FINAL SUBMITTAL

MCGUIRE EXAM 2000-301
50-369, 370/2000-301

MAY 8 - 12, MAY 19,
MAY 22 - 25, 2000

FINAL RO/SRO EXAM

REFERENCES

FINAL SUBMITTAL

MCGUIRE EXAM 2000-301
50-369/2000-301 AND 50-370/2000-301

MAY 8 - 12, MAY 19,
MAY 22 - 25, 2000

FINAL RO LICENSE EXAM

REFERENCE MATERIAL

RO Exam References:

120 Data Book Curve 8.4 (MDCA Pump Curve)

311 Steam Tables

603 Data Book Encl 7.38 (PZR Volume vs. Level)
Tech Spec 3.4.13 (RCS Leakage)
Associated Tech Specs not required:

- 3.4.14 (RCS Pressure Valve (PIV) Leakage
- 3.4.15 (RCS Leakage Detection Instrumentation)

619 Steam Tables
Data Book Curves 1.10B, 1.10C (Saturation Curve Adjusted for Instrument Error)

628 Station Drawing MCFD-1604-03.00 Flow Diagram of RV

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

a. No pressure boundary LEAKAGE;

b. 1 gpm unidentified LEAKAGE;

c. 10 gpm identified LEAKAGE;

d. 389 gallons per day total primary to secondary LEAKAGE through all steam generators (SGs); and

e. 135 gallons per day primary to secondary LEAKAGE through any one SG.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION		REQUIRED ACTION		COMPLETION TIME
A.	RCS LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE.	A.1	Reduce LEAKAGE to within limits.	4 hours
B.	Required Action and associated Completion Time of Condition A not met. OR Pressure boundary LEAKAGE exists.	B.1 AND B.2	Be in MODE 3. Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.13.1	----------NOTE---------- Not required to be performed in MODE 3 or 4 until 12 hours of steady state operation. ---------- Verify RCS Operational LEAKAGE is within limits by performance of RCS water inventory balance.	---------NOTE------- Only required to be performed during steady state operation ---------- 72 hours
SR 3.4.13.2	Verify steam generator tube integrity is in accordance with the Steam Generator Tube Surveillance Program.	In accordance with the Steam Generator Tube Surveillance Program

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.14 RCS Pressure Isolation Valve (PIV) Leakage

LCO 3.4.14 Leakage from each RCS PIV shall be within limit.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4, except valves in the residual heat removal (RHR) flow path when in, or during the transition to or from, the RHR mode of operation.

ACTIONS

----------NOTES----------

1. Separate Condition entry is allowed for each flow path.

2. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable PIV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more flow paths with leakage from one or more RCS PIVs not within limit.	----------NOTE---------- Each valve used to satisfy Required Action A.1 must have been verified to meet SR 3.4.14.1 and be in the reactor coolant pressure boundary or the high pressure portion of the system. ----------	(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.1 Isolate the high pressure portion of the affected system from the low pressure portion by use of one closed manual, deactivated automatic, or check valve. AND A.2 Restore RCS PIV to within limits.	4 hours 72 hours
B. Required Action and associated Completion Time for Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours
C. RHR System interlock function inoperable.	C.1 Isolate the affected penetration by use of one closed manual or deactivated automatic valve.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.14.1 ----------NOTE---------- 1. Not required to be performed in MODES 3 and 4. 2. Not required to be performed on the RCS PIVs located in the RHR flow path when in the shutdown cooling mode of operation. 3. RCS PIVs actuated during the performance of this Surveillance are not required to be tested more than once if a repetitive testing loop cannot be avoided. ---------- Verify leakage from each RCS PIV is equivalent to $\leq$ 0.5 gpm per nominal inch of valve size up to a maximum of 5 gpm at an RCS pressure $\geq$ 2215 psig and $\leq$ 2255 psig.	In accordance with the Inservice Testing Program, and 18 months AND Prior to entering MODE 2 whenever the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months AND Within 24 hours following valve actuation due to automatic or manual action or flow through the valve

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.14.2	Verify RHR system interlock prevents the valves from being opened with a simulated or actual RCS pressure signal $\geq$ 425 psig.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.15 RCS Leakage Detection Instrumentation

LCO 3.4.15 The following RCS leakage detection instrumentation shall be OPERABLE:

a. The containment floor and equipment sump level monitoring system;

b. One containment atmosphere gaseous radioactivity monitor; and

c. Either the containment ventilation condensate drain tank level monitor or the containment atmosphere particulate radioactivity monitor.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

----------NOTE----------
LCO 3.0.4 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment floor and equipment sump level monitoring system inoperable.	A.1 Perform SR 3.4.13.1. AND A.2 Restore containment floor and equipment sump level monitoring system to OPERABLE status.	Once per 24 hours 30 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Containment atmosphere gaseous radioactivity monitor inoperable.	B.1 Analyze grab samples of the containment atmosphere. OR B.2 Perform SR 3.4.13.1.	Once per 24 hours Once per 24 hours
C. Containment atmosphere particulate radioactivity monitor inoperable. AND Containment ventilation condensate drain tank level monitor inoperable.	C.1 Restore containment atmosphere particulate radioactivity monitor to OPERABLE status. OR C.2 Restore containment ventilation condensate drain tank level monitor to OPERABLE status.	30 days 30 days
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	6 hours 36 hours
E. All required monitors inoperable.	E.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.15.1	Perform CHANNEL CHECK of the required containment atmosphere radioactivity monitor.	12 hours
SR 3.4.15.2	Perform COT of the required containment atmosphere radioactivity monitor.	92 days
SR 3.4.15.3	Perform CHANNEL CALIBRATION of the required containment floor and equipment sump level monitoring system.	18 months
SR 3.4.15.4	Perform CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor.	18 months
SR 3.4.15.5	Perform CHANNEL CALIBRATION of the required containment ventilation condensate drain tank level monitor.	18 months

