7). Bidder shall submit an adder for supplying Union Carbide Grafoil as an alternate packing.

8.3.17 Valves should be capable of withstanding an integrated radiation dose of 2×10^8 rads without loss of function or integrity.

8.3.18 All valves shall have the capability of having a package of sixteen limit switches mounted directly on the valve and actuated by the valve stem. These limit switches are to act independently of any switches on the valve operator. After award of the order, the Owner will indicate on the valve list those valves requiring the extra limit switch package. These switches are in addition to those outlined in 8.4.2 below.

8.3.19 Valves shall be capable of safe proper and continuous operation under their respective design operating conditions, with a reasonable operating margin, and without undue strain, corrosion, deterioration, leakage, vibration, or other operating trouble.

8.4 Operators

8.4.1 Valves shall have operators as specified on the complete itemized valve lists referenced in specification section 8.1.

8.4.2 Electric motor operated valves shall be Philadelphia Gear (Limitorque) or Rotork, at the Owner's option. All operators are to be the "Four Drum Double Torque" design or an Owner-approved equivalent. Sixteen limit switches and two torque switches shall be provided with each motor operator, and are to be set as follows:

a. 1 limit switch indicating valve fully open.
b. 1 limit switch indicating valve fully closed.
c. 1 torque switch for the valve fully open.
d. 1 torque switch for the valve fully closed.
e. 2 limit switches indicating the valve open and intermediate.
f. 2 limit switches indicating the valve closed and intermediate.
g. An additional ten limit switches are to be provided for valve position indication (annunciator, computer, etc.) and interclocking capability. These ten limit switches should be divided between indicating valve fully open, fully closed, intermediate-open, and intermediate closed.

8.4.3 The additional limit switch package referenced in 8.3.18 should be composed of similar limit switches as in 8.4.2.

8.4.4 Electric valve operators applied inside the Containment (so identified on valve list) must have successfully met and passed IEEE Standard 382-1972 (ANSI N41.6), IEEE Trial-Use Guide for Type test of Class 1 Electric Valve Operators for Nuclear Power Generating Stations. The seismic qualification aspects required by section 4.3 of IEEE Standard 382 shall be those given in specification section 5.7.

The following IEEE standards are invoked by IEEE Standard 382, and are applicable for Containment operators:

a. IEEE 112A-1964, Test Procedure for Polyphase Induction Motors and Generators.
b. IEEE 117-1956, Test Procedure for Evaluation of Systems of Insulating materials for Random-Wound Electric Machinery.
c. IEEE 323-1971, General Guide for Qualifying Class 1 Electric Equipment for Nuclear Power Generating Stations.
d. IEEE 334-1971, Trial Use Guide for Type Tests of Continuous-Duty Class 1 Motors Installed inside the Containment of Nuclear Power Generating Stations.
e. IEEE 344-1971, Trial Use Guide for Seismic Qualification of Class 1 Electric Equipment for Nuclear Power Generating Stations.

8.4.5 Electric valve operators applied outside the Containment must meet and pass the following standards referenced in 8.4.4:

a. IEEE 112A-1964
b. IEEE 117-1956
c. IEEE 344-1971

In addition these motor operators must meet the seismic design requirements called out in attachment 5.7 for A, B, and C valves.

8.4.6 Electric valve operators applied either inside or outside the Containment, must be tested against the valve opening and closing design load (valve load can be simulated).

8.4.7 Electricity is available as follows:

a. Valve motors shall be rated 575 volt/3 phase/60 cycle
b. 120 volt/single phase, 60 cycle for motor control functions.

8.4.8 Compressed air operators if required shall be Owner approved.

8.4.9 Where air operators are required, compressed air at 70 to 100 psig is available and an air pressure regulator and filter shall be furnished by Owner when required.

8.4.10 Operators and topworks within the Reactor Building shall be suitable for high temperature service. Normal ambient condition in the Reactor Building will be 110 F and 100% relative humidity; however, all valves and valve operators designated on valve lists must be capable of operation for a period of at least 30 minutes during which the ambient conditions may reach 250 F and 100 percent steam saturation.

8.4.11 Operators, including handwheels, applied inside the containment must be painted in accordance with Duke Power Standard Coating Specification (Quality Assurance) MMM, dated 6-8-72, and Duke Power Standard Coating Specification KKK, dated 9-14-72. All other operators shall be coated with Duke Standard Coating Specification KKK only.

8.4.12 Operators located within the Reactor Building will be subjected to and shall suffer no adverse effects from periodic application of external pressure during Reactor Building leak rate testing. Once a year these tests will be conducted at pressures no greater than 19 psig.

8.4.13 Manual operating devices, handwheel or other, shall be manufacturer's standard or Owner approved equal. Chains for chainwheel operators will be supplied by Owner. Handwheels are not to be mounted when shipped but rather wired to the valve.

8.4.14 Motor operated valves serving Containment isolation functions will require fast operators. Fast is defined as an operating time of 10 seconds for valves up to and including 8" and 49"/min. for valves greater than 8". These valves will be so indicated on valve lists. All other motor operators shall be the standard sixty second operators.

8.5 Material Requirements

8.5.1 Delete

8.5.2 Valve bodies, bonnets and discs shall be carbon steel. Gland flange and gland shall be considered part of the body.

8.5.3 The stem material shall be A-182, F6 or an alternate of A-276, Type 316 Condition B, if noted in exception to specification.

8.5.4 Bolting shall conform to SA-193. Nut material shall conform to SA-194.

8.5.5 For all valves the contacting surfaces of the disc, main seats, and back seat surfaces shall be hardsurfaced with Stellite #6.

8.5.6 Precipitation hardened type 17-4 stainless steel may be used in valve trim items if noted.

Note: It is the responsibility of the Bidder to advise the Owner if any of the above materials will not satisfy the requirements of the ASME Boiler & Pressure Vessel Code Section III as referenced in paragraph 4.4a, or are not suitable for the intended service. This responsibility applies both prior to and following award of order.

8.5.7 Packing material shall be John Crane No. 187-1 with 200 ppm or less chlorides as received. Bidder should include in proposal an adder for supplying Union Carbide Grafoil packing. Certification must be furnished with QA documentation package (see paragraph 10.2). The correct packing size must be given in a suitable list after award of the order or on the outline drawing furnished for every type of valve supplied.

8.5.8 Nitriding treatment of plating on any surface exposed to the working fluid is prohibited.

8.5.9 Low melting point metals (lead, zinc, cadmium, tin, antimony, mercury, bismuth, sulfur, etc.) their compounds or material containing low melting point metals as a basic constituent shall not be used in direct contact with these valves at any time. This shall include tooling fixtures, lubricants, masking materials, fluxes, paints, temperature crayons, etc., which right be used during the fabrication of these valves.

8.5.10 Aluminum is not to be used in any valve or valve component.

8.5.11 Contaminations of iron or copper on the surfaces of austinetic base material used in these valves is prohibited.

8.5.12 Any lubricants used for body-bonnet joints, etc., shall not contain any of the materials and contaminants described in paragraphs 8.5.9, 8.5.10, and 8.5.11.

8.5.13 No parts, material or equipment shall be of manufacture outside the United States without prior approval of Owner.

9. SPECIAL REQUIREMENTS

9.1 All valves shall be tagged with metal tags showing Owner's valve item number and National Board Number (for all Duke Class A-C valves). All tags shall be permanently secured to the valve yoke as shown on the attached Duke Power Company Standard Orientation of EMO Valves.

9.2 All internal wetted surfaces shall be free of metal chips, weld spatter, slag, oil, grease, dirt, scale and other foreign material. Demineralized water which meets the requirements of specification section 4.4.3 shall be used for final cleaning or rinsing.

9.3 Immediately after final cleaning, the end connections shall be sealed with plugs, caps or covers to prevent entry of contaminants and to prevent damage to facings or weld ends. These caps are to be secured so as not to become detached during shipment or handling.

9.4 All valves are to be suitable for inside storage of 12 to 24 months prior to startup of the plant. Bidder shall supply Owner information on care during storage in accordance with specification section 5.11. All of the requirements of this attachment shall be followed.

9.5 The valves and accessories shall be packaged or crated to prevent deterioration, contamination and physical damage during transit or storage. All packaging material, especially the wooden crating for the larger components, must be flame treated or non-combustible wherever possible. Any articles or material that might otherwise be lost shall be boxed or wired in bundles and marked for identification.

9.6 All valves shall be prepared for shipment so that handling and unloading may be facilitated. At no time are valves to be shipped in a disorderly arrangement or situation of disarray so as to promote damage or hamper inspection of the equipment when received on the jobsite.

9.7 The attached Packaging and Shipping Requirements, form 301.4, shall be completed by Bidder and submitted for approval with Bidder's proposal.

9.8 Valves located within the Reactor Building shall have all external surfaces, which are not stainless steel, coated in accordance with the attached Duke Power Coating (Quality Assurance) Specification MMM, dated 6-8-72, and Duke Power Coating Specification KKK, dated 9-14-72. All other valve external surfaces which are not stainless steel, shall be coated in accordance with the attached Duke Power Coating Specification KKK, dated 9-14-72.

9.9 All Duke class A, B and C valves and valve operators must be seismically designed in accordance with Specification Section 5.7. Seismic calculations shall be made with the valve and operator in the worst possible orientation. With his proposal Bidder shall submit signed certification attesting to his company's ability to perform the required seismic analysis. The seismic calculations must be submitted for Owner's approval within eight weeks after drawing approval.

9.10 For bolted bonnet valves requiring Flexitallic gaskets, one extra gasket per 10 valves shall be supplied. A minimum of one extra gasket per size is required.

10. QUALITY ASSURANCE

10.1 These specifications cover equipment, systems, structures and/or materials important to nuclear safety; and it is essential that they meet the quality standards of these specifications and referenced codes, standards and guides; that this quality be proven by full documentation. With the proposal, each Bidder shall submit a description of the quality assurance procedures he proposes to use; outline his quality assurance organization showing lines of authority; a description of the documentation that will be developed during manufacture and that will be shipped to the Owner for retention for the life of the item. Evaluation of proposals will include analysis of information submitted and rendering a judgment with respect to each Bidder's qualification to provide and document the quality required by these specifications. After award, the Contractor shall submit complete written quality assurance procedures for Owner's review and approval.

10.2 Contractor shall submit to Owner no later than valve shipping date, a documentation package for each valve consisting of one reproducible copy of the following:

a. Mill test reports for all pressure boundary or pressure retaining material, including valve stem material.
b. Documentation of all hydrostatic and operational tests showing their results.
c. Heat treatment certification.

d. Certification of compliance that each non-evident producing form of NDT (UT, PT, MT) has been done by specified requirements and ASNT qualified operators. Include a list of the equipment used.

e. A complete radiography history including shooting sketch, reader sheet, all film rejected, record of defects, record of repairs and final cleared shooting record. Film and reader sheets should be marked or noted to show any conditions other than normal, i.e., surface conditions, defect with acceptance standards, etc. Final film to be sent to Duke Power Company.

f. Completed Duke Power Company Design Engineering Department Vendor Quality Assurance Certification, form 930.1.

g. Required ASME Code data reports (Class 1, 2 or 3). Required ASME Code Stress Report (Class 1).

h. Records of all major repairs. The term "major repairs", used in this statement, is defined by Section Nb-2539.4 of the ASME Section III Code.

i. Record of all deviations.

j. Record of wall thickness measurement comparing actual measurements and wall thickness required by the ASME code.

k. Where electric valve operators are supplied, a record of load test on operator (see 8.4.6). A comparison of actual torque required to operate the valve under design conditions vs. actual furnished available torque with percent margin will be supplied for each electric motor operated valve furnished.

l. Certification that packing material meets limit of 200 ppm chloride content.

10.3 The documentation package shall be sent to Mr S K Blackley, Jr, Chief Engineer, Mechanical & Nuclear Division, Duke Power Company, P O Box 2178, Charlotte, North Carolina 28242, Attn: Mr C M Myers. One copy of the Duke Power quality assurance certification form (Item f, above) and a copy of Form NPV-1 will be shipped with the valves.

10.4 The Bidder's quality assurance program must be in accordance with ANSI N45.2 (1971), for his bid to be considered. Bidder is to state in his proposal whether or not his quality assurance program meets the requirements of this standard.

11. DELIVERY

The estimated delivery of Unit 1 and Unit 2 valves is required to be completed on a system basis in accordance with the attached Estimated Valve Delivery Schedule By System.

12. DRAWINGS

12.1 Drawings shall be submitted in accordance with the attached Duke Power Drawing Requirements. In addition to this attachment, the drawings shall include the following information:

a. Valve Item and Mark Number.
b. Valve List Number.
c. Valve size.
d. Valve type, i.e., gate, globe, etc.
e. Operator type, i.e., EMO, piston, solenoid, handwheel, chainwheel, etc.
f. Manufacturer's standard operator orientation note; i.e., righthand, lefthand, etc. Duke's normal acceptance orientation is as shown on attached Duke Power Standard Orientation EMO Valves.
g. Mounting position restrictions.
h. Necessary dimensions (i.e., end to end, centerline of valve to end of open stem, centerline to lantern gland leak off line to centerline, centerline stem to end of leakoff nipple, dismantling requirements for valve and operator, handwheel location, handwheel location, handwheel diameter, etc.).
i. Ends to agree with valve list; i.e., socket weld, butt weld, flanged, etc.
j. The words, "Nuclear Safety Related" shall be printed in a character size equal to or larger than the largest size used in the body of the document just above its title block.
k. Manufacturer's valve figure number.
l. Complete bill of materials for every valve part.
m. Weight of valve, weight of operator, and combined weight of valve and operator.
n. Pressure rating of valve.
o. Back seat clearly shown.
p. Lantern gland clearly shown (when applicable).
q. Renewable seats shown for low pressure valves (600 psi or less when applicable).

12.2 Each drawing submitted to Duke Power Company will clearly show or state the valve item numbers as given on Duke Power valve list and the valve list number to which the drawing applies.

12.3 Only one valve list shall be assigned to one drawing; any number of valves may be shown on any one drawing as long as the list applies. Owner will outline in detail before first valve list is issued a "Procedure for Shop Acknowledgments and Drawings" to further define requirements of this section.

12.4 Manufacturer shall also submit (per 12.1) motor operator outlines and wiring diagrams covering the motor operators. Each motor operator outline and wiring diagram shall have a complete certification showing each applicable Duke Power valve list and valve item number and giving all electric motor characteristics required for ordering motor starters by Duke Power. Each operator wiring diagram shall show both opening and closing torque switches and indicate that these torque switches are supplied.

13. INSTRUCTION MANUALS

Thirteen copies of complete operating and maintenance instructions are to be submitted to Mr S K Blackley, Jr, Chief Engineer, Mechanical & Nuclear Division, Duke Power Company, P O Box 2178, Charlotte, North Carolina 28242, before equipment is shipped.

14. TESTS AND INSPECTIONS

Tests, reports and inspections shall be in accordance with the attached General Requirements Applicable to Specification. In addition to this attachment, the following shall also be required:

14.1 Nondestructive and destructive testing of pressure boundary materials of valves shall be in accordance with the procedures and acceptance standards set forth in reference code 4.4.1a. Required examinations, procedures, and acceptance standards for each class of valves are spelled out in the following sections of the above code.

a. Class 1 components - Article NB-2000 for materials and parts; Article NB-5000 for welds.
b. Class 2 components - Article NC-2000 for materials and parts; Article NC-5000 for welds.
c. Class 3 components - Article ND-2000 for materials and parts; Article ND-5000 for welds.

14.2 Hydrostatic testing of valves shall be in accordance with reference code 4.4.1a. Demineralized water which is in accordance with specification section 4.4.3 shall be used as the hydrostatic test media. The hydrostatic test shall be performed prior to the seat leakage test.

14.3 A seat leakage test shall be performed in accordance with MSS-SP-61 except the hold time shall be a minimum of 5 minutes. Seat leakage shall be no more than 3cc/hr/in. of nominal seat diameter.

14.4 A back seat leakage test shall be performed in accordance with MSS-SP-61 with packing removed. No leakage is allowed. Hold time shall be a minimum of 5 minutes.

14.5 After the back seat leakage test, the packing shall be installed and compressed and the back seat shall be removed from contact so that the entire stuffing box will be subjected to the hydrostatic pressure. Hold time shall be a minimum of 15 minutes. For gate and globe valves provided with lantern rings, leakage shall be checked. No leakage is permitted.

15. SPARE PARTS

Spare parts shall be in accordance with the attached General Requirements Applicable to Specification and 9.10.

16. INFORMATION TO BE FURNISHED

Bidder shall submit with quotation complete and detailed specifications covering design, construction, materials and workmanship of equipment proposed. Information provided shall include but should not be limited to that outlined below. Bidder should understand that his cooperation in supplying the information requested will be considered in the evaluation of the proposals.

16.1 A valve outline and section drawing of each size and type of valve showing design features.

16.2 Weight of each valve.

16.3 Lists of installations for similar valves (size and pressure listings) for ASME Section III, Class 1, 2 & 3 service. Indicate those already in service and date they went into service.

16.4 Suggested materials and description of trim materials of valve if different from that specified.

16.5 Bidder shall identify any parts, materials or equipment contemplated for manufacture outside the United States. If there are none, it shall be so stated in writing.

16.6 Bidder shall submit with quotation a description of his testing facilities and procedures.

16.7 Bidder shall submit description of measures he will take to protect Owner's delivery schedule, for example, advance ordering of castings or establishment of an inventory of castings. Bidder shall also discuss additional flexibility in terms of his ability to respond to Owner's valve requirements on short notice.

16.8 Bidder shall submit prices for each valve by type, size, safety class, and pressure rating.

For each valve a "mounting" charge shall be quoted for mounting a motor operator on the valve. This price shall include all hardware required to mount a motor operator on each valve and perform the required testing but shall not include the operator itself.

The Bidder shall supply a complete price list for both Limitorque and Rotork operators, including any cost additions necessary to meet definition of fast operation given in 8.4.14. Prices shall also be submitted for mounting an additional package of limit switches as required in 8.3.18.

16.9 Graph showing CV versus percent open for all globe valves.

16.10 Graph showing CV at full open for all check valves.

16.11 Bidder shall submit with his proposal a description of the method he will employ to measure and assure adequate valve wall thickness.

16.12 Bidder shall submit all quality assurance submittals in accordance with specification section 10.1.

17. DISCREPANCIES AND INTERPRETATION

Should the Bidder find discrepancies in, or ommission from, the drawings or specifications or be in doubt as to their meaning, he shall notify the Owner who will issue a written interpretation.

18. CONFORMANCE WITH SPECIFICATIONS

The Bidder must submit with his proposal a list of all major and minor exceptions to these specifications and obtain written approval from Owner of such exception prior to award of order. If there are no exceptions, it must be so stated in writing. It is particularly emphasized that any unapproved nonconformity with the specification must be changed to complete conformity at the manufacturer's expense and this expense will include the cost of all labor and materials and all other related expenses by the Owner or manufacturer.

19. CONSTRUCTION SERVICES

Not applicable.

20. ERECTION ENGINEER

Not applicable.

21. SUBMISSION OF PRICES AND PROPOSALS

All proposals, complete with prices FOB Newport, York County, South Carolina (Southern Railroad) and information requested shall be submitted to Mill Power Supply Company, P. O. Box 1339, Charlotte, North Carolina 28201, by _____. Any late or incomplete proposal

without prior approval by the Owner may not be considered in the award of the order. Extension of the above date will be granted only for valid and sufficient reasons of the Bidder and provided such request does not delay or interfere with the work of the Owner. The Owner reserves the right to reject any or all bids.

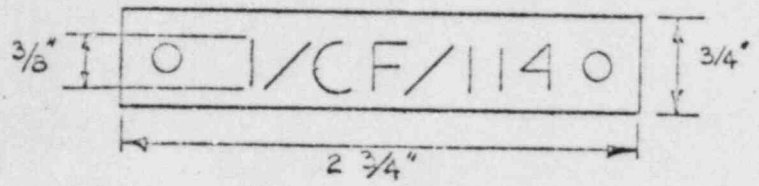
For any technical information required to prepare his proposal, the Bidder may contact by telephone J. R. Anderson (704-374-8109) or C. M. Myers (704-374-8273).

JRA/pc
2/25/74

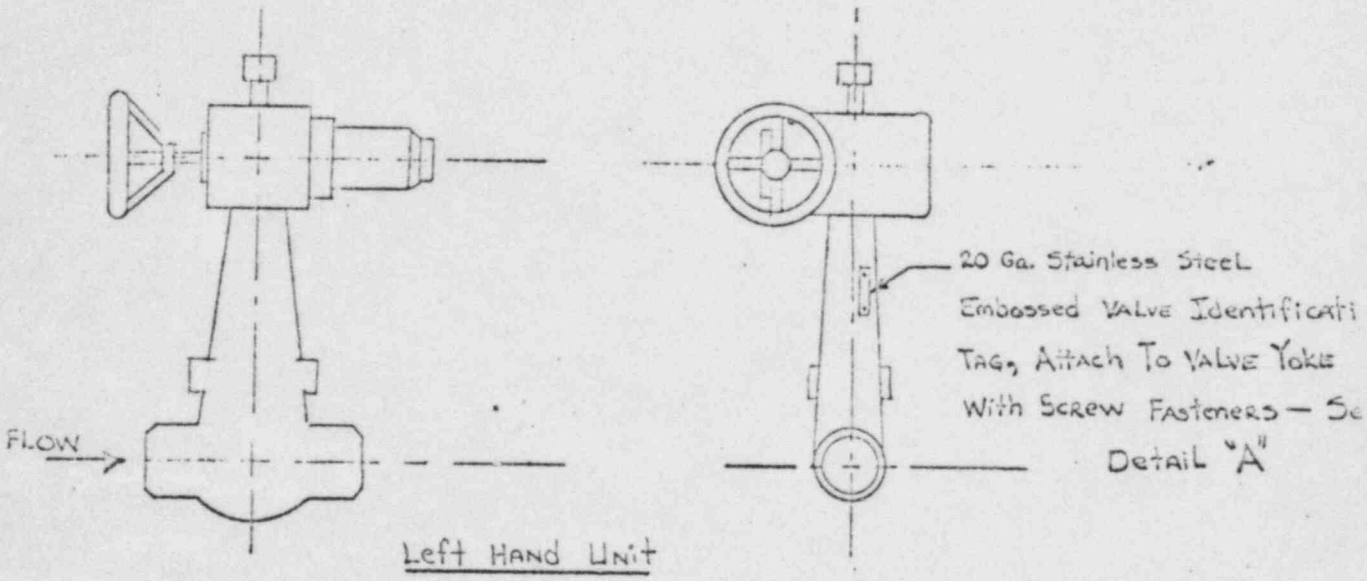
System Valve Classification

Duke System Valve Class	AEC Quality Class	ANSI Safety Class	Code Design Criteria	Designed for Seismic Loading
A	A	1	Class 1, ASME Section III, 1971	Yes
B	B	2	Class 2, ASME Section III, 1971	Yes
C	C	3	Class 3, ASME Section III, 1971	Yes
E	D	NNS	ANSI B31.1.0 (1973)	No
F	-	-	ANSI B31.1.0 (1973)	Yes
G	-	-	ANSI B31.1.0 (1973)	No
H	-	-	Duke Power Company Specifications	No

JRA/sf 3-6-74



Detail "A" Sample VALVE TAG



Left HAND UNIT

DUKE POWER COMPANY STANDARD
ORIENTATION E.M.O. VALVES

January 9, 1974

ESTIMATED VALVE DELIVERY SCHEDULE BY SYSTEM

CATAWBA NUCLEAR STATION

SYSTEM	DELIVERY DATE
AC	5-1-77
AH	7-1-76
AS	7-1-76
BB	9-1-77
BD	6-15-76
BU	6-1-76
CA	6-15-76
CF	2-1-76
CL	8-1-77
CM	8-1-76
CR	9-1-77
CS	2-1-77
FC	4-1-77
FD	10-15-77
FW	9-1-77
GH	9-15-77
GN	9-15-77
GS	7-15-77
HA	5-1-76
HB	5-1-76
HC	6-1-76
HD	6-1-76
HE	6-1-76
HF	8-1-76
HG	8-1-76
NR	12-1-76
NS	1-1-76
NV	11-1-76
PB	11-1-77
PC	11-1-77
PP	11-1-77
PW	9-1-77
RA	6-1-77
RC	4-1-74
RE	5-1-76
RF	11-1-76
RL	3-1-76
RN	7-1-74
RO	6-15-77
RP	3-1-77

SYSTEM	DELIVERY DATE
HR	10-15-77
HS	4-1-77
HV	9-1-77
HW	4-1-76
HM	4-1-77
KC	1-1-77
KF	12-1-76
KG	7-1-76
KR	7-1-76
KD	11-1-77
LF	6-1-77
LG	8-1-77
LH	8-1-77
LP	8-1-77
LT	6-1-77
MD	10-1-77
MI	3-1-77
MR	11-1-77
MV	10-1-77
NB	12-1-76
NC	6-1-76
ND	1-1-76
NF	5-1-77
NI	6-15-76
NM	7-15-77
NP	5-1-77
TS	11-1-77
TW	7-1-77
VA	1-15-77
VB	5-1-77
VC	1-1-77
VD	5-1-77
VE	5-1-77
VF	5-1-77
VG	5-1-77
VH	5-1-77
VM	12-1-76
VI	1-1-76
VK	10-1-77
VL	2-1-77
VP	12-1-76
VR	10-1-77

RT	8-1-77
RY	2-15-75
RS	8-15-77
RV	3-1-77
SA	7-1-77
SB	2-1-77
SC	1-1-77
SD	11-1-77
SE	5-1-77
SM	7-1-76
SP	6-1-77
SV	6-1-77
TA	
TD	6-1-77
TE	8-1-77
TF	9-1-77
TL	9-1-77
VS	1-1-76
VT	6-1-77
VN	8-1-77
VO	6-1-76
VW	
VX	
VU	2-1-77
WD	
WE	5-1-77
WF	
WG	12-1-76
WL	12-1-76
WM	12-1-76
WP	11-1-76
WS	12-1-76
WT	11-1-74
WU	9-1-76
WY	

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1/9/74

DUKE POWER COMPANY
SEISMIC DESIGN REQUIREMENTS
VALVES
CATAWBA 1 & 2
GATE, GLOBE, & CHECK VALVES
SAFETY CLASS 1, 2 & 3

1.0 Seismic Design Manual

The valve and appurtenances shall be qualified to meet the seismic design requirements of this specification in accordance with the procedures and guidelines of the Duke Power Company Seismic Design Manual. The Manual is intended to be utilized only as a reference to this section and not to be used alone. The sections of the Manual pertaining to particular portions of this specification are noted below. However, those sections should not be used directly without the background information provided in the remainder of the Manual.

2.0 Operating Conditions

2.1 Modes of Operation

Two modes of operation shall be considered (Manual Section 4.1.3). The upset mode includes the effects of the Operational Basis Earthquake (OBE), and the faulted mode includes the effects of the Safe Shutdown Earthquake (SSE). The seismic loads shall be considered in combination with all other concurrent loadings on the valve (Manual Section 4.1.3). The criteria for these loads are specified below.

2.2 Seismic Input Criteria

For the SSE, a Seismic Load Factor (SLF) of 3.0 g shall be applied in each of two orthogonal horizontal directions in combination with an SLF of 2.0 g in the vertical direction, all acting simultaneously (Manual Section 4.1.1.1). The SLF values for the OBE shall be taken as 8/15 of the respective values for the SSE.

2.3 Concurrent Loading Conditions

Other concurrent loadings to be considered are described in Manual Section 4.1.3. Any additional considerations are specified below.

2.3.1 For Class 1 valves, loadings resulting from operational transient conditions shall also be included.

3.0 Seismic Qualification

3.1 Procedure

One of the following procedures may be utilized for the seismic qualification:

3.1.1 Equivalent Static Analysis

An analysis shall be performed in accordance with Manual Section 4.2. The results shall be demonstrated to fulfill the acceptance criteria of Manual Section 6.0 for active valves.

3.1.2 Testing

A testing program shall be performed in accordance with Manual Section 5.0. Test procedures 5.2.1 to 5.2.8 shall be performed. It is to be noted that a preliminary report shall be submitted prior to any tests (Manual Section 7.1).

3.1.3 Combined Testing and Analysis

A testing program may be selected to satisfy only a portion of the seismic requirements. The remainder of the equipment shall be qualified by analysis. Complete documentation shall be presented demonstrating the correlation between the analysis and the test results (Manual Section 5.0).

3.2 Orientation

The valve shall be considered in the worst possible orientation (highest stress/deformation level in each valve component) with respect to the total combined loading conditions.

3.3 Support Conditions

The valve shall be considered to be supported only at the inlet and outlet ends.

3.4 Active Valves

For safety, relief, isolation, and all other active valves having extended operator structures:

3.4.1 Rigid Structure

The valves shall be designed such that there are no natural frequencies less than 33 Hz. This shall be demonstrated either via testing (Manual Section 5.2.4, Exploratory Scanning Test) or by analysis (Manual Section 4.2.1.2).

3.4.2 Static Deflection Test

A static deflection test shall be performed in accordance with Manual Section 5.2.9 to verify operability under the specified static loading conditions.

3.5 Piping Loads

The following two criteria shall be met to verify the capability of the valve with respect to piping loads.

3.5.1 To ensure that the torsional and bending moment capability of the valve body is greater than that of the adjacent piping, the ratio of the minimum section modulus of the valve body perpendicular to the run of the valve to the yield strength of the valve body material shall be at least 1.2 times the same ratio for the adjacent piping. Required data for the piping is as follows:

Pipe Size: _____

Yield Strength: Sy = _____ psi

Section Modulus: Z = _____ in^3

3.5.2 To ensure operability of the valve while subjected to maximum piping loads, valve operation shall not be impaired due to a bending moment, M = Z x Sy, or a torsional moment, T = 1.2 Z x Sy, each applied singly at the ends of the valve.

4.0 General Considerations

4.1 In addition to these seismic criteria, all requirements of ASME Section III shall be met.

5.0 Reporting Requirements

A fully documented report on the seismic qualification shall be submitted in accordance with Sections 7.0 and 8.0 of the Seismic Design Manual. This report must be approved by Duke Power Company prior to shipment of any items of equipment.

	Operating Cycle	Occurrences	Figure	Transient Category
1.	Heatup at 100°F/hr Cooldown at 100°F/hr (Pressurizer 200°F/hr)	200 200 200	1	N
2.	Unit Loading at 5% of full power/mm min. Unit Unloading at 5% of full power/min.	18,300 18,300	2	N
3.	Step Load Increase of 10% of full power Step Load Decrease of 10% of full power	2,000 2,000	3	N
4.	Large Step Decrease in Load (with steam dump)	200	4	N
5.	Steady State Fluctuation 2225 to 2275 psia @ 620°F	Infinite	---	N
6.	Loss of Load (without immediate turbine or reactor trip)	80	5	U
7.	Loss of Power (blockout with natural circulation in reactor coolant system)	40	6	U
8.	Loss of Flow (partial loss of flow one pump only)	80	7&8	U
9.	Reactor Trip From Full Power	400	9	U
10.	Turbine Roll Test	10	12	T
11.	Hydrostatic Test Conditions			
	a. Primary Side Hydrostatic Test Before Initial Startup at 3106 psig	5		T
	b. Primary Side Post Operation Hydrostatic Test at 2450 psig	50		T
	c. Secondary Side Hydrostatic Test Before Initial Startup	5		T
	d. Secondary Side Post Operation Hydrostatic Test	50		T
12.	Accident Conditions			
	a. Reactor Coolant Pipe Break	1	10	F
	b. Steam Pipe Break	1	11	F

GROUP II
CLASS 1 VALVE TRANSIENTS

Combine with Hot Leg Transients Only

	NUMBER OF OCCURRENCES	TEMPERATURE & DURATION TRANSIENT	DESIGN WATER VELOCITY THRU NOZZLE (FT/SEC)	TRANSIENT CATEGORY
RHR Manifold Return Nozzle	400	Figure 28A	20	U

GROUP III

CLASS 1 VALVE TRANSIENTS

Combine with Cold Leg Transients Only

	NUMBER OF OCCURRENCES	TEMPERATURE & DURATION TRANSIENT	DESIGN WATER VELOCITY THRU NOZZLE (FT/SEC)	TRANSI CATEGO
13. Charging Line Nozzle				
a) Plant Startup & Shutdown	200	Figure 25	4 min.-6 max.	U
b) Charging Rate Increased by 50%	24,000	Figure 26A	6 min.-9 max.	N
c) Charging Rate Decreased by 50%	24,000	Figure 26B	2 min.-3 max.	N
d) Letdown Rate Increased by 60%	24,000	Figure 27A	4 min.-6 max.	N
e) Letdown Rate Decreased by 60%	2,000	Figure 27B	4 min.-6 max.	N

GROUP IV

CLASS 1 VALVE TRANSIENTS

Combine with Cold Leg Transients Only

	NUMBER OF OCCURRENCES	TEMPERATURE & DURATION TRANSIENT	DESIGN WATER VELOCITY THRU NOZZLE (FT/SEC)	TRANSI CATEGO
13. Accumulator Nozzle	5	Figure 28A	100 (max.)	U
14. Low Head Safety Injection (on loops)	1	Figure 28C	30	F
Low Head Safety Injection (on reactor vessel)	1	Figure 28C	60	
15. Residual Heat Rmvl. System Return	200	Figure 28B	15	N
16. High Head Safety Injection	50	Figure 28D	50	U

The above transient conditions as defined in ASME Boiler and Pressure Vessel Code ASME Section III, are as follows:

N = Normal Conditions
U = Upset Conditions
E = Emergency Conditions
F = Faulted Conditions
T = Test Conditions

CLASS I VALVE TRANSIENTS

	Operating Cycle	Occurrences	Figure
1.	Heatup at 100°F/hr Cooldown at 100°F/hr (Pressurizer 200°F/hr)	200 200 200	1
2.	Unit Loading at 5% of full power/mm min Unit Unloading at 5% of full power/min	18,300 18,300	2
3.	Step Load Increase of 10% of full power Step Load Decrease of 10% of full power	2,000 2,000	3
4.	Large Step Decrease in Load (with steam dump)	200	4
5.	Loss of Load (without immediate turbine or reactor trip)	80	5
6.	Loss of Power (blockout with natural circulation in Reactor Coolant System)	40	6
7.	Loss of Flow (partial loss of flow one pump only)	80	7&8
8.	Reactor Trip from Full Power	400	9
9.	Turbine Roll Test	10	12
10.	Hydrostatic Test Conditions		
	a. Primary Side Hydrostatic Test Before Initial Startup at 3106 psig	5	
	b. Primary Side Post Operation Hydrostatic Test at 2450 psig	50	
	c. Secondary Side Hydrostatic Test Before Initial Startup	5	
	d. Secondary Side Post Operation Hydrostatic Test	50	
11.	Accident Conditions		
	a. Reactor Coolant Pipe Break	1	10
	b. Steam Pipe Break	1	11
	c. Steam Generator Tube Rupture	---	---

		Number of Occurrences	Temperature Transient	Duration of Transient	Design Water Velocity thru Nozzle (Ft/Sec)
12.	Charging Line Nozzle				
	a. Plant Startup and Shutdown	Later	Figure 25	Figure 25	4 min - 6 max
	b. Charging Rate Increased 50%	24,000	Figure 26A	Figure 26A	6 min - 9 max
	c. Charging Rate Decreased 50%	24,000	Figure 26B	Figure 26B	2 min - 3 max
	d. Letdown Rate Increased 60%	24,000	Figure 27A	Figure 27A	4 min - 6 max
	e. Letdown Rate Decreased 50%	2,000	Figure 27B	Figure 27B	4 min - 6 max
13.	Accumulator Nozzle	5	Figure 28A	Figure 28A	100 (max)
14.	Low Head Safety Injection (on Loops)	1	Figure 28C	Figure 28C	30
	Low Head Safety Injection (on reactor vessel)	1	Figure 28C	Figure 28C	60
15.	Residual Heat Removal System Return	200	Figure 28B	Figure 28B	15
16.	High Head Safety Injection	50	Figure 28D	Figure 28D	50
17.	RTD Manifold Return Nozzle	200	Figure 28E	Figure 28E	20