OP/1/A/6100/22
ENCLOSURE 4.3
CURVE 1.10B

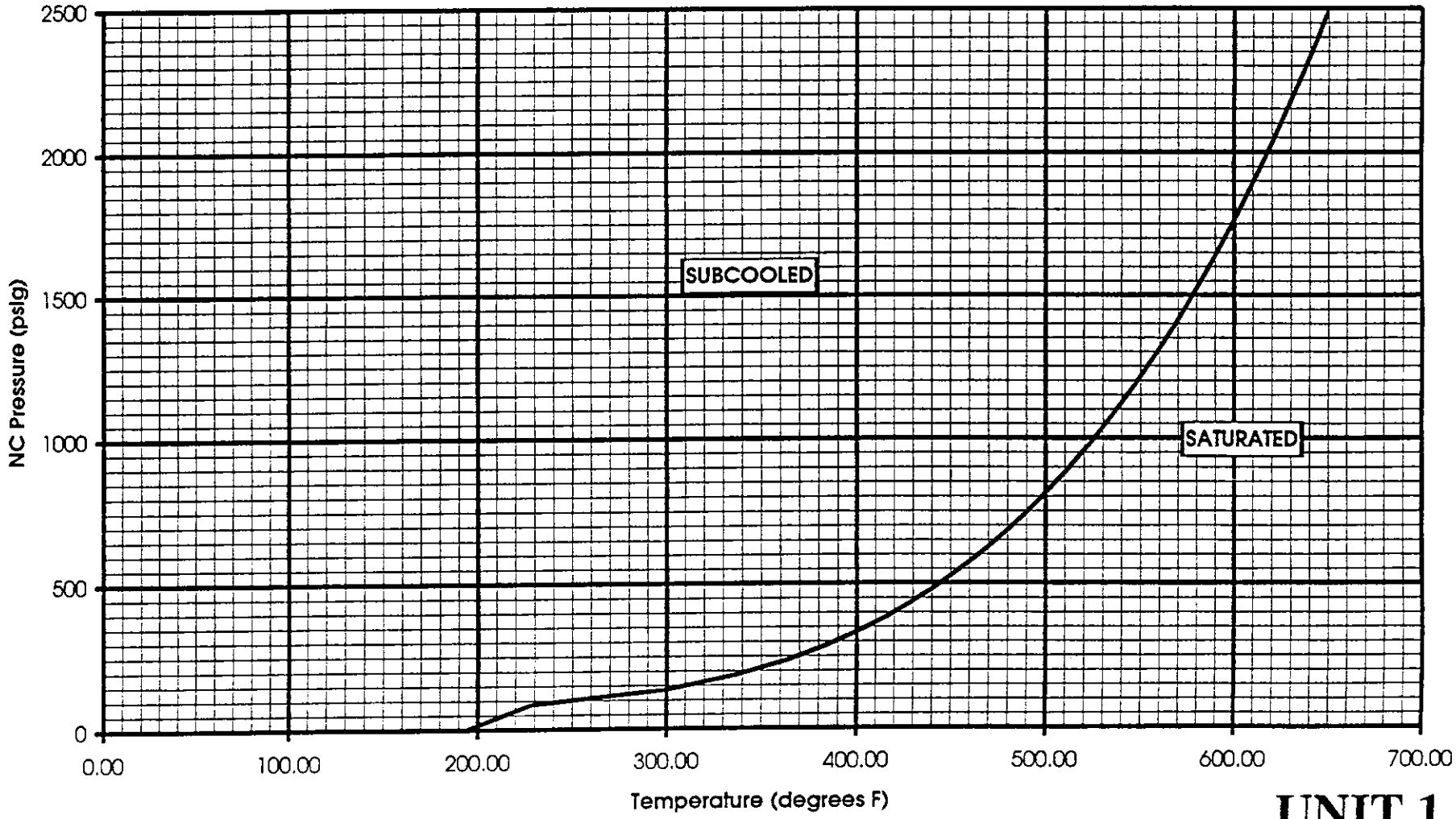
SATURATION CURVE ADJUSTED FOR INSTRUMENT ERROR (WIDE RANGE NC PRESSURE INSTRUMENT)

NC PRESSURE (psig)	SATURATION TEMP. ADJUSTED FOR INSTRUMENT ERROR (^{o}F)
0.0	193.90
35.3	207.84
85.3	228.15
135.3	299.73
185.3	336.80
235.3	363.07
285.3	383.81
335.3	401.13
385.3	416.09
435.3	429.35
485.3	441.28
535.3	452.17
585.3	462.20
635.3	471.53
685.3	480.25
735.3	488.45
785.3	496.21
885.3	510.56
985.3	523.66
1085.3	535.73
1185.3	546.93
1285.3	557.41
1385.3	567.26
1485.3	576.56
1585.3	585.37
1685.3	593.76
1785.3	601.75
1885.3	609.39
1985.3	616.71
2085.3	623.74
2185.3	630.50
2285.3	637.00
2385.3	643.27
2485.3	649.32

References:
1) Calculation File MCC-1552.08-00-0160, Instrument Uncertainties for ICCM and OAC Subcooling Margin, Rev. 1.
2) MCEI-0400-08, ICCM and OAC Error Adjusted Saturation Tables, Rev. 0.
3) IP/0/A/3000/18, ICCM-86 Programming and Operation, approved 12/3/91.

UNIT 1

OP/1/A/6100/22
ENCLOSURE 4.3 - CURVE 1.10B
SATURATION CURVE ADJUSTED FOR INSTRUMENT ERROR
(WIDE RANGE NC PRESSURE SENSOR)