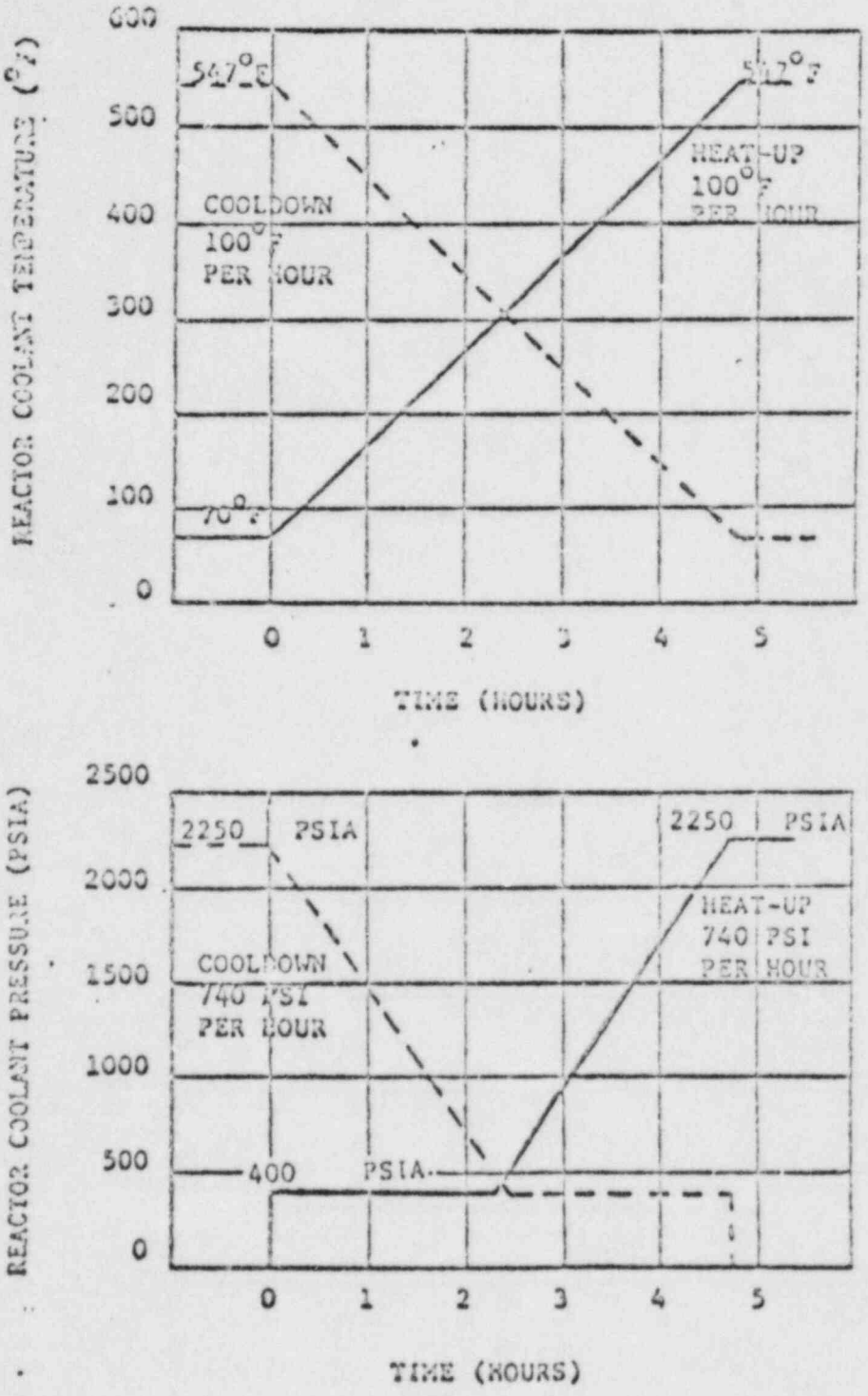
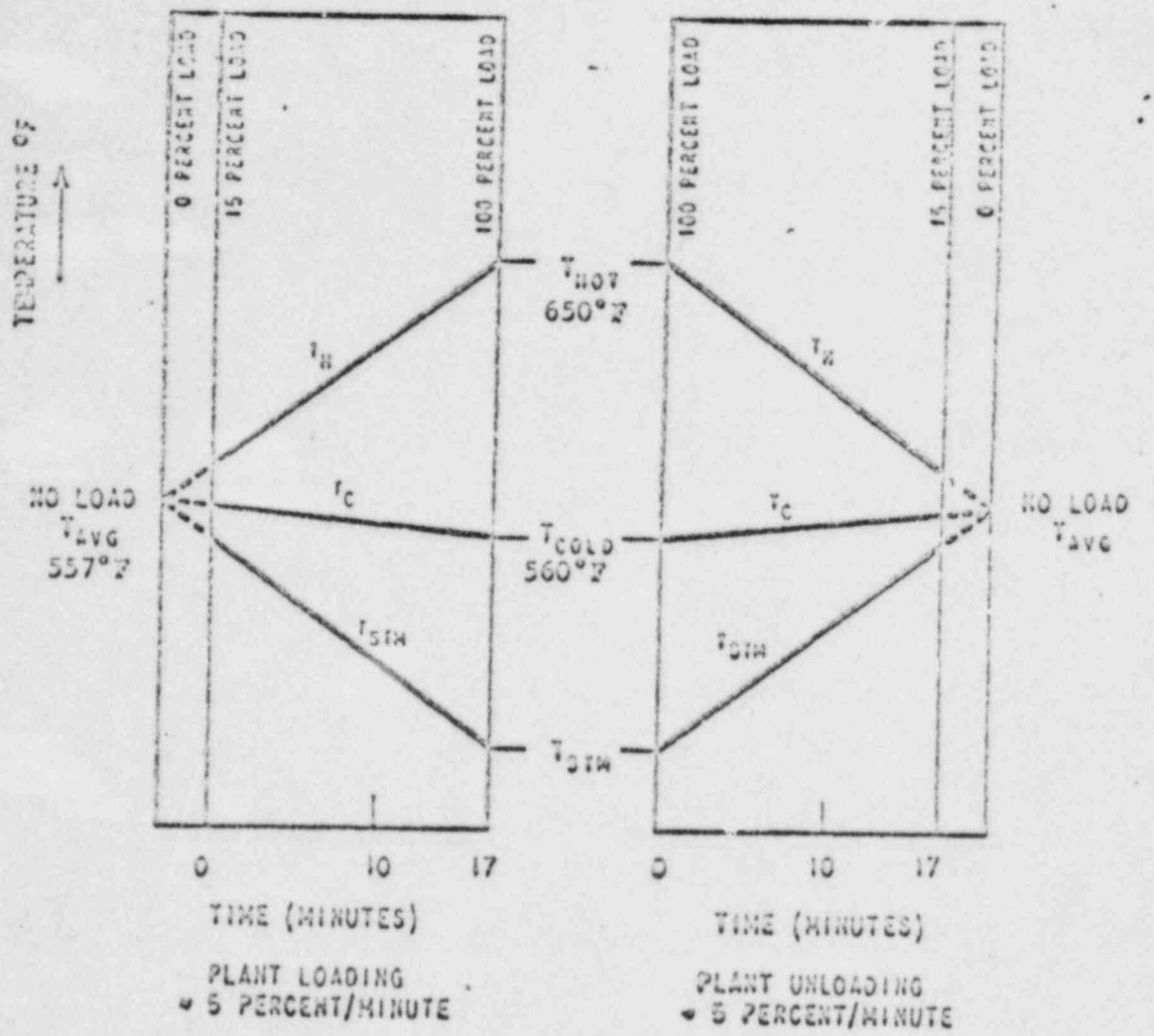


FIGURE 1

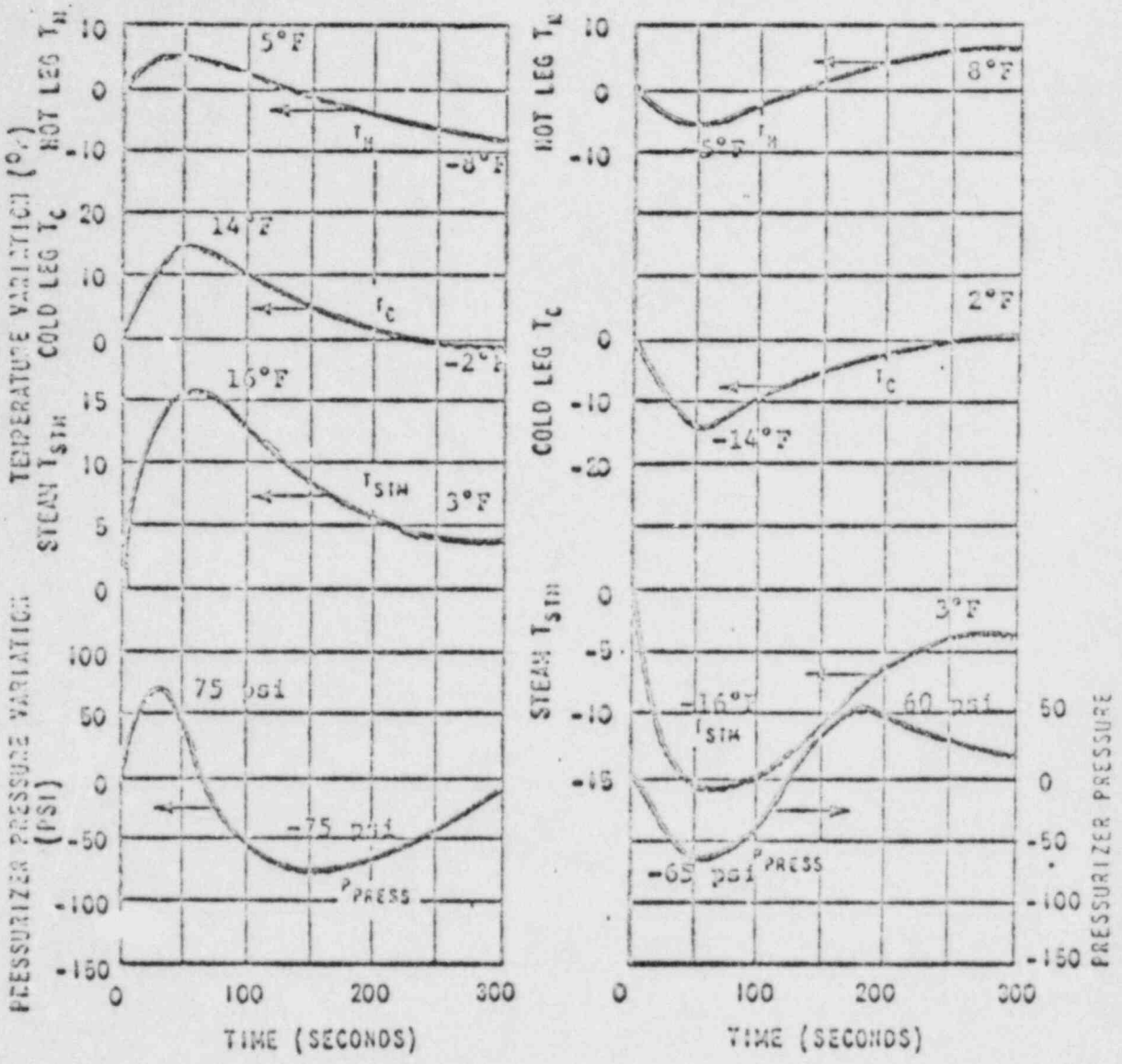
Plant Heatup & Cooldown



NOTE: REACTOR COOLANT PRESSURE 2250 PSIA

FIGURE 2

Plant Loading and Unloading at a Rate
of 5 Percent per Minute



10 PERCENT STEP LOAD DECREASE (INITIAL POWER 100 PERCENT)

10 PERCENT STEP LOAD INCREASE (INITIAL POWER 90 PERCENT)

NOTE: After 300 seconds the plant is returning to initial conditions consistent with the Plant Loading and Unloading Transient

FIGURE 3

10 Percent Step Load Increase and Decrease

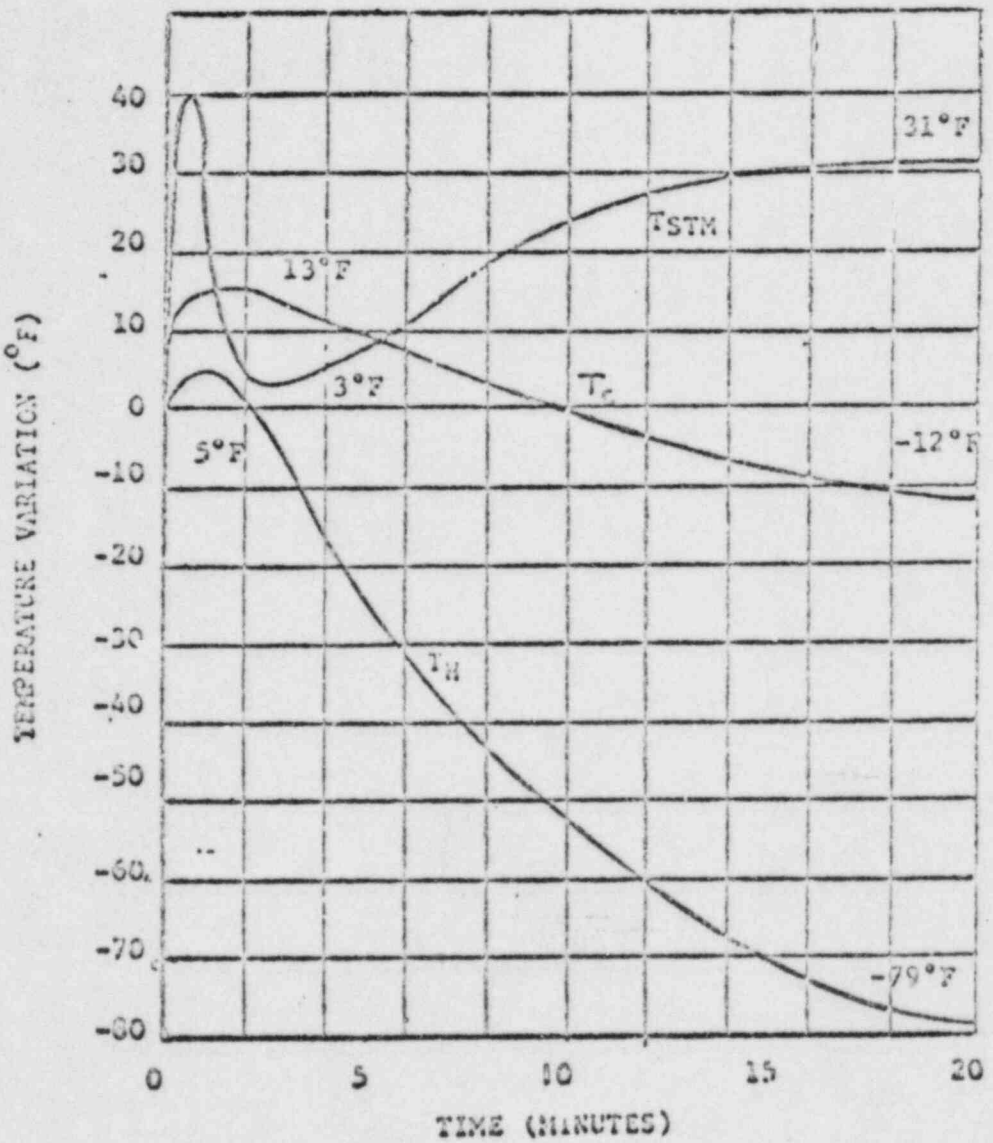


FIGURE 4A

Large Step Decrease in Load with Steam Dump

NOTES:
1. Basis: 95% Step with 85% Steam Dump
2. The plant remains at condition reached in 20 minutes indefinitely.

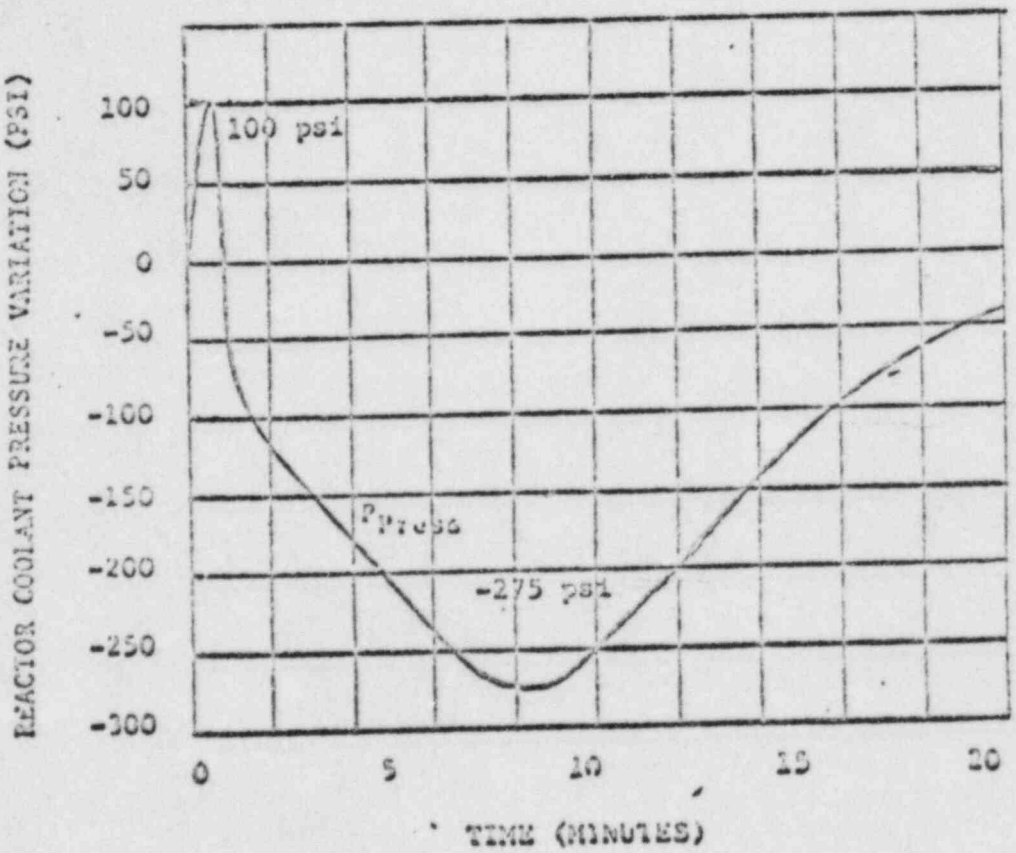
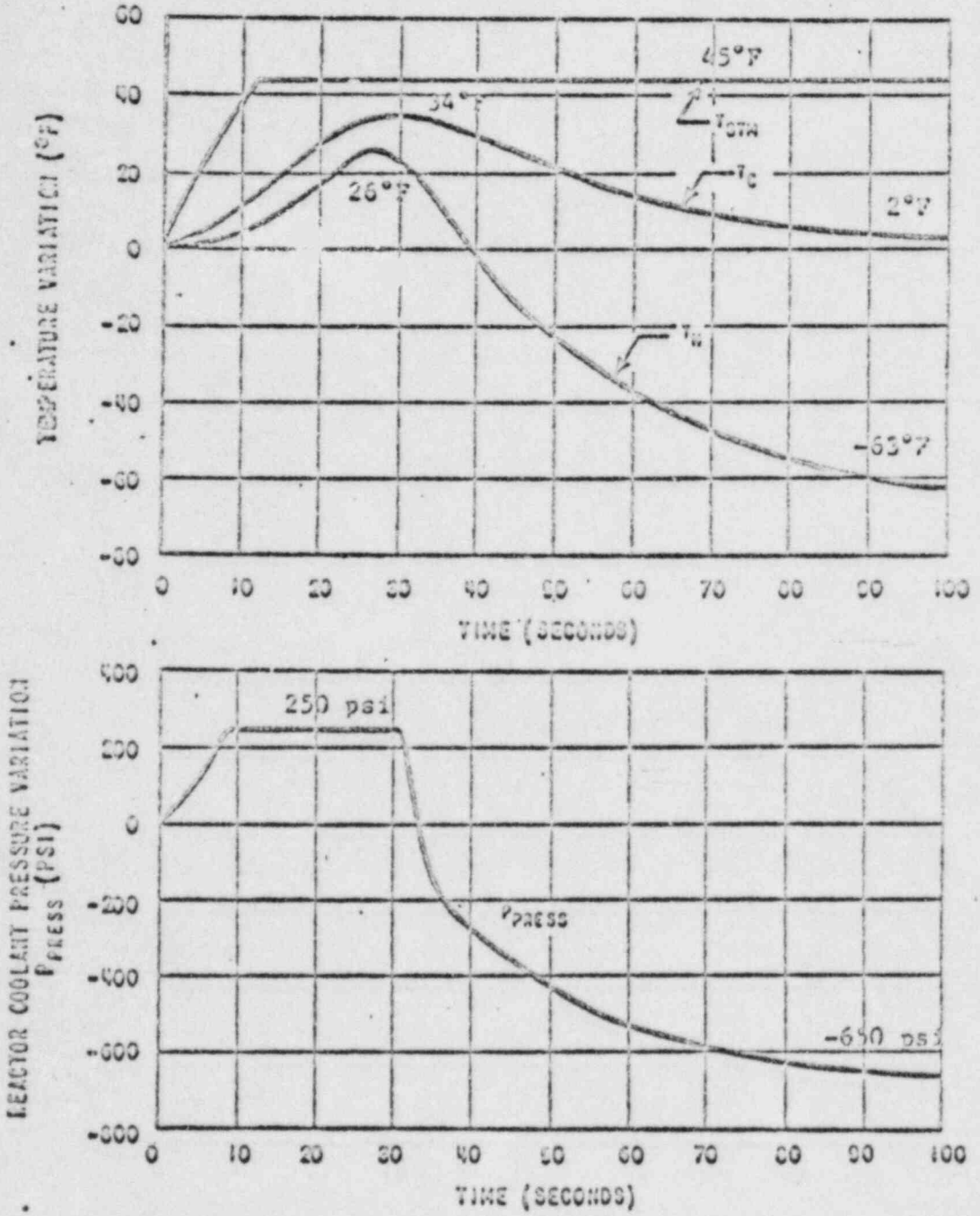


FIGURE 48

Large Step Decrease in Load with Steam Dump

Note:

Basis: 95% Step with 85% Steam Dump



NOTE: At the end of this transient the plant returns to no load condition consistent with the Plant Heatup Transient

FIGURE 5

Loss of Load from Full Power

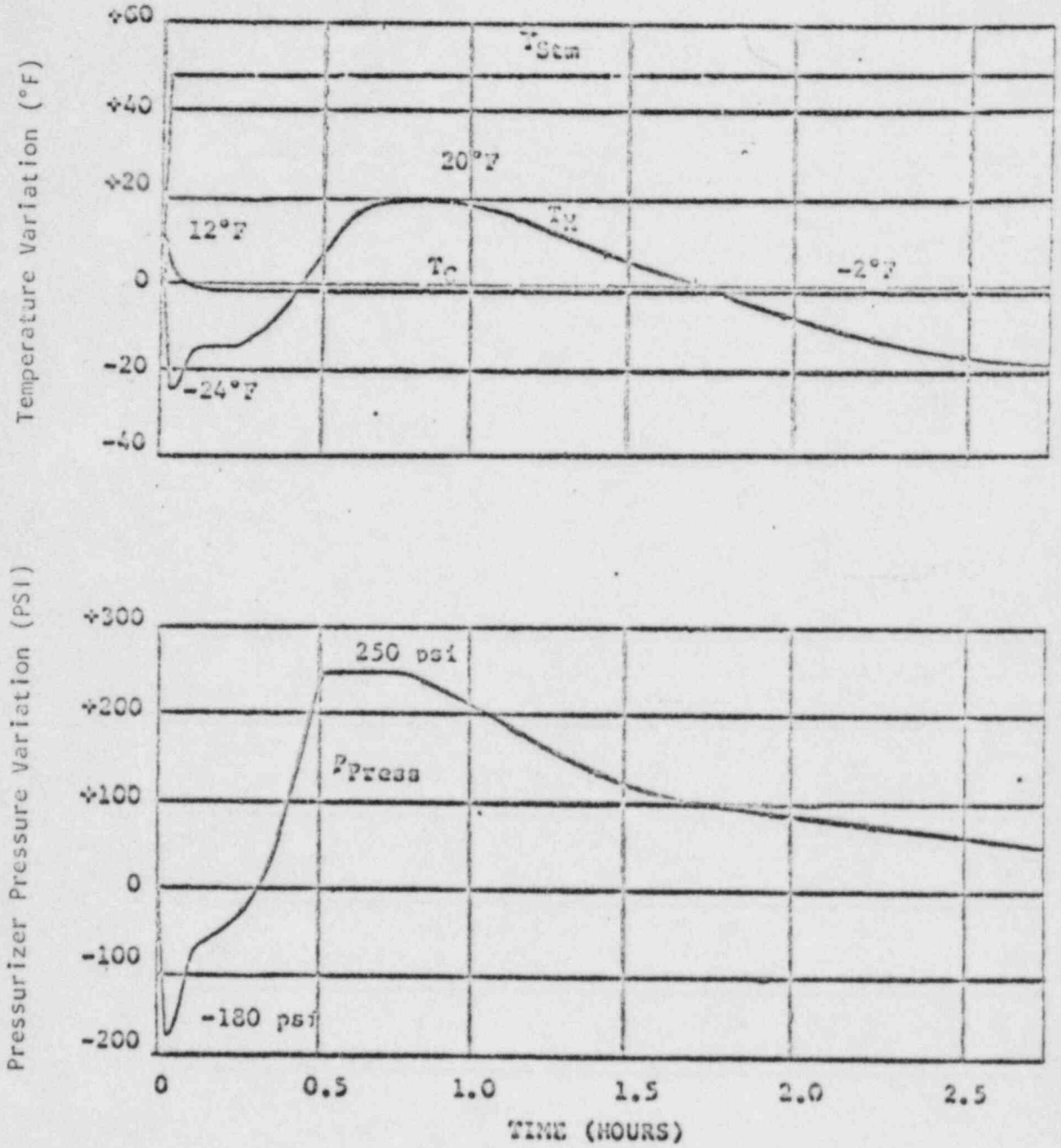
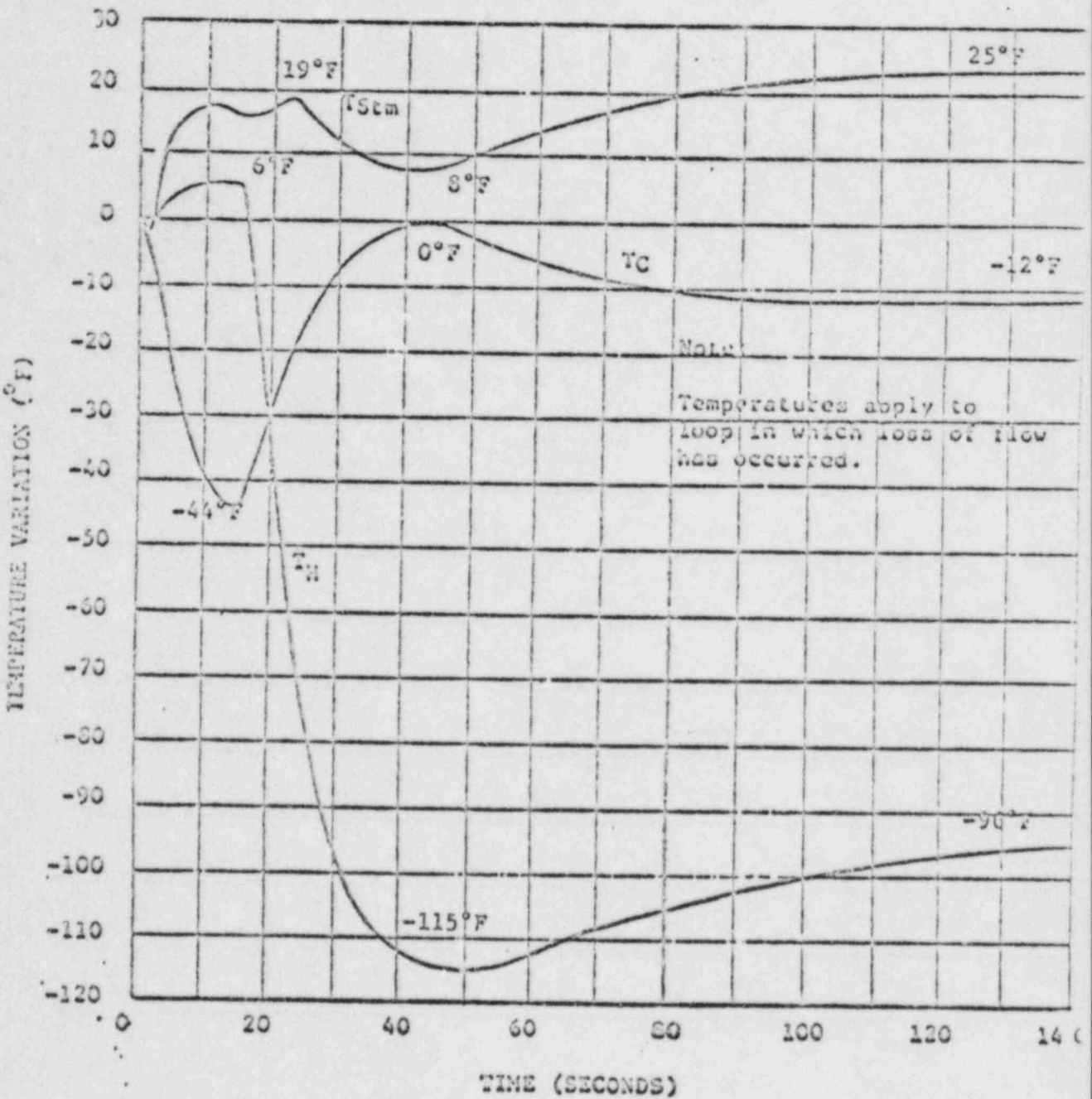


FIGURE 6

Loss of Power

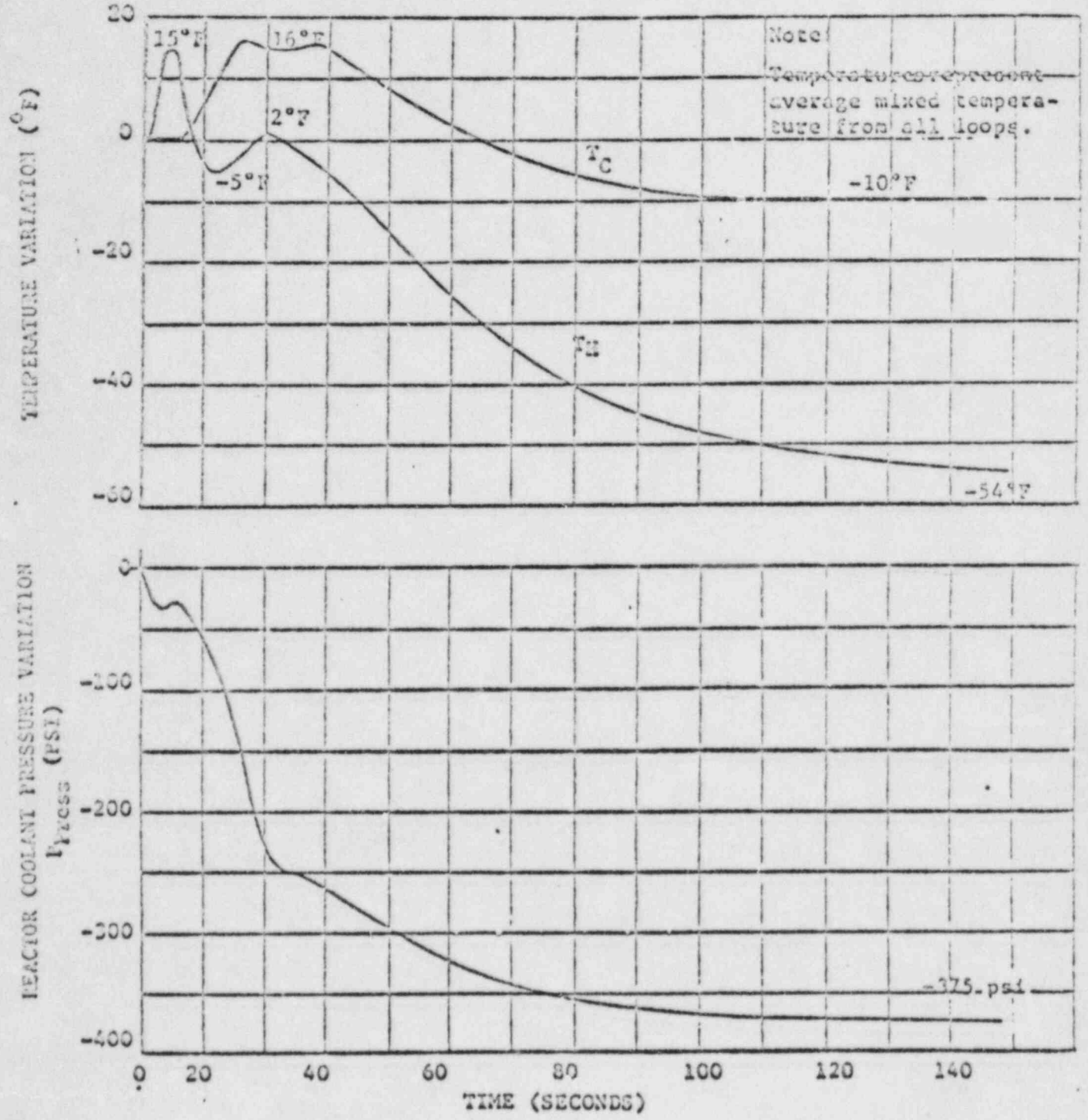
NOTE: At the end of this transient the plant returns to a no load condition consistent with the Plant Heatup Transient.



NOTE: At the end of this transient the plant returns to a no load condition consistent with the Plant Heatup Transient.

FIGURE 7

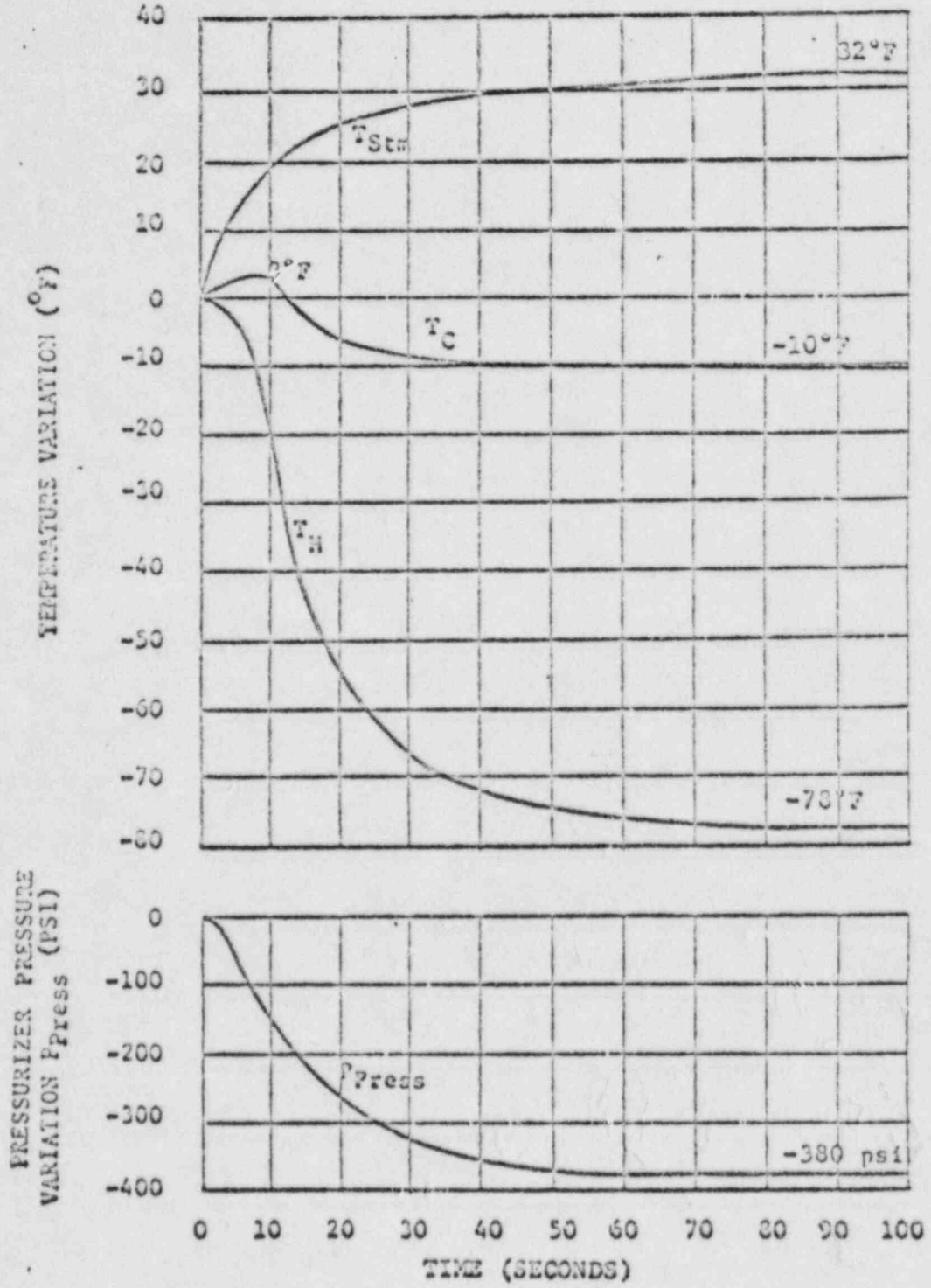
Loss of Flow in One Loop



NOTE: At the end of this transient the plant returns to a no load condition consistent with the Plant Heatup Transient.

FIGURE 8

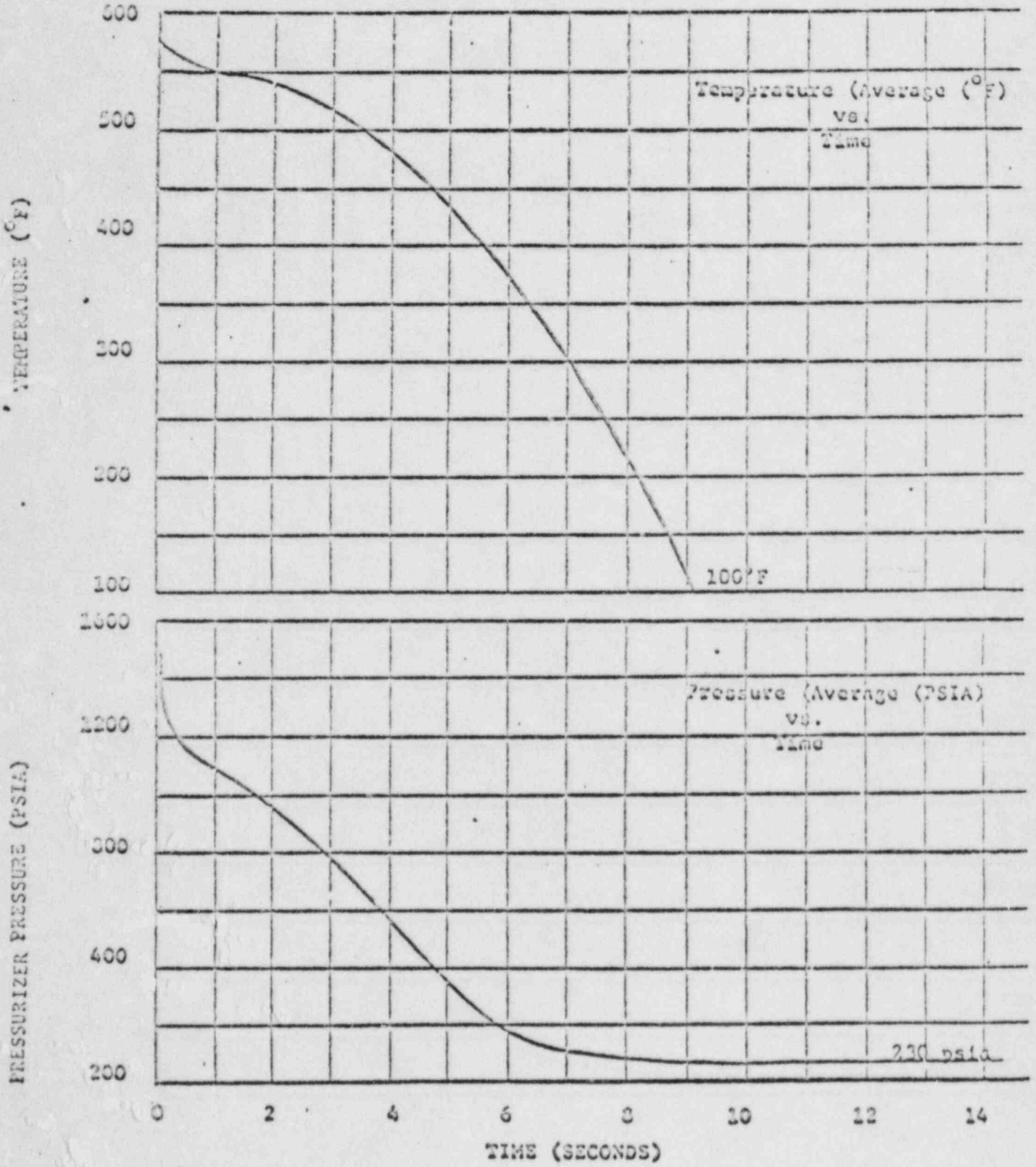
Loss of Flow in One Loop



NOTE: At the end of this transient the plant returns to a no load condition consistent with the Plant Heatup Transient.