UNIT 1

UNIT 1

OP/1/A/6100/22
ENCLOSURE 4.3
CURVE 1.10C

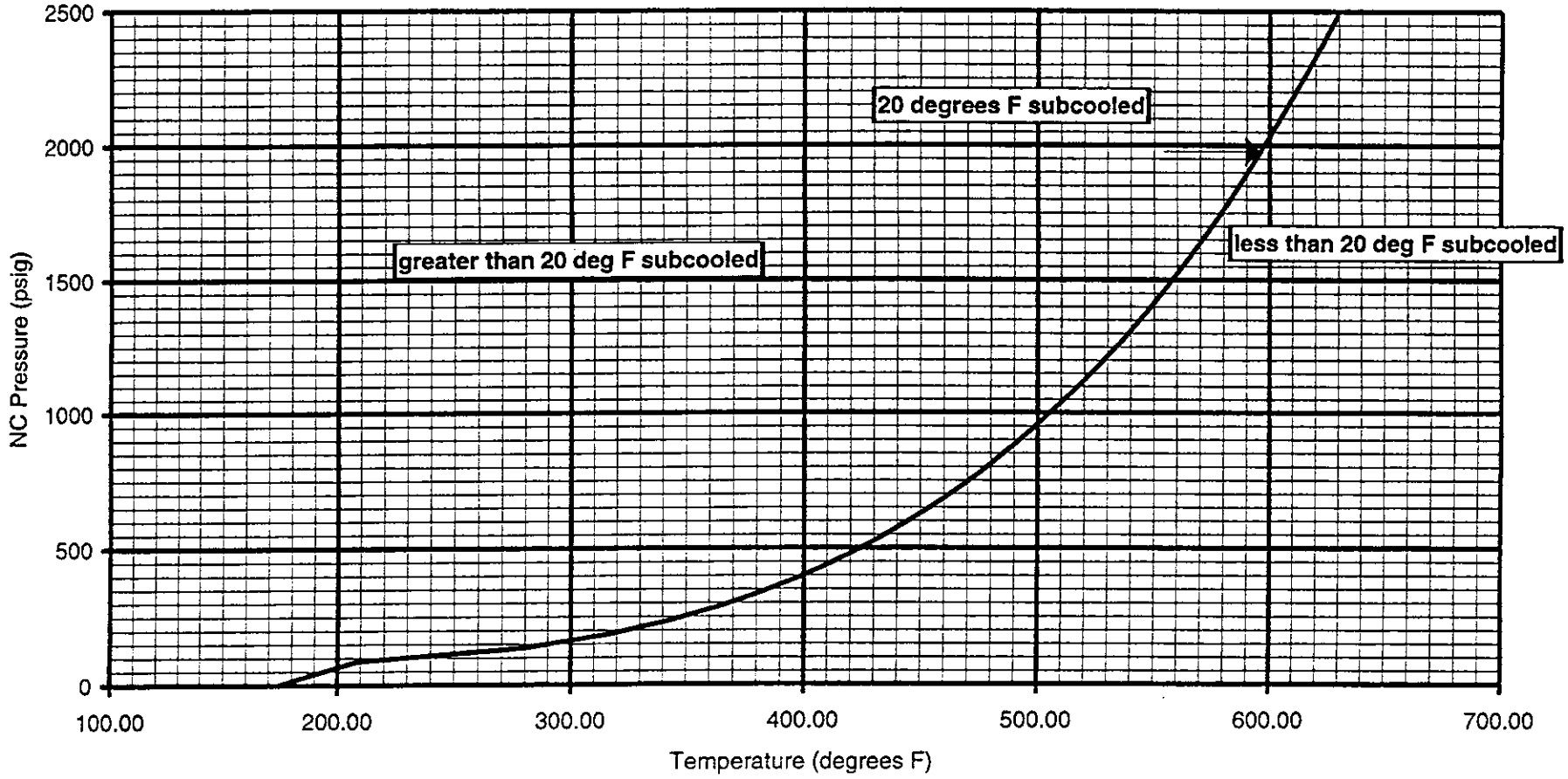
SATURATION CURVE ADJUSTED FOR INSTRUMENT ERROR
WITH 20 DEGREES SUBCOOLING
(WIDE RANGE NC PRESSURE SENSOR)

NC PRESSURE (psig)	SATURATION TEMP. ADJUSTED FOR INSTRUMENT ERROR AND 20 deg F SUBCOOLING(^{O}F)
0.0	173.90
35.3	187.84
85.3	208.15
135.3	279.73
185.3	316.80
235.3	343.07
285.3	363.81
335.3	381.13
385.3	396.09
435.3	409.35
485.3	421.28
535.3	432.17
585.3	442.20
635.3	451.53
685.3	460.25
735.3	468.45
785.3	476.21
885.3	490.56
985.3	503.66
1085.3	515.73
1185.3	526.93
1285.3	537.41
1385.3	547.26
1485.3	556.56
1585.3	565.37
1685.3	573.76
1785.3	581.75
1885.3	589.39
1985.3	596.71
2085.3	603.74
2185.3	610.50
2285.3	617.00
2385.3	623.27
2485.3	629.32

References:
1) Calculation File MCC-1552.08-00-0160, Instrument Uncertainties for ICCM and OAC Subcooling Margin, Rev. 1.
2) MCEI-0400-08, ICCM and OAC Error Adjusted Saturation Tables, Rev. 0.
3) IP/0/A/3000/18, ICCM-86 Programming and Operation, approved 12/3/91.

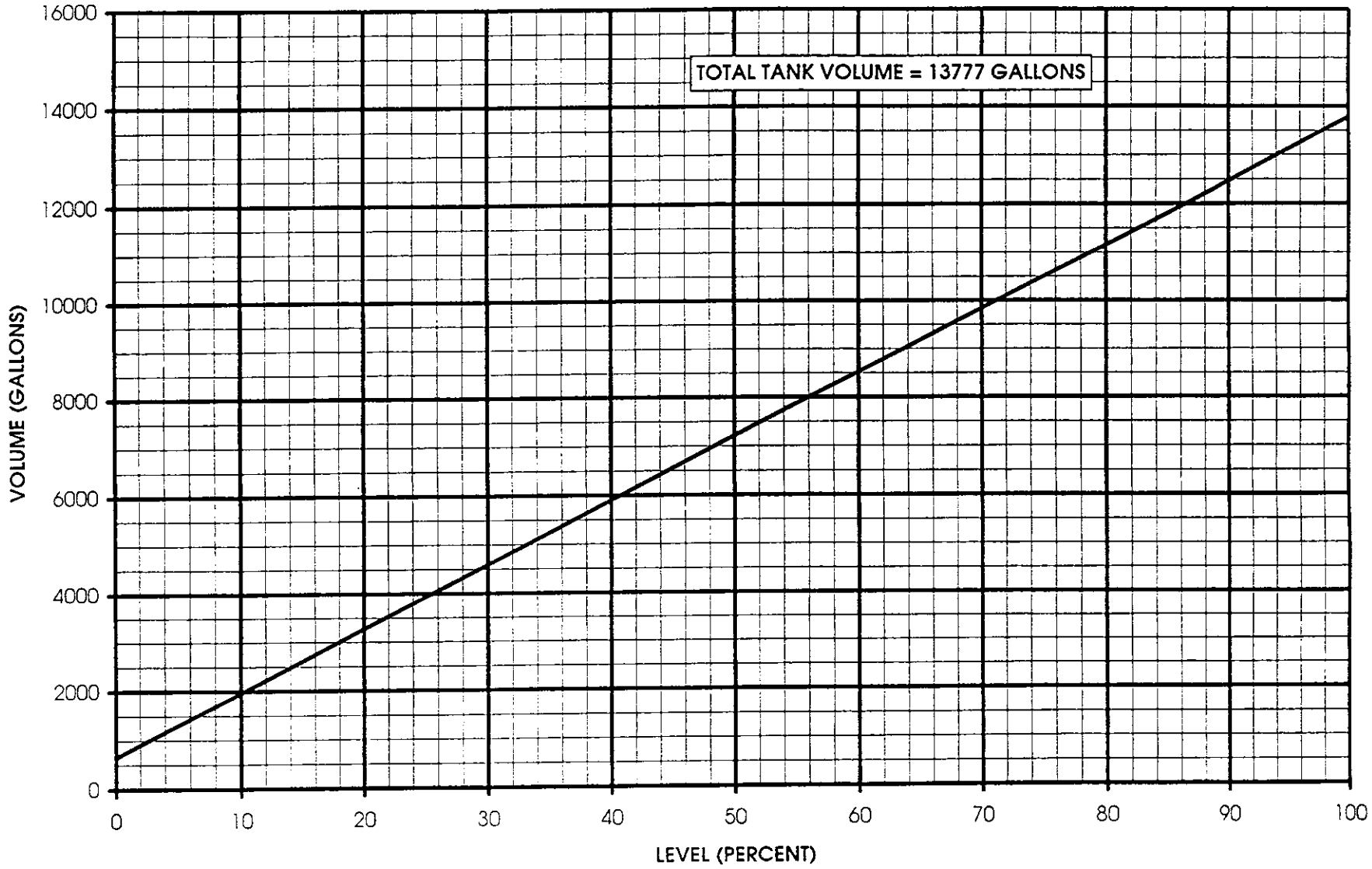
UNIT 1

OP/1/A/6100/22
ENCLOSURE 4.3 - CURVE 1.10C
SATURATION CURVE ADJUSTED FOR INSTRUMENT ERROR
WITH 20 DEGREES F SUBCOOLING (WIDE RANGE NC PRESSURE SENSOR)



UNIT 1

OP/1/A/ .22
ENCLOSURE 4.3
CURVE 7.38
PRESSURIZER
(VOLUME vs. TANK LEVEL)



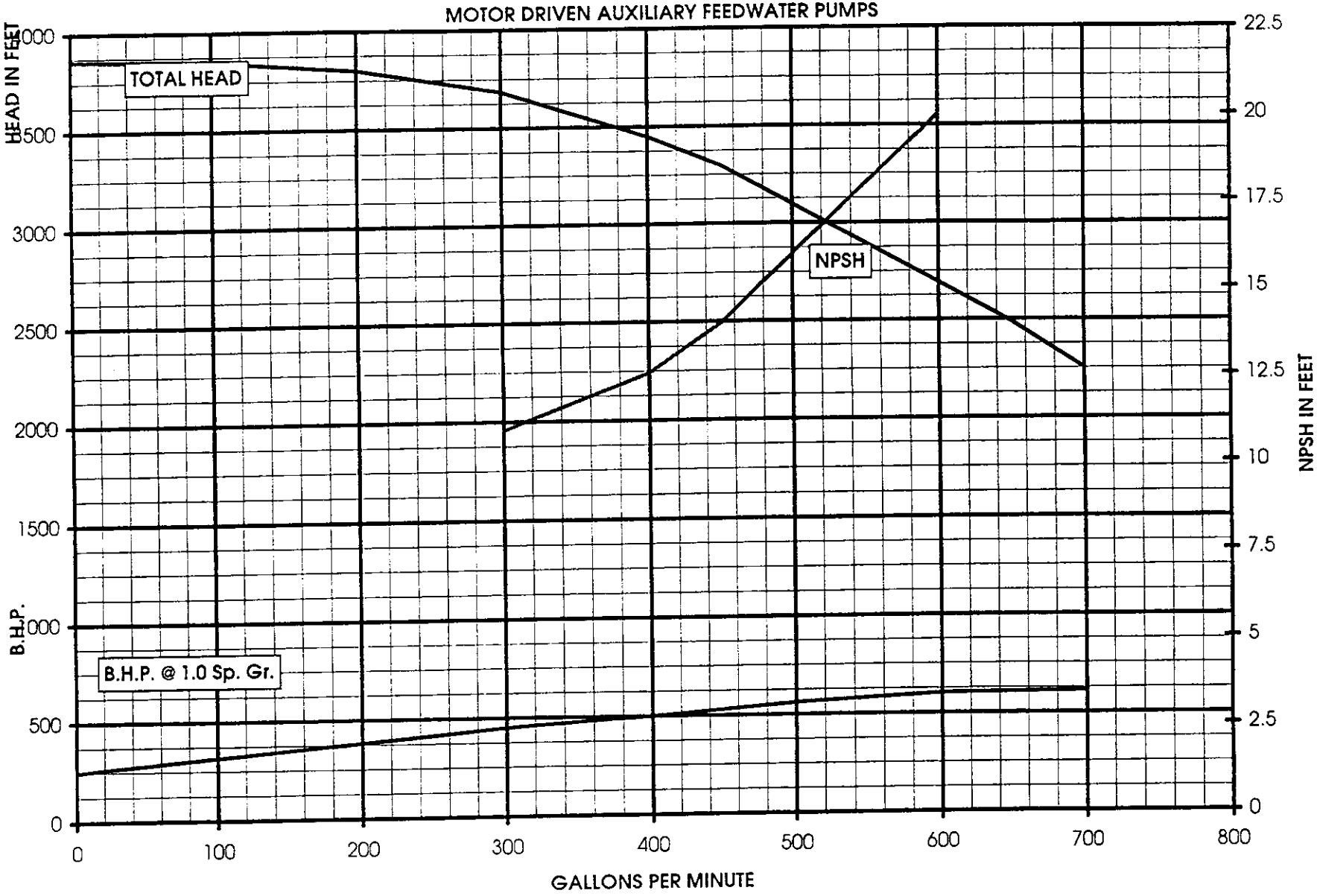
UNIT 1

This data is also available on the OAC.