FIGURE 9

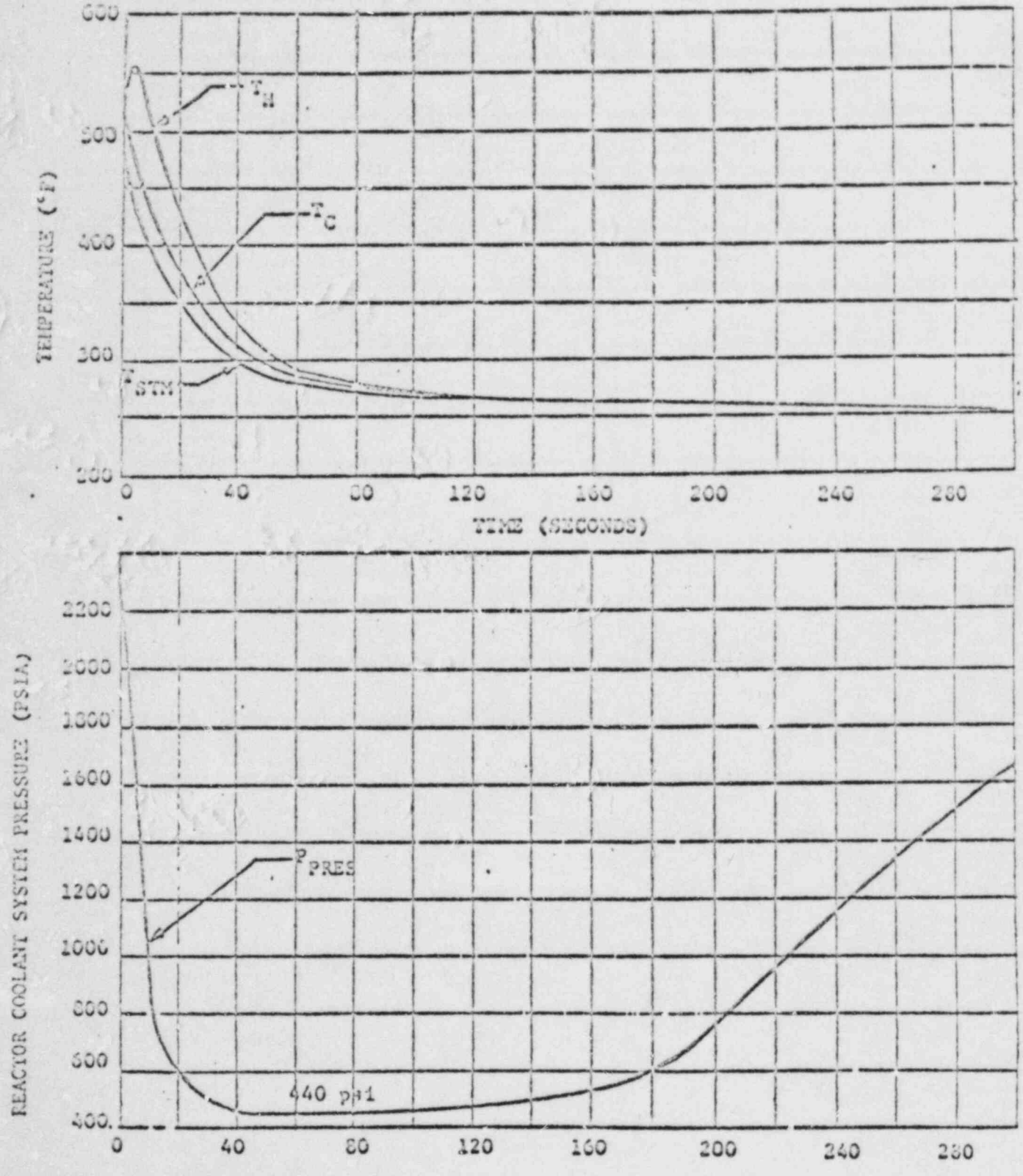
Reactor Trip from Full Power



NOTE: The plant remains at condition reaches in 10 seconds indefinitely.

FIGURE 10

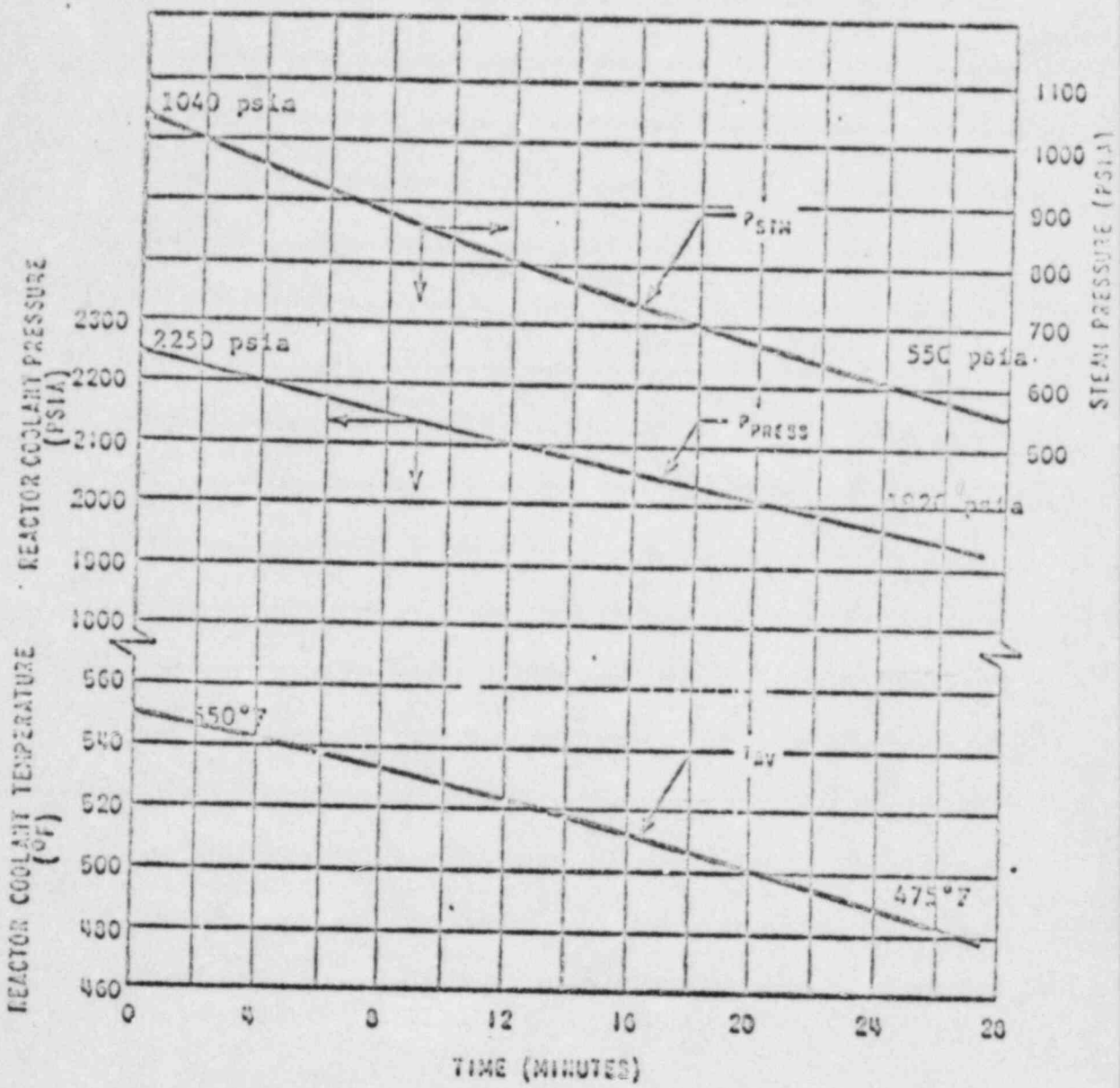
Reactor Coolant Pipe Break



NOTE: After 360 seconds the plant remains indefinitely at 212°F and 2500 psia.

FIGURE 11

Steam Line Break From No Load



NOTE: Transient is based on approximately 2% of maximum guaranteed steam flowrate. At the end of this transient the plant is brought to a no load condition consistent with the normal plant heatup transient.

FIGURE 12

Turbine Roll Test

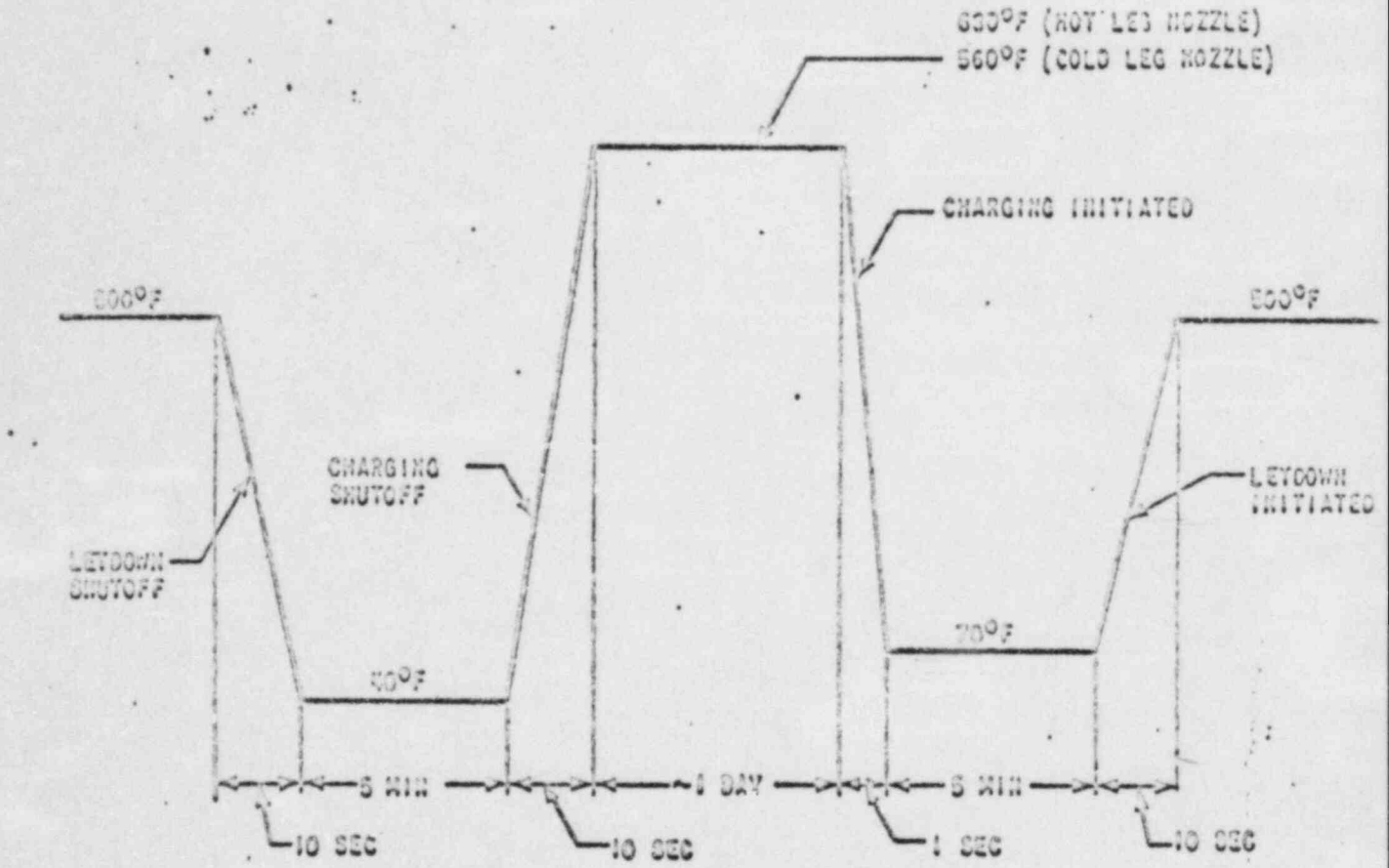


FIGURE 25

Temperature of Fluid in Contact with Charging Line Nozzle when Charging and Letdown Line is Removed From and Put Back In Service

Figure 26A. Charging Line Flowrate Increased by 50% and then Reduced Back to Normal

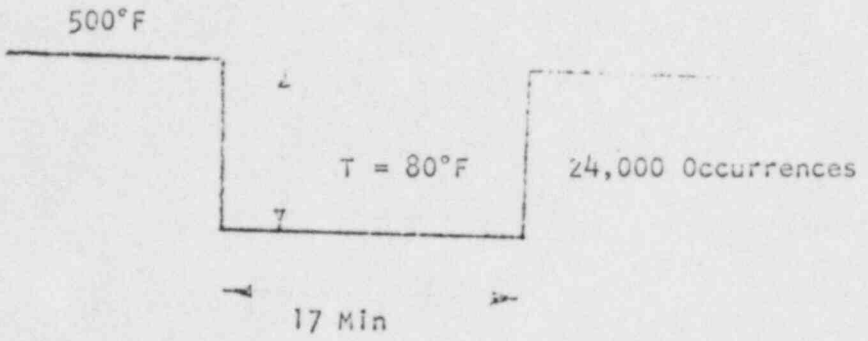


Figure 26B. Charging Line Flowrate Decreased by 50% and then Increased Back to Normal

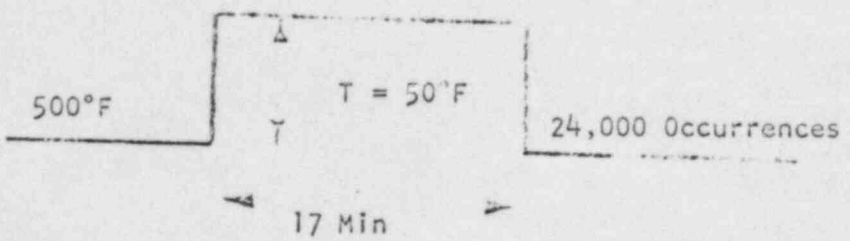


Figure 27A. Letdown Line Flowrate Increased by 60% and then Reduced Back to Normal

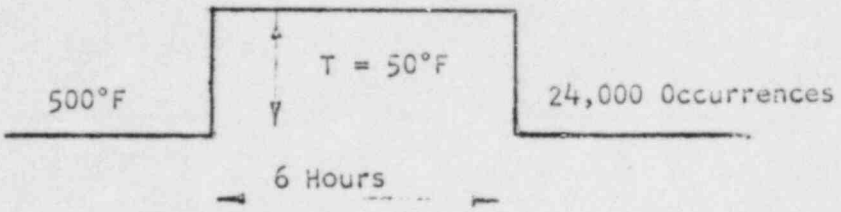


Figure 27B. Letdown Line Flowrate Decreased by 50% and then Increased Back to Normal

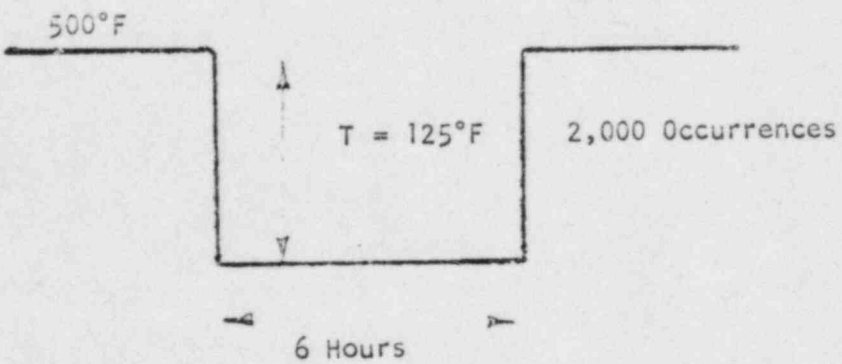
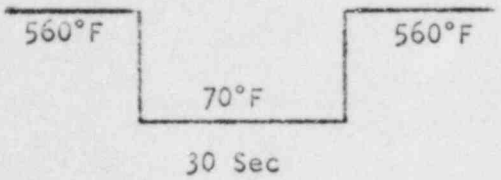
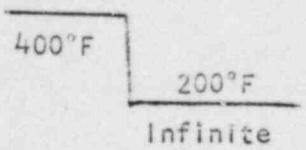


Figure 28. Design Transients for Miscellaneous Nozzles

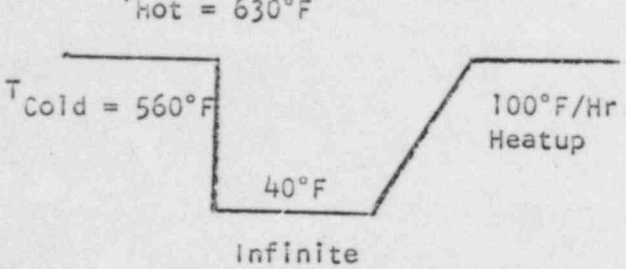
A. Accumulator Connection



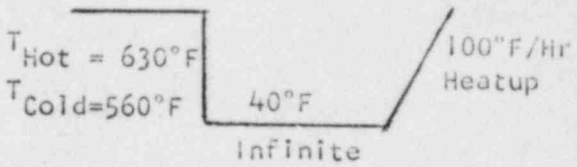
B. Residual Heat Removal System Return Nozzle



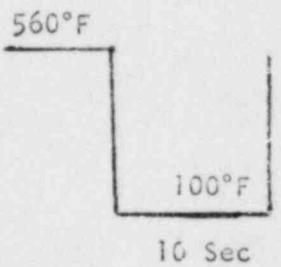
C. Low Head Safety Injection



D. High Head Safety Injection



E. RTD Manifold Return Nozzle



Estimated Valve List for Specification CNS-1205.00-6

Carbon Steel Valves
600 psi/1500 psi Classes
ASME III Class 2

Type	Size	Quantity	Operation	Operator Speed	Pressure Class
Gate	4"	8	Manual	-	600 psi
Check	4"	8	-	-	600 psi
Gate	6"	4	Manual	-	600 psi
Gate	4"	4	Manual	-	1500 psi
Globe	4"	4	Manual	-	1500 psi
Check	4"	10	-	-	1500 psi
Gate	6"	4	Manual	-	1500 psi

JRA/sf
2-21-74

GENERAL CONDITIONS OF CONTRACT

EQUIPMENT AND SYSTEMS

Effective August 1, 1973

1. GENERAL CONDITIONS

a) These General Conditions of Contract of the Owner shall prevail in the event conditions offered by the Contractor add to or are in conflict with these General Conditions.

b) Where these General Conditions of Contract are in conflict with the Owner's specification, including revisions and addenda thereto, the specification shall prevail.

2. GUARANTEE

For a period of one calendar year after initial operation, the Contractor guarantees that the equipment covered by the specifications shall be free from defects in workmanship and materials, and shall operate satisfactorily under all conditions described by the specifications. Any equipment or components thereof which fail to meet the above guarantee shall be repaired, replaced or upgraded by the Contractor to the full satisfaction of the Owner and at no cost to the Owner. The initial operation of this equipment is scheduled on or about March 1, 1979.

3. FAILURE TO MEET GUARANTEE

a) Any defects in material or workmanship or other failure to meet requirements of the specifications, including errors or omissions, which are disclosed prior to final payment, or prior to acceptance by the Owner, whichever occurs at the later date, shall, if so directed by the Owner, be corrected entirely at the expense of the Contractor.

b) Any latent defects not disclosed before date of final payment or date of acceptance, whichever is the later date, but disclosed within one year after the equipment and/or systems are placed in use, shall be corrected promptly by and at the expense of the Contractor.

c) Any variation from the materials or design agreed upon with the Contractor at the time of the award of the contract shall be approved by the Owner before any such changes are incorporated in the equipment or system to be furnished by Contractor. Approved variations must be fully documented and records thereof furnished to the Owner.

4. RIGHT TO OPERATE UNSATISFACTORY EQUIPMENT

The Owner shall have the right to operate any and all equipment as soon and as long as it is in operating condition whether or not such equipment has yet been accepted as complete and satisfactory. This shall not be construed, however, to require continued operation of equipment which may be materially damaged by such operation before the required repair has been made.

If the operation or use of the equipment, after installation, proves to be unsatisfactory to the Owner, the Owner shall have the right to operate and use such equipment for such time as Owner deems necessary until it can be taken out of service for repairs or replacement in whole or part by the Contractor. Use or operation of equipment, systems, or materials which do not meet the foregoing guarantee shall not waive Owner's right to require full compliance with the contract nor shall it waive the Owner's right to recover damages from Contractor.

5. PATENTS

The Contractor shall defend any suit or proceeding brought against the Owner so far as based on a claim that any equipment or any part thereof, furnished under this contract constitutes an infringement of any patent of the United States or any other country, and the Contractor shall indemnify and save the Owner harmless from all expenses, damages and costs awarded therein against the Owner or incurred by the Owner. In case said equipment, or any part thereof, is in such suit held to constitute infringement and the use of said equipment or part is enjoined, the Contractor shall, at its own expense and at its option, either procure for the Owner the right to continue using said equipment or part; or replace same with non-infringing equipment; or modify it so it becomes non-infringing; or remove said equipment and refund the purchase price and the transportation and installation costs thereof.

6. COMMENCEMENT, PROSECUTION AND DELIVERY

The Contractor agrees that he will commence performance of work under the contract within ten calendar days after receipt by him of notice of award of the contract unless the consent of the Owner in writing is given to begin at a different date, and that he will prosecute the same so that all work shall be entirely completed and performed in accordance with the specifications and the items delivered at destination on the dates established by the Owner.

7. SCHEDULE AND PROGRESS CHART

The Contractor shall submit to the Purchaser within fifteen days after award of contract for approval four copies of an outline of his proposed methods and manner of executing the work including sequences of operation and a brief time schedule of performing it. Within fifteen days after approval thereof, the Contractor shall submit to the Purchaser, for approval, a practicable schedule showing the order in which the Contractor proposes to carry on the work, the dates on which he will start the several salient features (including engineering, procurement of materials, fabrication, assembly, tests, shipments, etc.) and the contemplated dates for completing it. The schedule shall be in accordance with the outline and brief schedule previously approved and in the form of a bar graph of suitable scale to indicate appropriately the percentage of work scheduled for completion at any time on the salient

features as well as the total contract. The Contractor shall enter on the graph the actual progress at the end of each month and shall immediately deliver to the Purchaser six copies thereof.