ENCLOSURE 4.3

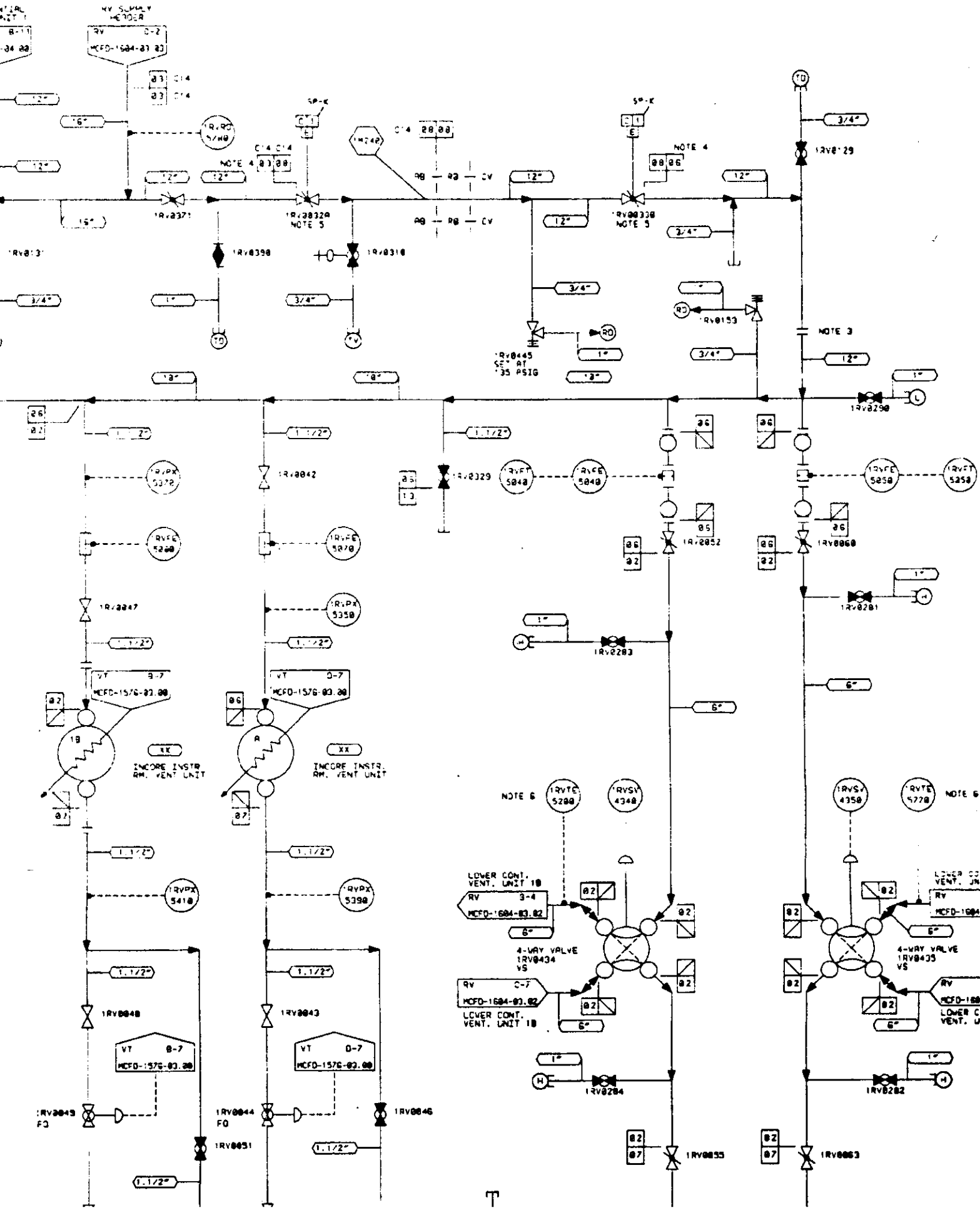
CURVE 8.4

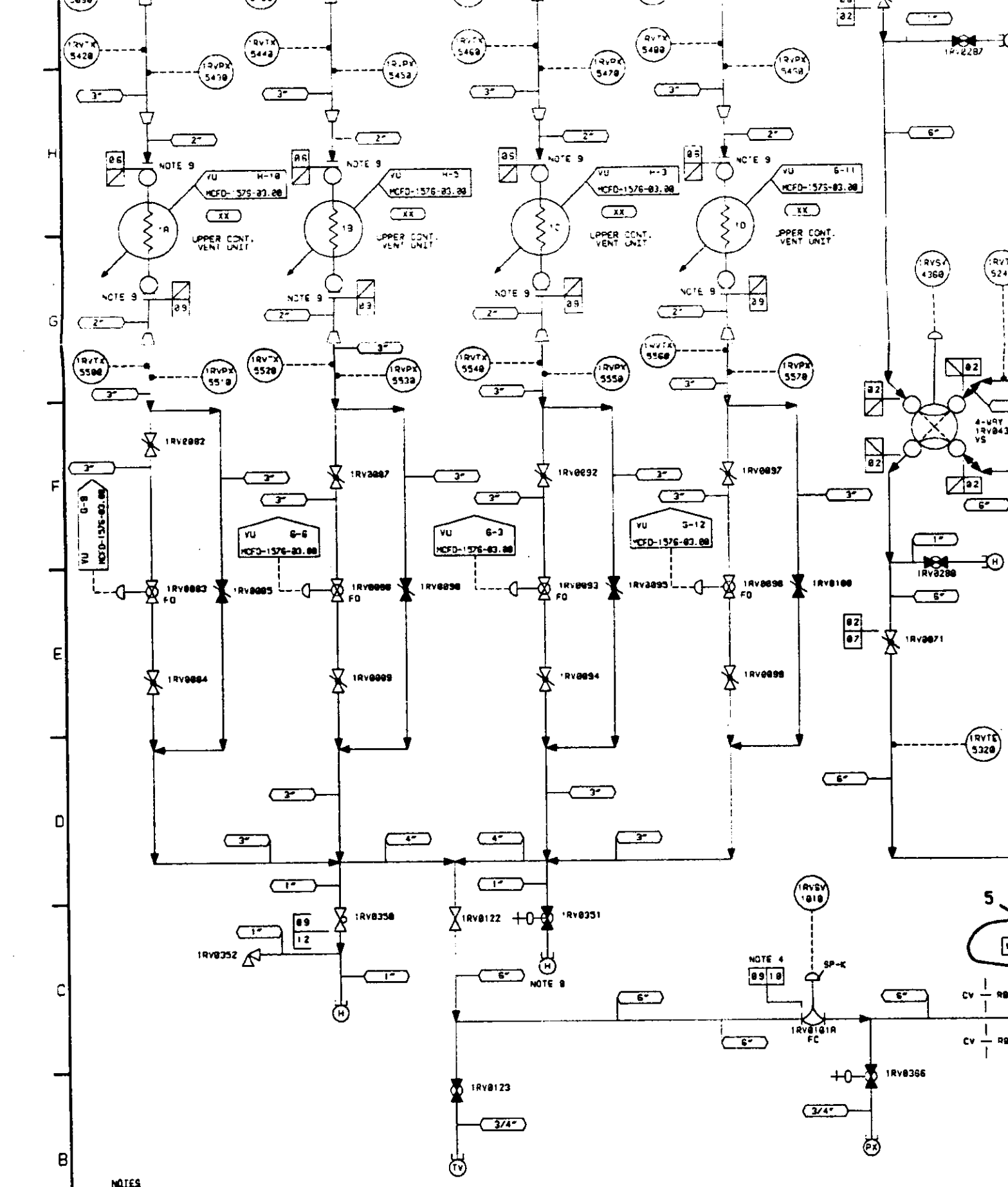
MOTOR DRIVEN AUXILIARY FEEDWATER PUMPS



This data is also available on the OAC.

DWG. NO. MCFD-1604-03.02





NOTES

1. DELETED
2. DELETED
3. FLANGE TO BE USED FOR PENETRATION TESTING.
4. CLASS F PIPE DUE TO FLOODING POTENTIAL TO SAFETY EQUIPMENT.
5. VALVES 1RC0032A AND 1RV0033B TO BE INSTALLED WITH FLOW ARROW OPPOSITE TO FLOW DIRECTION.
6. RV TO VL AHU INLET AND OUTLET TEMPERATURE ELEMENTS CONNECTED TOGETHER AS DIFFERENTIAL THERMOPILE PROVIDING SIGNAL TO OPERATOR AID COMPUTER.
7. 1RV0362 IS STAINLESS STEEL.
8. VENT AND DRAIN ASSEMBLIES ARE TO BE FABRICATED AND INSTALLED IN ACCORDANCE WITH MCS-1206.00-02-0002 USING ENGINEERING SPECIFICATION MOD-ES-1A, 1B, 1C AND 1D.
9. TYPICAL SUPPLY/RETURN CONNECTION. ACTUAL CONFIGURATION IS FOUR COILS, ONE SUPPLY AND ONE RETURN PER COIL.

ERN: MC0093XM

FINAL SUBMITTAL

MCGUIRE EXAM 2000-301
50-369/2000-301 AND 50-370/2000-301

MAY 8 - 12, MAY 19,
MAY 22 - 25, 2000

FINAL SRO LICENSE EXAM

REFERENCE MATERIAL

SRO Exam References:

RO&SRO Questions

120 Data Book Curve 8.4 (MDCA Pump Curve)

311 Steam Tables

603 Data Book Encl 7.38 (PZR Volume vs. Level)
Tech Spec 3.4.13 (RCS Leakage)
Associated Tech Specs not required:
- 3.4.14 (RCS Pressure Valve (PIV) Leakage
- 3.4.15 (RCS Leakage Detection Instrumentation)

619 Steam Tables
Data Book Curves 1.10B, 1.10C (Saturation Curves Adjusted for Instrument Error)

628 Station Drawing MCFD-1604-03.00 Flow Diagram of RV

SRO Only Questions

207 Tech Spec 3.6.1 (Containment)
Tech Spec Bases B3.6.1-3, 4
Associated Tech Specs not required:
- Tech Spec 3.6.3 (Containment Isolation Valves)
- Tech Spec 3.6.4 (Containment Leak Detection System)

217 Tech Spec 3.7.1 (Main Steam Safety Valves)
Associated Tech Specs not required:
- Tech Spec 3.7.2 (Main Steam Isolation Valves)
- Tech Spec 3.7.4 (Steam Generator Power Operated Relief Valves)

618 Steam Tables
Data Book Curves 1.10B, 1.10C (Saturation Curves Adjusted for Instrument Error)

663 DWG No. MCTC-1563-NS.V004-01 (Valve Design Criteria/Operability Requirements and Compensatory Measures – for 1NS-32A)