8. MATERIALS AND WORKMANSHIP

a) All materials used in the construction of the equipment shall be new and of highest standard commercial quality normally used for this type of equipment, considering strength, ductility, durability, best engineering practice, and the purpose for which the equipment is to be used (unless otherwise required by the specifications). Liberal factors of safety shall be used throughout the design and especially in the design of all parts subject to alternating stresses or shock.

b) All work shall be performed and completed in a thorough workmanlike manner and shall follow the best modern practice in the manufacture of high quality equipment, notwithsatnding any omissions from the specifications or drawings. All work shall be performed by workmen skilled in their various trades. All parts shall be made accurately to standard gauge, where possible, to facilitate replacement and repairs. Like parts shall be interchangeable insofar as practicable. Incidental fittings, fixtures, accessories and supplies shall be new, of approved manufacture and of standard first-grade quality. The Contractor shall provide and maintain in storage for at least ten years, free of cost to the Owner, sufficient templates, gauges, patterns, or other recores to enable the Contractor to make repair and replacement parts. All special gauges and templates necessary for field erection and installation shall become the property of the Owner. The patterns shall remain the property of the Contractor.

9. INSPECTION AND TESTS

a) All materials furnished and all work performed will be subject to rigid inspection, and no materials shall be shipped until all required or specified tests, analyses, and inspections have been made, or certified copies of reports of tests and analyses or Contractor's guarantees shall have been accepted. The Contractor shall prepare specimens and perform tests and analyses in accordance with the specifications and as required to demonstrate conformance of the various materials with the applicable specifications. The Contractor shall furnish the Owner with copies of certified test reports for all tests and analyses and/or certifications required by the specifications.

b) The Contractor shall keep the Owner informed in advance, of the time of starting and of the progress of the work in its various stages so that arrangements can be made for inspection.

c) All items shipped to the Owner at any location will be subject to the Owner's receiving inspection upon arrival at the shipping destination and prior to unloading where possible.

d) Acceptance of the equipment or the waiving of the inspection thereof shall in no way relieve the Contractor of the responsibility for furnishing equipment meeting the requirements of the specifications.

10. ACCESS TO FACILITIES

a) The Owner and/or his agents shall at all times have access to all places where materials or equipment are being prepared or manufactured for use under the contract, and shall have full facilities for unrestricted inspection of such materials or equipment and their manufacture.

b) The Owner and/or his agents at all times have access to quality assurance records concerning equipment and systems being prepared or manufactured for use under the contract.

11. COOPERATION WITH OTHER MANUFACTURERS

The Contractor shall cooperate with other manufacturers or suppliers furnishing associated equipment or equipment connecting directly thereto. The Contractor shall exchange with other suppliers all necessary drawings, dimensions, templates, gauges and other information required to insure a combined installation that is most suitable in every respect within the intent of the specification, and to eliminate delays in manufacture, fabrication or installation. The Contractor shall keep the Owner informed of all such coordination by copy of his letters to other manufacturers.

12. MARKING

Each complete item, or component part of an item, if multiple units are being furnished, shall be given an identification number or letter, and each part of each item which is not permanently connected in shop assembly shall be legibly marked and match-marked. Except on bolts and other small parts, all such marks shall be made as required by the specifications or in a manner suitable for the expected service. Diagrams, detail drawings or erection drawings showing all such marking shall be supplied. Each piece or subassembly separately packaged for shipment shall be labeled or tagged with the specification number and the mark number of such piece or the numbers of the parts grouped in such subassembly or contained in the package.

13. PREPARATION FOR SHIPMENT

The Contractor shall prepare all equipment and materials for shipment in such manner to protect them from damage in transit. Any articles or material that might otherwise be lost shall be suitably packaged and protected and clearly marked for identification. All parts shall be prepared for shipment so that slings for handling may be attached readily while the parts are on the conveyance. Where it is unsafe to attach slings to a box, boxed parts shall be packed with

slings attached to the part, and the slings shall project through the box or crate so that attachment can be made readily. All finished surfaces shall be coated with rust-preventative compound, and all finished nonferrous metalwork and devices subject to damage shall be suitably wrapped or otherwise protected from damage during shipment unless otherwise specified in specification. All components requiring indoor storage prior to erection shall be shipped in closed, weather-tight conveyances, and the package shall be clearly labeled in large letters with detailed instructions covering the proper protection of article or articles while in storage.

14. SHIPMENT

a) The Contractor shall notify the Purchaser at least fifteen days in advance of expected shipping dates. When a shipment is made, the Contractor shall notify the Purchaser giving the type of carrier and name of transporting agent and also a description of the article or articles shipped, the packing list, and any other information necessary for the identification, storage or assembly of the article or articles shipped. The shipping weight of such item shall also be given.

b) Title to, risk of loss of, and damage to equipment, materials and articles shipped shall be and remain with the Contractor until delivered to and accepted at the destination designated by the Owner.

15. ERECTION

a) Erection of the equipment will be performed by the Owner with the technical advice of the Contractor's erection engineers as required.

b) The Contractor shall furnish, if and when and to the extent required by the Owner, one or more erection engineers who shall give technical direction for the erecting, inspecting, initial operation and testing until completed to the satisfaction of the Owner, and to instruct the Owner (and/or his agent) in the operational and maintenance features of the equipment. The work and operations of the erection engineer(s) shall be coordinated with the construction program at the erection site as directed by the Owner.

c) In addition to other warranty requirements specified herein, if any portion of the equipment is damaged as a direct result of faulty or inadequate technical direction of installation, inspecting or instruction by the Contractor's erection engineer(s) within one year from the date of initial operation, the Contractor shall correct such damage at his own expense.

16. INDEMNITY

The Contractor will indemnify and save harmless the Owner against all damages, claims for damages, suits, demands, attorney fees and costs, in whole or in part, growing out of or in any way connected with the performance of this contract by the Contractor and its employess or its subcontractors, if any, and their employees. In connection with the foregoing indemnity, the Contractor, on demand by the Owner, shall take over and defend any suit against the Owner covered by the indemnity. The Contractor shall not, however, be liable in any event for any loss or injury to persons or property (including the apparatus installed) caused solely by:

a) The negligence or fault of the Owner, its employees, agents, and other contractors with Owner;

b) Failure to observe the erection engineer's instructions;

c) The failure or malfunctioning of tools, equipment, facilities, or devices not furnished by the Contractor, which is caused by defects therein not observable by the erection engineer's visual inspection.

17. SUBCONTRACTORS AND ASSIGNMENT

a) Prior to award of contract the Contractor shall submit to the Owner for his approval, a list of all portions of the contract in the engineering, material and fabrication areas that will be subcontracted to nondomestic suppliers. The following award of the contract, an up-to-date inventory shall be submitted by the Contractor to the Owner on a monthly basis which provides information on the percentage of the total contract that will be provided by nondomestic subcontractors. Owner approval in writing is required prior to award by the Contractor of any subcontract to a nondomestic supplier.

b) The Contractor shall submit to the Owner within thirty days after receipt of notice of award the name and address of all subcontractors, if any, of major parts, materials and fabrications. Any portion of fabrication to be subcontracted must first be approved by the Owner prior to the award of the order tosuch subcontractor. No right or interest in the contract or obligation under the contract may be assigned by Contractor without written permission of the Owner.

18. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)

All work performed by the Contractor or any Subcontractor on the Owner's premises shall comply with the latest revision of Safety and Health Regulations for Construction (29 FR 1518). Designs of equipment or systems by the Contractor or subcontractor shall incorporate the features required to insure that such equipment or systems comply with latest revisions of Occupational Safety and Health Standards (29 FR 1910).

19. PRICE STABILIZATION

Contractor represents to the Owner that its prices and those of its subcontractors, if any, are in accord with the Economic Stabilization Act of 1970 and any Executive Orders and Rules and Regulations issued thereunder or any similar Act of Congress controlling prices or wages and any orders, rules, or regulations issued thereunder.

20. PAYMENT SCHEDULE

Unless specifically provided elsewhere in the contract to the contrary, all payments for work done or materials furnished hereunder shall be made as follows:

a) Invoices received by the Owner at any time between the 26th day of a month and 10th day of the next month shall be paid on the 25th day of said next month, provided the work has been satisfactorily completed or materials received and accepted.

b) Invoices received by the Owner at any time between the 11th and 25th days of any month shall be paid on the 10th day of the next ensuing month, provided the work has been satisfactorily completed or materials received and accepted.

c) Invoices on which payment is withheld due to an exception will be paid as provided above, such invoices to be considered received by the Owner on the date on which such exception is removed.

d) If any payment date as provided above shall fall on a Saturday, a Sunday or legal holiday, payment shall be deferred to the next ensuing business day of the Owner.

e) Terms of payment are to be as offered and accepted or as may be negotiated.

f) In addition to terms of payment, complete final payment will not be made until all documentation required for application, installation or other utilization is received by the Owner from the Contractor. This includes, but is not limited to, test reports, handling and storage recommendations, quality assurance documentation, identification information, etc. A maximum of five percent of the contract amount will be withheld until such requirements are met.

GENERAL REQUIREMENTS APPLICABLE TO SPECIFICATION

1. SPARE PARTS

A complete list shall be included with quotation showing the spare parts recommended for each piece of equipment by Bidder, with parts numbers and prices for each item.

2. FOREIGN MANUFACTURE

No parts, materials, or equipment shall be of manufacture outside of the United States without prior approval of Owner. Bidder shall identify in his proposal any parts, materials, or equipment contemplated for manufacture outside of the United States.

3. TESTS, REPORTS AND INSPECTION

The Owner shall have full access to the equipment during the process of its manufacture and shop testing. The Owner shall be notified when manufacturing schedule is arranged. Should any work, fabrication or materials be supplied by a subcontractor or outside vendor, the Owner shall be notified prior to release to the vendor. The Owner reserves the right of approval of any subcontractor and also the right to inspect work, fabrication or material being subcontracted at the subcontractor's location. The Owner shall be kept informed during manufacture of any major problems or rework of material and be informed of any major repair procedures. The manufacturer shall obtain approval from Owner prior to proceeding with any major repair procedures or material rework. Bidder shall submit written outline giving extent of testing and inspection of each manufacturing operation.

Six copies of certified pump performance test curves for pumps covered by the specification are to be submitted to Mr S K Blackley, Jr for approval prior to shipment of any pumps.

Six copies of hydrotest results, where applicable, are required for approval prior to shipment of equipment.

4. CARE DURING STORAGE

The Contractor must submit to Owner, within four to six months prior to the time at which equipment is shipped, instructions for care of equipment during the periods listed below. These instructions should include requirements, if any, for periodic operation, rotation, or energizing, for application or removal of protective coatings or lubricants, for disassembly or assembly during storage, and other instructions as necessary.

A. On-site storage prior to installation.

B. After installation, prior to startup, during construction.

C. After startup, during a lay up due to extended unit outage (this information required only if such information is not included in the instruction manual).

This information should be mailed to Mr S K Blackley, Jr at the address given in the specification.

5. CONFORMANCE WITH SPECIFICATIONS

The Contractor must submit with his proposal a list of all major and minor exceptions to these specifications and obtain written approval from Owner prior to award of the order. If there are no exceptions, it must be so stated in writing. It is particularly emphasized that any unapproved non-conformity with the specification must be changed to complete conformity at the Contractor's expense and this expense will include the cost of all labor and materials and all other related expenses by the Owner or Contractor.

JRA/cf
11-9-72

PACKAGING AND SHIPPING REQUIREMENTS

Specification No. Date

1. ITEM CLASSIFICATION (ANSI N45.2.2 - 1972)

   Level A C D Special
   Special _____

2. PACKAGING (ANSI N45.2.2 - 1972, Section 3 and Appendix A3)

   Level A B C D Special
   Special Instructions _____

3. SHIPPING (ANSI N45.2.2 - 1972, Section 4.2)

   Carrier Open Closed Special
   Special Instructions _____

   Shipment via Train Truck Plane Barge Ship Other

   Description of other means _____

4. LOADING & TRANSIT (ANSI N45.2.2 - 1972, Section 4.3)

   Special Instructions for loading, rigging, handling, preservative coatings, seals, stacking and vandalism precautions _____

5. IDENTIFICATION AND MARKING (ANSI N45.2.2 - 1972, Appendix A3.9)

   Item Markings _____

   Container Markings _____

DRAWING REQUIREMENTS

The Contractor shall prepare and submit five prints each of all drawings to Mr S K Blackley, Jr, Duke Power Company, P O Box 2178, Charlotte, N.C. 28242, Attn: C. M. Myers . These prints are to be full size and legible with uniform background density suitable for microfilming and subsequent reproduction from microfilm. These prints will be reviewed by the Owner and, if satisfactory, will be approved and one so marked will be returned to the Contractor. If not satisfactory, the prints will be appropriately marked and one returned to Contractor for correction after which five (5) prints of the drawings as corrected shall again be submitted to the Owner for approval. Contractor shall make any corrections required by the Owner and appropriately note any changes by dated revisions on the drawing.

Drawings will be microfilmed by the Owner and should adhere to the following Drafting Lettering Standards:

Minimum character height (A, B, C size dwgs)	- 0.125 in (1/8)
Minimum character height (D & E size dwgs)	- 0.156 in (5/32)
Minimum spacing between lines of characters	- height of characters
Machine & guide generated characters	- 12 point size min
Density of characters and lines	- Dense, sharp, uniform
Background density of drawing	- uniform

If drawings are not acceptable to Owner for microfilming, Contractor shall furnish 15 copies of all drawings for Owner's records within 14 days of receipt of drawing approval. Bidder to state drafting lettering standards that will apply.

On all drawings and correspondence concerning this order, the Contractor shall show the numbers (Mill Power Supply Company's Order Number/Duke Power Company's Item Number). Material is not to be fabricated until such drawings have been approved. All drawings will be due four weeks after award of order.

The following information shall be included on the certified prints of outline and cross-section drawings:

a) Support anchor bolt hole size ($\frac{1}{4}$" larger diameter than required bolt size) and location. Indicate anchored end and slotted end, if applicable.

b) Owner foundation requirements including bolt projection and grouting requirements. For safety related equipment, include:

   (1) Anchor bolt diameter and minimum yield stress requirement.
   (2) Operating moments and shears at the base of the equipment.
   (3) Seismic moments and shears at the base of the equipment.
   (4) Total dead load.

c) Overall dimensions and center-of-gravity of equipment, including equipment centerline to face of all piping connections requiring Owner connection and any disassembly clearances required, such as tube pulling clearances, etc.

d) All nozzle orientations with size and rating of all suction and discharge flanges, and ID/OD if not nominal for weld end nozzles. If more than one nozzle orientation is allowable, so indicate.

e) Nozzle list tabulated on drawing.

f) ASTM material specification of all flanges, couplings and pipe nozzles and shell and heads of vessel, as applicable.

g) Equipment weight, empty and full of water, and baseplate weight, if applicable.

h) All necessary vents, drains, instrument connections, manway and other connections shown and dimensioned. Show use, type connection, flange rating and nominal size.

i) Lifting lugs shown for tanks as required by Duke Power specification and/or as normally furnished by the Contractor.

j) Information shown on equipment nameplate.

k) Allowable nozzle loadings on equipment if applicable.

Contractor shall include in proposal or in supplemental data after order (not necessarily to be included on separate drawing):

a) Sketch of weld end detail for each nozzle connection per Owner's weld and standard.

b) List of all lifting lugs or eyes, with ASME or ASTM material specification, and sketch of handling method.

c) List of all miscellaneous valves, plugs, etc included as part of Contractor's scope of supply and sketch or diagram of any special piping, valves, controls, etc required and to be furnished by Owner. All diagrammatic connections must be identifiable by nomenclature or connection number to the connection as shown on the equipment drawing.

TFM/cf
11-9-72
Rev 7-11-73
Rev 1-31-74

Specification No
Date:

DUKE POWER COMPANY
DESIGN ENGINEERING DEPARTMENT

STANDARD COATING SPECIFICATION No MMM

Date 6-8-72 Revised

THIS DOCUMENT INCLUDES ENGINEERING DESIGN OF ITEMS RELATED TO NUCLEAR SAFETY. IN ACCORDANCE WITH ESTABLISHED PROCEDURES, ITS QUALITY HAS BEEN ASSURED.

ORIGINATED BY 6/8/72 DATE 6/9/72

CHECKED BY 4/22/73 DATE

APPROVED BY 4/22/73 INSPECTION WAIVED 4/22/73 DATE

D W Peach, Technical Specialist, Coatings

DESIGN ENGINEERING DEPARTMENT

STANDARD COATING SPECIFICATION NO. MMM

BY: Durwood Peach DATE 6/8/72 REVISED

DESIGN ENGINEERING DEPARTMENT - CIVIL SECTION CERTIFICATION REQUIREMENTS SHOP APPLIED COATINGS FOR CLASS I SERVICE LEVELS

1. PURPOSE & SCOPE

1.1 The purpose of this specification is to implement planned and systematic actions necessary to provide the owner with adequate confidence that a coating material has been properly manufactured and applied to Class I Service Level Coating areas of nuclear facilities.

1.2 This specification establishes minimum control criteria for coating materials, surface preparation of substrates, application of materials and inspection.

1.3 This procedure conforms to Section, 1.2.4 of ANSI 5.7 - 1972 (American National Standard Quality Assurance for Protective Coatings applied to nuclear facilities).

2. GENERAL REQUIREMENTS

2.1 The vendor QA Certification Form A shall be completed by the supplier, and a copy of this form shall be shipped with components and materials to the jobsite.

2.2 Form A will be authorization for Construction to accept delivery of components and materials when completed as required. Absence of properly completed form will result in quarantine or return to supplier of delivered component or material.

2.3 The original of vendor QA Certification Form A plus all QA Documentation required by the specification shall be mailed to Duke Power Design Engineering no later than the time at which components and materials are shipped to the jobsite. This QA Documentation will be checked and approved or upgraded for approval if necessary, by the Civil Design Section.

2.4 For materials or components which must be shipped to the jobsite in more than one delivery over extended periods of time where release of each shipment for receiving and erection is essential before remaining shipments are received, the vendor QA Certification Form will be completed to cover only items contained in individual identified shipments. The original of the partial form will be mailed to Duke Power Civil Design Section and the certifications and documentations will be checked and approved the same as provided in 2.3 above.

2.5 The following applicable QA Documentation listed below will be maintained in appropriate letter file by the supplier until permission is received in writing from the Duke Power Design Engineering Section to destroy them.

2.5.1 Material or component specification

2.5.2 QA documentation required by specifications

2.5.3 Vendor QA Certification Form A and all inspection and documentation required to support the information provided on Form A.

2.5.4 Copies of any and all correspondence pertaining to written permission from Duke Power Company Design Engineering for the vendor to deviate from the specifications submitted at the time work was bid, or during fabrication.

3. DOCUMENTATION REQUIRED FOR CERTIFICATION

3.1 The following forms are attached to and made a part of these QA Procedures.

3.1.1 Form A - Design Engineering Department - Civil Section Vendor Quality Assurance Certification.

3.1.2 DPNC Form 1 - Coatings Materials - Manufacturers Product Identity Certification Record.

3.3.3 DPNC Form 2A - Coatings Materials - Shipping and Receiving Record.

3.1.4 DPNC Form 5B - Coating Applicator's Surface Preparation Record - Steel.

3.1.5 DPNC Form 6 - Coating Applicators Coating Record.

3.1.6 DPNC Form 9 - Coating Work Exception Record.

3.2 DPNC Forms 1, 2A, 5B, 6 and 9 shall be filled out for each separate work shift and copies applicable attached to each Form A to be fowarded to Duke Power Design Engineering.

3.3 DPNC Form A shall be completed in such a manner as to identify the items certi and list all QA documentation required by the job specification. Form A shall be signed by a manager of the company responsible for Quality Assurance.