710 Databook Section 2.10.1 and curves A-F (Thermal Margin Curves)

3.6 CONTAINMENT SYSTEMS

3.6.1 Containment

LCO 3.6.1 Containment shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment inoperable.	A.1 Restore containment to OPERABLE status.	1 hour
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.1.1	----------NOTE---------- The space between each dual ply bellows assembly on penetrations between the containment building and annulus shall be vented to the annulus during Type A tests. ----------	
	Perform required visual examinations and Type A leakage rate testing in accordance with the Containment Leakage Rate Testing Program.	In accordance with the Containment Leakage Rate Testing Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.1.2	----------NOTE---------- 1. Following each Type A test, the space between each dual-ply bellows assembly shall be subjected to a low pressure test at 3 to 5 psig to verify no detectable leakage, or the assembly shall be subjected to a leak test with the pressure on the containment side of the assembly at P_a. 2. Type C tests on penetrations M372 and M373 may be performed without draining the glycol-water mixture from the seats of their diaphragm valves if meeting a zero indicated leakage rate (not including instrument error). ----------	--------NOTE-------- SR 3.0.2 is not applicable ----------
	Perform required Type B and C leakage rate testing, except for containment air lock testing and valves with resilient seals, in accordance with 10 CFR 50, Appendix J, Option A, as modified by approved exemptions. The leakage rate acceptance criterion is $\leq 1.0\ L_a$. However, during the first unit startup following testing performed in accordance with 10 CFR 50, Appendix J, Option A, as modified by approved exemptions, the leakage rate acceptance criteria are $< 0.6\ L_a$ for the Type B and Type C tests.	In accordance with 10 CFR 50, Appendix J, Option A, as modified by approved exemptions

3.6 CONTAINMENT SYSTEMS

3.6.3 Containment Isolation Valves

LCO 3.6.3 Each containment isolation valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

----------NOTES----------

1. Penetration flow path(s) except for containment purge supply and/or exhaust isolation valves for the lower compartment and instrument room may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for systems made inoperable by containment isolation valves.
4. Enter applicable Conditions and Required Actions of LCO 3.6.1, "Containment," when isolation valve leakage results in exceeding the overall containment leakage rate acceptance criteria.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Only applicable to penetration flow paths with two containment isolation valves. ---------- One or more penetration flow paths with one containment isolation valve inoperable except for purge valve or reactor building bypass leakage not within limit.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve inside containment with flow through the valve secured. AND	4 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 ----------NOTE---------- Isolation devices in high radiation areas may be verified by use of administrative means. ---------- Verify the affected penetration flow path is isolated.	Once per 31 days for isolation devices outside containment AND Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment
B. ----------NOTE---------- Only applicable to penetration flow paths with two containment isolation valves. ---------- One or more penetration flow paths with two containment isolation valves inoperable except for purge valve or reactor building bypass leakage not within limit.	B.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.	1 hour

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ----------NOTE---------- Only applicable to penetration flow paths with only one containment isolation valve and a closed system. ---------- One or more penetration flow paths with one containment isolation valve inoperable.	C.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange. AND C.2 ----------NOTE---------- Isolation devices in high radiation areas may be verified by use of administrative means. ---------- Verify the affected penetration flow path is isolated.	72 hours Once per 31 days
D. Reactor building bypass leakage not within limit.	D.1 Restore leakage within limit.	4 hours
E. One or more penetration flow paths with one or more containment purge valves not within purge valve leakage limits.	E.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange. AND	24 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. (continued)	E.2 ----------NOTE---------- Isolation devices in high radiation areas may be verified by use of administrative means. ---------- Verify the affected penetration flow path is isolated.	Once per 31 days for isolation devices outside containment AND Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment
	AND E.3 Perform SR 3.6.3.6 for the resilient seal purge valves closed to comply with Required Action E.1.	Once per 92 days
F. Required Action and associated Completion Time not met.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.6.3.1	Verify each containment purge valve for the lower compartment and instrument room is sealed closed, except for one purge valve in a penetration flow path while in Condition E of this LCO.	31 days
SR 3.6.3.2	Verify each containment purge and exhaust isolation valve for the upper compartment is closed, except when the valves are open for pressure control, ALARA or air quality considerations for personnel entry, or for Surveillances that require the valves to be open.	31 days
SR 3.6.3.3	----------NOTE---------- Valves and blind flanges in high radiation areas may be verified by use of administrative controls. ---------- Verify each containment isolation manual valve and blind flange that is located outside containment or annulus and not locked, sealed, or otherwise secured and required to be closed during accident conditions is closed, except for containment isolation valves that are open under administrative controls.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.6.3.4	----------NOTE---------- Valves and blind flanges in high radiation areas may be verified by use of administrative controls. --- Verify each containment isolation manual valve and blind flange that is located inside containment or annulus and not locked, sealed, or otherwise secured and required to be closed during accident conditions is closed, except for containment isolation valves that are open under administrative controls.	Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days
SR 3.6.3.5	Verify the isolation time of automatic power operated containment isolation valve is within limits.	In accordance with the Inservice Testing Program
SR 3.6.3.6	Perform leakage rate testing for containment purge lower and upper compartment and Instrument room valves with resilient seals.	184 days AND within 92 days after opening the valve
SR 3.6.3.7	Verify each automatic containment isolation valve that is not locked, sealed or otherwise secured in position, actuates to the isolation position on an actual or simulated actuation signal.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.3.8	----------NOTE---------- Penetrations not individually testable shall be determined to have no visible leakage when tested with soap bubbles. ----------	---------NOTE------- SR 3.0.2 is not applicable. ----------
	Verify the combined leakage rate for all reactor building bypass leakage paths is $\leq 0.07\ L_a$ when pressurized to P_a, 14.8 psig.	In accordance with 10 CFR 50, Appendix J, as modified by approved exemptions, for Type B and C testable penetrations AND During SR 3.6.1.1 Type A tests for penetrations not individually testable

3.7 PLANT SYSTEMS

3.7.1 Main Steam Safety Valves (MSSVs)

LCO 3.7.1 The MSSVs shall be OPERABLE as specified in Table 3.7.1-1 and Table 3.7.1-2.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each MSSV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required MSSVs inoperable.	A.1 Reduce power to less than or equal to the applicable % RTP listed in Table 3.7.1-1. AND	4 hours
	A.2 Reduce the Power Range Neutron Flux High Trip Setpoints to the % RTP value listed in Table 3.7.1-1.	4 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met. OR One or more steam generators with less than two MSSVs OPERABLE.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.1.1	----------NOTE---------- Only required to be performed prior to entry into MODE 2. ---------- Verify each required MSSV lift setpoint per Table 3.7.1-2 in accordance with the Inservice Testing Program. Following testing, lift setting shall be within $\pm$1%.	In accordance with the Inservice Testing Program