3.4 The General Data portion of DPNC Form 1 shall be filled out by the Purchasing Agent responsible for ordering coatings and shall be attached to the written purchase order mailed to the coating manufacturer.

3.5 The coating manufacturer shall complete the Technical Data portion of DPNC Forr and return it to the vendor with the material shipped. No material shall be accepted from the coating manufacturer unless it has been certified.

3.6 The vendors receiving department shall complete DPNC Form 2A to verify materia was received. This information is to be obtained from DPNC Form 1.

3.7 The coating applicator shall complete DPNC Form 5B to verify the actual conditions existing during surface preparation and the methods used. DPNC Forr 5B shall be completed and signed by both the applicator and an inspector prior to application of any coating.

3.8 The coating applicator shall complete DPNC Form 6 to verify materials used, ambient conditions, application equipment and finished results. DPNC Form 6 shall be signed by both the applicator and an inspector.

3.9 The inspector or other parties observing working conditions, equipment, surface preparations, apolication or finished work that does not meet the minimum requirements of the job specification shall complete a DPNC Form 9. This shall indicate the deficiency noted and the corrective measures taken.

COATING MATERIALS - MANUFACTURER'S PRODUCT IDENTITY CERTIFICATION RECORD

GENERAL DATA (To be filled in by Purchaser)

PURCHASER _____
PURCHASER LOCATION _____
PROJECT DESIGNATION _____ DATE _____
PROJECT LOCATION _____ REPORT NO. _____
OWNER _____ PURCHASE ORDER # _____
BUILDING, UNIT OR EQUIPMENT DESIGNATION: _____ CONTRACT NO. _____
SHOP WORK _____
FIELD WORK _____
PRODUCT NAME & NUMBER _____

TECHNICAL DATA (Submit at time of Shipment)

COATING MANUFACTURER _____
PRODUCT NAME & NUMBER _____
GENERIC TYPE _____ BATCH NO. _____
DATE OF MANUFACTURE _____ SHELF LIFE _____
NET WEIGHT, LBS. PER GALLON _____ (By Fed. Test Method Std. No. 141, Method 4184 ± or by ASTM D1475).
VISCOSITY RANGE _____ TEMPERATURE _____ °F. METHOD _____
*SOLIDS VOLUME % ± _____
DRY HARD: _____ HOURS @ _____ °F _____ % R.H.
TACK FREE TIME: _____ HOURS @ _____ °F _____ % R.H.
RECOAT TIME RANGE: _____ @ _____ °F _____ % R.H.
DRY FILM THICKNESS PER COAT: _____ MILS
COLOR, VISUAL _____
MIXING RATIO BY VOLUME: _____ PARTS _____ COMPONEN
INDUCTION PERIOD: _____ HOURS @ _____ °F.
POT LIFE: _____ HOURS @ _____ °F.
SPECIFIED THINNER _____
*FLASH POINT TAG OPEN CUP _____ °F. (ASTM D-92)

*Formulae value as calculated or previously determined.

SIGNATURE _____
TITLE _____
DATE _____

Distribution: Contractor
Duke Civil Design Section

DESIGN ENGINEERING DEPARTMENT - CIVIL SECTION
VENDOR QUALITY ASSURANCE CERTIFICATION
CLASS I SERVICE LEVEL COATINGS

Name of Vendor_____ Item No._____

Address of Vendor Plant_____ Spec. No. _____

Component(s) or Material_____ Date_____

_____ Shipping ID No._____

_____ _____

Mill Power Order No._____ ____Full Certification
____Partial Included

The following listed tests and inspections have been completed as required by specification: (If partial certification, list materials or components certification for which applies)

1)_____
2)_____
3)_____
4)_____
5)_____

The following QA documentation as required by the specification is attached to the original copy of this form: (If partial certification, include documentation applicable only to this specific shipment)

_____
_____
_____
_____

Any approved deviations - _____
_____

The above component(s) or material conform to the requirements of Duke Power Company specification_____with the approved deviations noted above. The QA documentation has been completed and attached to this form.
(No later than component or material shipment, the complete QA documentation packet is being transmitted to Principal Civil Engineer, Duke Power Company, P. O. Box 2178, Charlotte, N.C. 28201.) A copy of this completed Vendor Quality Assurance Certification form will be included with shipping papers and shipped with the component or material to Duke Power Company, at the address designated in component or material specification.

QA/QC Management_____ Title_____

Date_____

- -

FOR DUKE POWER COMPANY USE ONLY:
Approved for Installation

Senior Engineer_____

Distribution: Contractor/Vendor
Duke Power Civil Design Section
w/shipment of item to jobsite

DPNC FORM 2A

COATING MATERIALS - SHIPPING AND RECEIVING RECORD
(To Be Completed By Receiving Department)

GENERAL DATA

PROJECT DESIGNATION _____ DATE _____

PROJECT LOCATION _____ REPORT NO. _____

OWNER _____ PURCHASE ORDER NO. _____

BUILDING, UNIT, OR EQUIPMENT DESIGNATION: _____ CONTRACT NO. _____

SHOP WORK _____

FIELD WORK _____

TECHNICAL DATA

COATING MANUFACTURER _____

PRODUCT NAME & NUMBER _____

BATCH NUMBER(S) _____

QUANTITY SHIPPED (EACH BATCH) _____

DATE SHIPPED _____

SHIPPED VIA _____

DATE RECEIVED _____

QUANTITY RECEIVED (EACH BATCH) _____

STORAGE AREA _____

DAMAGE REPORT _____

SIGNATURE _____

TITLE _____

Distribution: Contractor
Duke Civil Design Section

DPNC FORM 2B

COATING MATERIALS - WAREHOUSING RECORD
(To Be Completed for Each Batch)

GENERAL DATA

PROJECT DESIGNATION _____ DATE _____

PROJECT LOCATION _____ REPORT NO. _____

OWNER _____ PURCHASE ORDER NO. _____

BUILDING, UNIT, OR EQUIPMENT DESIGNATION: _____ CONTRACT NO. _____

_____ SHOP WORK _____

FIELD WORK _____

TECHNICAL DATA

COATING MANUFACTURER _____

PRODUCT NAME & NUMBER _____

BATCH NUMBER _____ EXPIRATION DATE _____

GALLONS RECEIVED _____ DATE RECEIVED _____

DATE	STORAGE TEMPERATURE °F. (REPORT DAILY)	NUMBER GALLONS WITHDRAWN	NUMBER GALLONS REMAINING	REMARKS

SIGNATURE _____

TITLE _____

Distribution: Contractor
/ Duke Civil Design Section

DPNC FORM 5B

COATING APPLICATOR'S SURFACE PREPARATION RECORD-STEEL

(To Be Filled In By Coating Applicator at Time of Surface Preparation)

GENERAL DATA

PROJECT DESIGNATION _____ DATE _____

PROJECT LOCATION _____ REPORT NO. _____

OWNER _____ PURCHASE ORDER NO. _____

BUILDING, UNIT, OR EQUIPMENT DESIGNATION: _____ CONTRACT NO. _____

_____ SHOP WORK _____

_____ FIELD WORK _____

TECHNICAL DATA

COATING APPLICATOR _____ COATING FOREMAN _____

TYPE OF SURFACE AND EXACT LOCATION _____

_____

(Wherever possible, attach sketch to indicate exact location of area)

AMBIENT CONDITIONS:

DATE/TIME _____ RELATIVE HUMIDITY _____ %

TEMPERATURE, AMBIENT: _____ °F., SURFACE: _____ °F. DEW POINT _____ °F.

1. ORIGINAL CONDITION OF SURFACE:
   PRIME COATED _____
   OTHER _____
2. METHOD OF FIELD PREPARATION _____
   SSPC SPECIFICATION _____
3. TYPE & SIZE OF ABRASIVE SPECIFIED _____
   TYPE & SIZE OF ABRASIVE USED _____
4. ANCHOR PATTERN SPECIFIED _____ MILS
   ANCHOR PATTERN OBTAINED* _____ MILS
5. WERE WATER TRAPS AND SEPARATORS USED _____
   WERE THEY EFFECTIVE _____

*Estimated by an Approved Surface Profile Comparator

6. HOW WERE CONTAMINANTS REMOVED _____

_____

7. WAS THE SURFACE DUSTED OR VACUUMED AS A FINAL STEP? _____

HOW QUICKLY WAS PRIMER APPLIED? _____

WHAT PRIMER WAS USED? _____

8. ADDITIONAL COMMENTS: _____

_____

_____

_____

_____

_____

_____

_____

APPLICATOR SIGNATURE _____

TITLE _____

INSPECTOR _____

Distribution: Contractor
Duke Civil Design Section

DPNC FORM 6

COATING APPLICATOR'S COATING RECORD

(To Be Filled In By Applicator at Time of Surface Preparation)

GENERAL DATA

PROJECT DESIGNATION _____ DATE _____

PROJECT LOCATION _____ REPORT NO. _____

OWNER _____ PURCHASE ORDER NO. _____

BUILDING, UNIT, OR EQUIPMENT DESIGNATION: _____ CONTRACT NO. _____

SHOP WORK _____

FIELD WORK _____

SHIFT NO. _____

TECHNICAL DATA

COATING: APPLICATOR _____ FOREMAN _____ INSPECTOR _____

LOCATION OF WORK THIS SHIFT _____

(Wherever possible, attach map to indicate exact location of areas, including batch numbers for all coats in each area)

AMBIENT CONDITIONS:

DATE/TIME _____ RELATIVE HUMIDITY _____ %

TEMPERATURE, AMBIENT: _____ °F. SURFACE: _____ °F. DEW POINT _____ °F.

SUBSTRATE:

TYPE: CONCRETE _____ MASONRY _____ STEEL _____ OTHER _____

DEFECTS NOTED (DESCRIBE) _____

WAS ALL DELETERIOUS MATERIAL REMOVED PRIOR TO COATING _____

DATE/TIME: SURFACE PREPARATION COMPLETED _____ COATING BEGUN _____

COATING MATERIAL:	PRIMER	INTERMEDIATE COAT	TOPCOAT
TYPE:			
PRODUCT NO'S.			
BATCH NO'S. (This Shift)			
QUANTITY USED, GALLONS (This Shift)			
REDUCER USED & QUANTITY			

COATING EQUIPMENT:

TYPE SPRAY GUN USED _____ FLUID TIP _____ AIR CAP _____

PAINT POT PRESSURE _____ ATOMIZATION PRESSURE _____

WERE TRAPS & SEPARATORS USED (DESCRIBE) _____

OTHER APPLICATION METHODS (DESCRIBE) _____

VENTILATING, COOLING AND HEATING TECHNIQUES USED (DESCRIBE) _____

_____

COATING APPLICATION:

SPECIFIED DFT, MILS: PRIMER _____ INTERMEDIATE COAT _____ TOPCOAT _____

MEASURED DFT, MILS (MIN. & MAX.):

PRIMER _____ INTERMEDIATE COAT _____ TOPCOAT _____

MEASURING INSTRUMENT USED (DESCRIBE) _____

WAS SUBSTRATE DRY BEFORE APPLYING PRIMER _____

TIME BETWEEN COATS: SPECIFIED _____ ACTUAL _____

WAS EACH PREVIOUS COAT DRY BEFORE APPLYING SUBSEQUENT COAT _____

COATING DEVIATIONS:	PRIMER	INTERMEDIATE COAT	TOPCOAT
ANY IMPERFECTIONS NOTED (DESCRIBE INCLUDING AREA LOCATION)			
WERE ALL AREAS OF LOW FILM BUILD RE-LOCATED SATISFACTORILY			

REMARKS & RECOMMENDATIONS:

_____

_____

_____

_____

SIGNATURE _____
APPLICATOR OR REPRESENTATIVE

TITLE _____

INSPECTOR _____

Distribution: Contractor
Duke Civil Design Section

DPNC FORM 9

COATING WORK EXCEPTION RECORD

GENERAL DATA

PROJECT DESIGNATION _____ DATE _____

PROJECT LOCATION _____ REPORT NO. _____

OWNER _____ PURCHASE ORDER NO. _____

BUILDING, UNIT, OR EQUIPMENT CONTRACT NO. _____

DESIGNATION: _____ SHOP WORK _____

_____ FIELD WORK _____

TECHNICAL DATA

REPORTED BY _____ TITLE _____

REPORTED TO _____

LOCATION _____

BATCH NO(S). _____

DEFINE UNSATISFACTORY PROCESS OR CONDITIONS CAUSING WORK BELOW MINIMUM ACCEPTANCE STANDARDS _____

_____

CORRECTIVE ACTION RECOMMENDED _____

_____

RECOMMENDED BY _____ DATE _____

CORRECTIVE ACTION TAKEN _____

DATE _____

WAS CORRECTIVE ACTION SATISFACTORY (DESCRIBE) _____

_____

REFER TO DAILY COATING INSPECTION REPORT NO. _____

REMARKS: _____

_____

SIGNATURE _____

TITLE _____

INSPECTOR _____

Distribution: Contractor
Duke Civil Design Section

Specification No
Date:

DUKE POWER COMPANY
DESIGN ENGINEERING DEPARTMENT

STANDARD COATING SPECIFICATION No KKK

Date 5-26-72 Revised 9-14-72

THIS DOCUMENT INCLUDES ENGINEERING DESIGN OF ITEMS RELATED TO NUCLEAR SAFETY. IN ACCORDANCE WITH ESTABLISHED PROCEDURES, ITS QUALITY HAS BEEN ASSURED.

D W Peach 9/14/72 [illegible] 9/14/72
ORIGINATED BY DATE

H C McKay 1/22/73
CHECKED BY DATE

[illegible] 1/22/73 [illegible] 1/22/73
APPROVED BY DATE INSPECTION WAIVED DATE

D W Peach, Technical Specialist, Coatings

DUKE POWER COMPANY

DESIGN ENGINEERING DEPARTMENT

STANDARD COATING SPECIFICATION NO. KKK

BY: Durwood Peach DATE 5-26-72 REVISED 9-14-72

1. SCOPE

1.1 This specification defines the method of surface preparation, material, and application of shop applied Catalyzed Polyamide Epoxy Primer over SSPC-SP5-63 (white metal blast cleaned) steel surfaces. Surfaces are Class I Service Level for coatings.

1.2 Class I Service Level for coatings applies to those systems and components of nuclear facilities which are essential to: 1) the prevention of postulated accidents which could effect the public health and safety, or 2) mitigate the consequences of these accidents.

1.3 The contractor shall provide each item mentioned or indicated of quality or subject to qualifications as noted under each section of this specification, perform each operation, prescribed and provide all necessary labor, equipment and incidentals for surface preparation and coating application, as well as drying and protection of the painted surfaces in the shop and in transit to the jobsite.

1.4 The contractor shall strictly adhere to all required documentation and certification in order to comply with the owners formal quality assurance program for Class I Service Levels.

2. SURFACE PREPARATION

2.1 All surfaces to be coated shall be dry sandblasted or dry grit blasted in strict accordance with SSPC-SP5-63 (white metal blast cleaning) of the Surface Preparation Specification of Steel Structures Painting Council as approved October 1.

2.2 Contaminated sand or grit shall not be used for finished work.

2.3 The grit used shall be sharp silica sand, steel slag grit similar or equal to 16-35 mesh flint silica to give a 1.5 - 2.5 mil blast profile. No polished surfaces shall be allowed.

2.4 All weld splatter shall be removed prior to blast cleaning.

2.5 The surface shall be degreased prior to blast cleaning. Organic solvents, alkaline solution, steam, hot water with detergents or other systems that completely remove dirt, oil, grease, etc. may be used.

2.6 Remove all traces of grit, dust, grease and foreign matter after blast cleaning by cleaning in strict accordance with SSPC-SP1-63 (solvent cleaning) of the Surface Preparation Specification of Steel Structures Painting Council as approved October 1.

2.7 The prime coat shall be applied within (4) four hours after sandblasting. The surface shall be protected rom moisture prior to application of primer.

3. MATERIALS

3.1 Materials shall be those manufactured by Mobil Chemical Company, P. O. Box 250, Edison, New Jersey.

3.2 Paints and accessories shall be delivered to the job location in the original unopened containers with manufacturer's labels and tags intact. Packages and containers are to remain unopened until required for mixing just prior to application.

3.3 All materials shall be stored in enclosed structures, protected from contaminat on and temperatures exceeding the manufacturer's recommendations.

3.4 Material substitutions will not be permitted.

3.5 Materials which have been kept beyond the manufacturer's recommended shelf life shall not be used unless written approval is obtained from the coatings manufacturer.

4. COATING SYSTEM

4.1 Prime: 1 coat Val Chem 13-R-60 Epoxy Primer
@ 2.5 mils dft minimum

5. APPLICATION

5.1 Apply one coat of 13-R-60 Val Chem Epoxy Primer @ 2.5 mils dft.
No dry film thickness readings shall be less than 2.0 mils or more than 4.0 mils.

5.2 Material shall be applied in strict accordance with the manufacturer's recommendations.

5.3 Application shall be by airless spray, conventional spray or brush.

5.4 Roller application shall not be allowed.

6. WORKMANSHIP

6.1 All materials shall be evenly applied so as to be free from sags, runs, skips, mud cracking and other defects.

6.2 Particular attention shall be given to apply a satisfactory film build on edges, corners, bolts and other critical areas.

6.3 Paint shall not be applied over underwriters labels, manufacturer's serial number plates, or other identification plates.

6.4 All motors and mechanical rotating components shall be protected from blasting and primer overspray.

7. INSPECTION

7.1 Both the owner and the coatings manufacturer, or their responsible representative shall have access to the fabricator or vendors shop at all times during the surface preparation and application of coatings or to inspect work previously primed.

7.2 The owner reserves the right to reject all work that does not meet the standards of this specification.

7.3 The owner or his representative shall make a final inspection of all coating work on each finished component at the contractor's or vendor's shop prior to shipment to the jobiste.

7.4 All or any portion of finished work not meeting the standards of this specification shall be corrected at the expense of the contractor.

7.5 Dry film thickness readings shall be made after application of the primer coat and application of the finish coat with a Nordson Microtest Dry Film Gauge or equivalent.

7.6 An inspection shall be made of surface preparation and application of each coat of material by someone other than the applicator and any areas not meeting the requirements of this specification shall be corrected.

Attachment 6

Frequency Report
for
Valves VQ3B and VQ15B

EDS LETTER NO. 9093210-157,DATED 1/15/80,REV. 0
BORG WARNER ITEM 2H-400,GROUP J,DWG. CNM1205.00-388.KPT 401JBC3-4,PF 94.

DIV		DATE
CIVIL		
MECH	AM	VAS
ELECT		

0=FREE, 1=FIXED GLOBAL DEGREE OF FREEDOM

JOINT	X	Y	Z	RX	RY	RZ	X-COOR	Y-COOR	Z-COOR
1	1	1	1	1	1	1	0.00	0.00	-6.03
2	1	1	1	1	1	1	0.00	0.00	6.03
3	0	0	0	0	0	0	0.00	0.00	0.00
4	0	0	0	0	0	0	0.00	7.60	0.00
5	0	0	0	0	0	0	0.00	11.85	0.60
6	0	0	0	0	0	0	-2.11	11.85	0.00
7	0	0	0	0	0	0	2.11	11.85	0.00
8	0	0	0	0	0	0	-2.11	13.85	0.00
9	0	0	0	0	0	0	2.11	13.85	0.00
10	0	0	0	0	0	0	-1.89	19.05	0.00
11	0	0	0	0	0	0	1.89	19.05	0.00
12	0	0	0	0	0	0	-1.66	24.24	0.00
13	0	0	0	0	0	0	1.66	24.24	0.00
14	0	0	0	0	0	0	0.00	24.24	0.00
15	0	0	0	0	0	0	0.00	30.10	0.00
16	0	0	0	0	0	0	1.22	30.10	.24
17	1	1	1	1	1	1	200.00	200.00	0.00

PROJECT: Duke - Catawba N.S.
BY: RCH DATE: 1-3-80
CKD: FF DATE: 1-4-80
APPRD: VAL DATE: 1/4/80
PROJ. ENGIN.

MATERIAL NO.	YOUNGS MODULUS(PSI)	POISSONS RATIO	MASS DENSITY(LB-S**2/IN**4)
1	.29E+08	.300	.1000000E-08
2	.29E+08	.300	.7340000E-03

ALL PROPERTIES IN INCH UNITS (AXIAL=AXIS ORIENTED FROM I TO J-NODE OF MEMBER, 1=AXIS LOCATED IN PLANE OF K-NODE ORTHOGONALLY POSITIONED TO AXIAL-AXIS, LOCAL 2=AXIS DEFINED BY RIGHT HAND RULE)

PROPERTY	AXIAL AREA	SHEAR AREA-1	SHEAR AREA-2	TORSION-J	INERTIA-1	INERTIA-2
1	100.000	100.000	100.000	1000.000	1000.000	1000.000
2	8.148	4.074	4.074	42.831	21.416	21.416
3	16.819	8.409	8.409	177.820	88.910	88.910
4	5.801	2.534	2.534	1.397	4.151	.349
5	3.330	1.553	1.553	.530	1.550	.132

CNM 1205.00-0826 SH. 1-6

BORG WARNER ITEM 28-400,GROUP J,DWG CNM1205,00-588,RPT 401JBC3-4,PF 94.

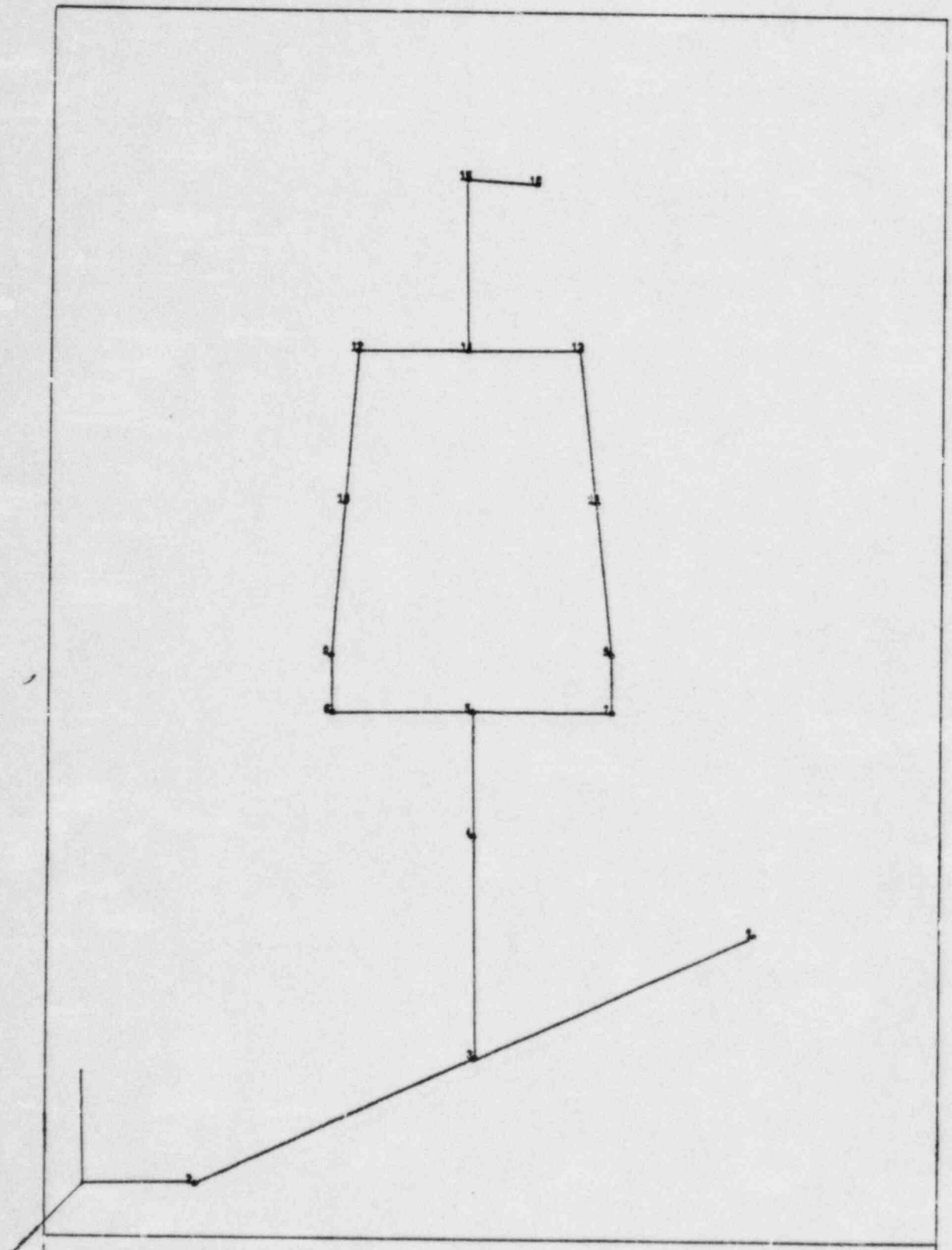
ELEMENT	I-NODE	J-NODE	K-NODE	PROPERTY NO.	MATERIAL NO.
1	1	3	17	2	2
2	2	3	17	2	2
3	3	4	17	3	2
4	4	5	17	1	1
5	5	6	17	1	1
6	5	7	17	1	1
7	6	8	17	4	2
8	7	9	17	4	2
9	8	10	17	4	2
10	9	11	17	4	2
11	10	12	17	5	2
12	11	13	17	5	2
13	12	14	17	1	1
14	13	14	17	1	1
15	14	15	17	1	1
16	15	16	17	1	1

ALL UNITS REPRESENTED AS LB,INCHES,SECONDS IN GLOBAL SYSTEM

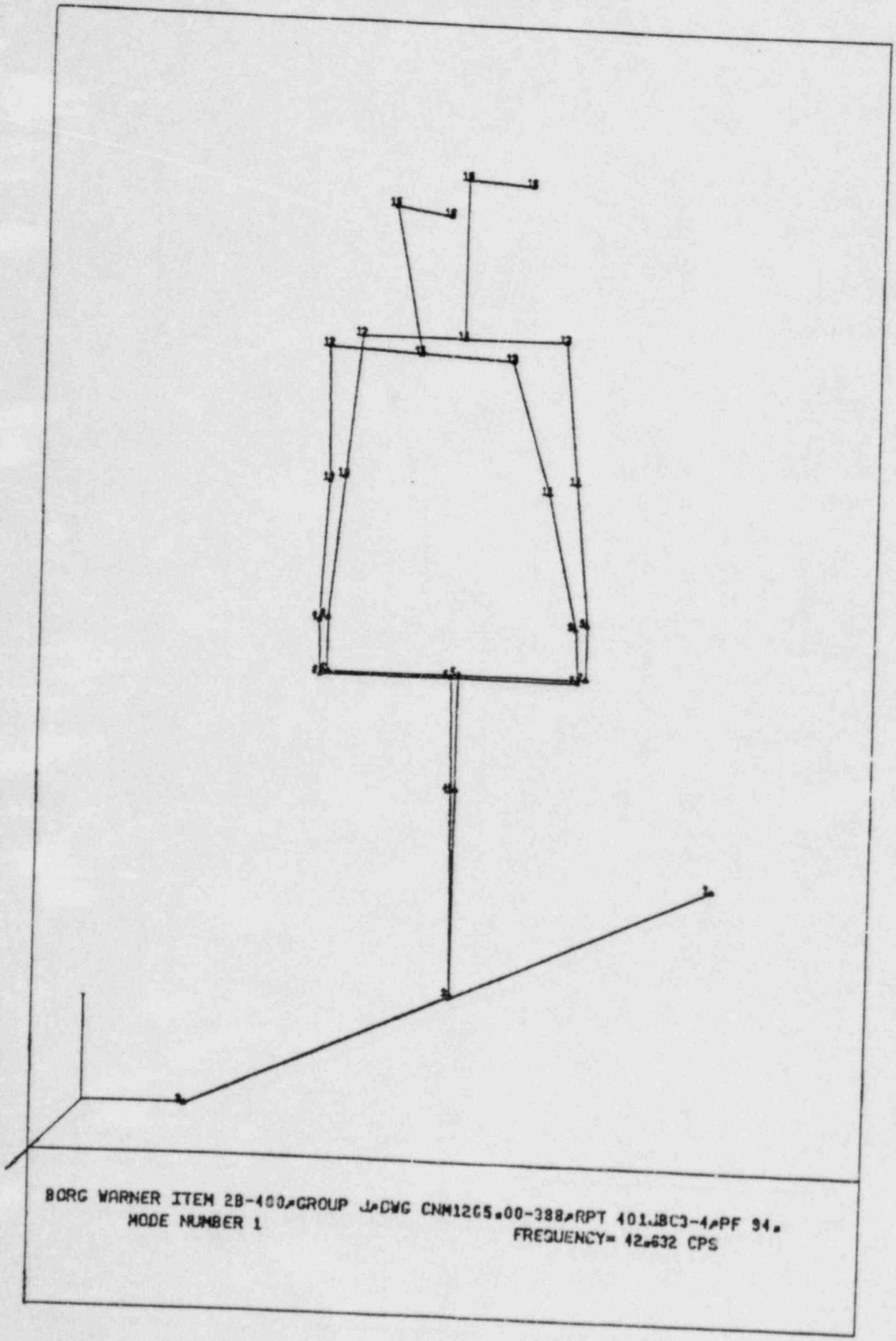
MASS POINT	LUMPED MASS	MASS INERTIA-X	MASS INERTIA-Y	MASS INERTIA-Z
16	.533	45.365	47.498	9.410

ANALYSIS SUMMARY:		MAX. ALLOW. SEISMIC LOAD (G)		ALLOW. RESTRAINT LOAD (LBS)	
MODAL FREQ.	MODAL TYPE	RES*T OBE	RES*T SSE	RES*T OBE	RES*T SSE
42.63	R	6.24	9.45	1285.44	1946.70
47.46	R				
50.16	R				

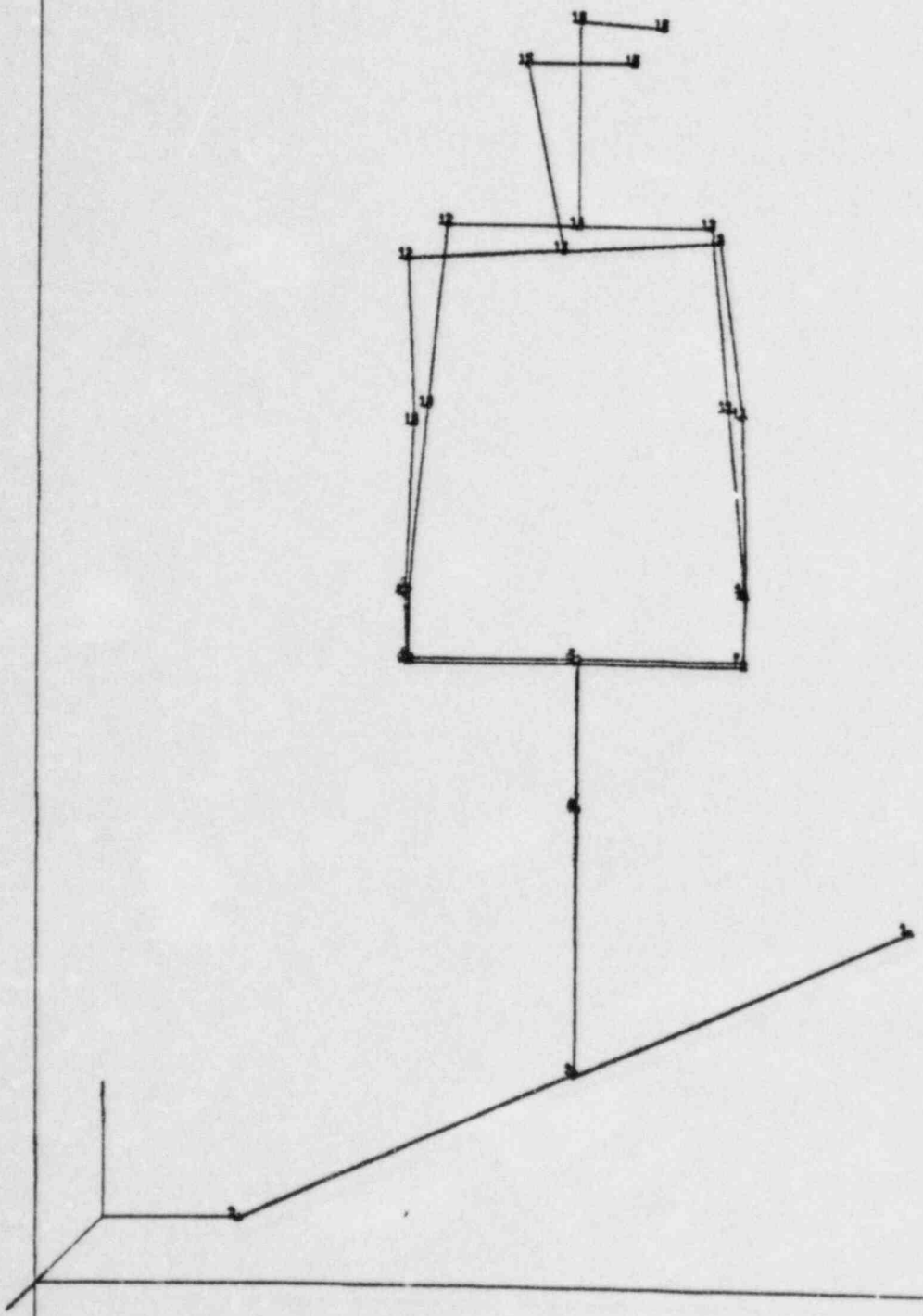
2



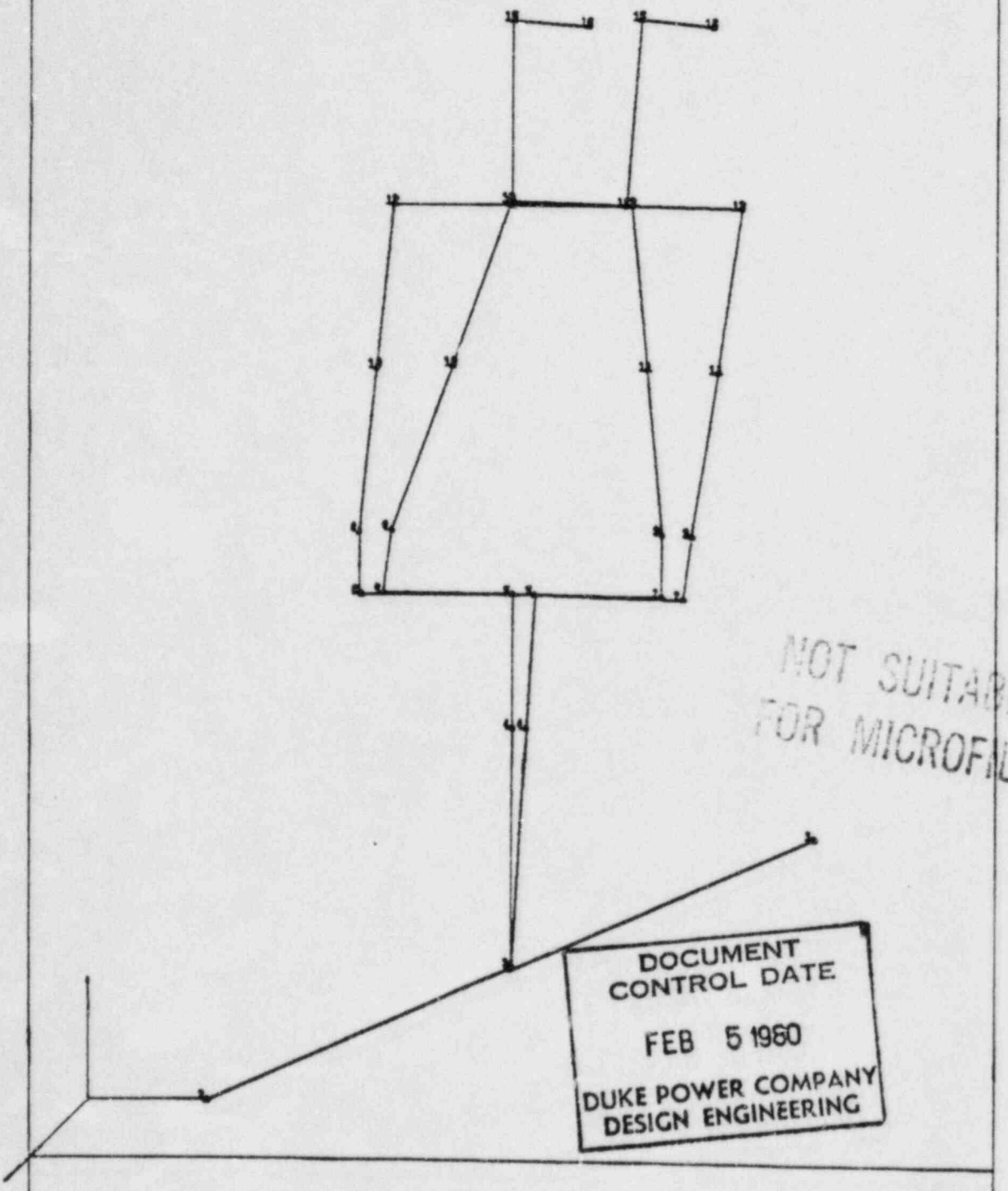
BORG WARNER ITEM 28-400 GROUP J CWG CNM1205.00-388 RPT 401J8C3-4 PF 94.



BORG WARNER ITEM 2B-400,GROUP J,DWG CNM1205.00-388,RPT 401.JBCJ-4,PF 94.
MODE NUMBER 1
FREQUENCY= 42.632 CPS



BORG WARNER ITEM 28-400 GROUP J DWG CNM1205.00-388 RPT 401JBC3-4 PF 94.
MODE NUMBER 2 FREQUENCY= 47.462 CPS



BORG WARNER ITEM 28-400,GROUP J,DWG CNM1205.00-388,RPT 401.BC3-4,PF 94.
MODE NUMBER 3 FREQUENCY= 50.162 CPS

CNM 1205.00-0826 SH. 7

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
SAFETY RELATED VALVE STATUS LIST

DUKE ITEM NO. OR TAG NO.	REPORT NO.	VALVE MODAL FREQUENCIES	MODAL TYPE	MAX. ALLOW. SEISMIC LOAD (G) RES*T OBE	RES*T SSE	MAX. ALLOW. RESTRAINT LOAD (LBS) RES*T OBE	RES*T SSE
BURG-WARNER							
2B-216	N3R-75R50	24.77	B	12.52	20.15	3756.00	6045.00
		33.87	B				
		45.03	R+T				
6H-206	435JAR3-1	32.01	B	8.21	14.07	2159.23	3700.41
		44.42	B				
		64.51	R+T				
6J-219	436JAR3-1	30.81	B	3.54	6.06	992.70	1545.30
		44.18	B				
		75.1	B+T				
6J-229	436JAR4-1	13.06	B	7.18	14.11	8903.20	17496.40
		20.17	B				
		46.61	T				
2B-393	401KRC3-1	47.37	B	9.47	14.86	2367.50	3715.00
		58.56	B				
		67.6	B+T				
2B-400	401JRR3-4	42.63	B	6.24	9.45	1265.44	1946.70
		47.46	B				
		50.16	B				
2B-384	401JRC1-3	120.8	B	21.73	35.10	434.60	703.20
		168.6	B				
		888.7	B				
WALWORTH-GREENSBURG							
2A-218	276,(0)234	17.46	B	2.44	3.70	663.68	1006.40
		20.76	B				
		27.28	B+T				
2B-242,-243	273	26.89	B	5.81	8.82	1204.76	1828.92
		34.56	B				
		40.88	B+T				

KEY, B= BENDING ONLY, T= TORSION ONLY, B+T= COMBINED BENDING AND TORSION

NOTE, N/A NO ANALYSIS TO FOLLOW

DATE OF CURRENT LISTING 01/03/80