Table 3.7.1-1 (page 1 of 1)
OPERABLE Main Steam Safety Valves versus
Maximum Allowable Power Range Neutron Flux High
Setpoints in Percent of RATED THERMAL POWER

MINIMUM NUMBER OF MSSVs PER STEAM GENERATOR REQUIRED OPERABLE	MAXIMUM ALLOWABLE POWER RANGE NEUTRON FLUX HIGH SETPOINTS (% RTP)
4	≤ 58
3	≤ 39
2	≤ 19

Table 3.7.1-2 (page 1 of 1)
Main Steam Safety Valve Lift Settings

VALVE NUMBER				LIFT SETTING (psig ± 3%)
STEAM GENERATOR				
A	B	C	D	
SV-20	SV-14	SV-8	SV-2	1170
SV-21	SV-15	SV-9	SV-3	1190
SV-22	SV-16	SV-10	SV-4	1205
SV-23	SV-17	SV-11	SV-5	1220
SV-24	SV-18	SV-12	SV-6	1225

3.7 PLANT SYSTEMS

3.7.2 Main Steam Isolation Valves (MSIVs)

LCO 3.7.2 Four MSIVs shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3 except when MSIVs are closed and de-activated.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One MSIV inoperable in MODE 1.	A.1 Restore MSIV to OPERABLE status.	8 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 2.	6 hours
C. ----------NOTE---------- Separate Condition entry is allowed for each MSIV. ---------- One or more MSIVs inoperable in MODE 2 or 3.	C.1 Close MSIV. AND C.2 Verify MSIV is closed.	8 hours Once per 7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	----------NOTE---------- Only required to be performed prior to entry into MODE 2. ---------- Verify closure time of each MSIV is ≤ 8.0 seconds on an actual or simulated actuation signal.	In accordance with the Inservice Testing Program

3.7 PLANT SYSTEMS

3.7.4 Steam Generator Power Operated Relief Valves (SG PORVs)

LCO 3.7.4 Three SG PORV lines shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

CONDITION		REQUIRED ACTION		COMPLETION TIME
A.	One required SG PORV line inoperable.	A.1	----------NOTE---------- LCO 3.0.4 is not applicable. ---------- Restore required SG PORV line to OPERABLE status.	7 days
B.	Two or more required SG PORV lines inoperable.	B.1	Restore all but one required SG PORV line to OPERABLE status.	24 hours
C.	Required Action and associated Completion Time not met.	C.1 AND C.2	Be in MODE 3. Be in MODE 4 without reliance upon steam generator for heat removal.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.4.1	Verify one complete cycle of each SG PORV.	18 months
SR 3.7.4.2	Verify one complete cycle of each SG PORV block valve.	18 months

Valve Design Criteria/Operability Requirements and Compensatory Measures

Design Criteria:

1/2NS-12B, 1/2NS-15B, 1/2NS-29A, and 1/2NS-32A are motor operated gate valves located on the discharge of the NS HX at the containment penetration. These valves fail as-is and provide the following safety functions by the following methods:

Function	*Method*
Aligns for Containment Spray	S_P signal and CPCS permissive interlock to open (0.35 psig increasing)
Terminate Containment Spray	CPCS terminate interlock to close (0.35 psig decreasing)
Containment Isolation*	Remote manual to close

The valves are interlocked with the Containment Spray Pumps and CPCS to prevent pump dead heading and Containment depressurization. Reference MCS-1563.NS-00-0001.

Bonnet pressurization which could produce valve lockup is prevented on these valves through procedural controls, which require valve stroking after NS pump operation to verify opening capability.

*These valves are exempt from leak testing because the NS system outside of Containment is designed a closed seismic loop and is needed for accident mitigation.

Operability Requirements and Compensatory Measures:

Modes 1-4:

If 1/2NS-12B, 1/2NS-15B, 1/2NS-29A, or 1/2NS-32A is open and incapable of automatically closing, the containment penetration is inoperable. Refer to Technical Specification for Containment Isolation Valves for approved actions.

If 1/2NS-12B, 1/2NS-15B, 1/2NS-29A, or 1/2NS-32A is closed and incapable of opening within the required time, the respective train of NS is inoperable. There are no compensatory measures which would establish operability in these modes.

Modes 5, 6, No-Mode:

There are no operability requirements in these shutdown modes.

Testing and Acceptance Criteria

Test/Measurement	Reference Document	Acceptable Value Including Tolerance
Stroke Time Open	IST Program (OM-10) MCC-1223.02-00-0001/2, Engineered Safety Features Valve Response Time Testing Requirements	< 10 seconds
Stroke Closed	UFSAR 6.2.4.1	Closed Valve
Thrust/Torque (VOTES) & Motor Power	MCM-1205.19-0039, Electric Motor Operator GL89-10 Set-up Information	Controlled in reference calculation

NO	REVISIONS	DSN	CHK	APR	DTE	C/E	ELE
2	Rev. per MGMM-9755	BDM	PLS	JJW	11-25-97	–	RTD
1	Rev. per MGMM-9480	NAS	ELH	MDR	7/24/97	--	BKM
0	Original Issue	RSS	RED	RAH	12/19/91	--	TAB

Duke Power Company — QA COND 1

McGuire Nuclear Station, Units 1 & 2
Design Criteria, Operability Requirements and Compensatory Measures,
Testing and Acceptance Criteria
Isolation Valves 1/2NS-12B, 1/2NS-15B, 1/2NS-29A, 1/2NS-32A

DSN R S Starr — DTE 12/18/91
CHK R E Dixon — DTE 12/19/91
APP R A Harris — DTE 12/19/91
INS T A Belk — DTE 12/19/91
INS -- — DTE --

DWG NO: MCTC-1563-NS.V004-01 — REV 2

OP/1/A/6100/22
ENCLOSURE 4.3
CURVE 1.10B

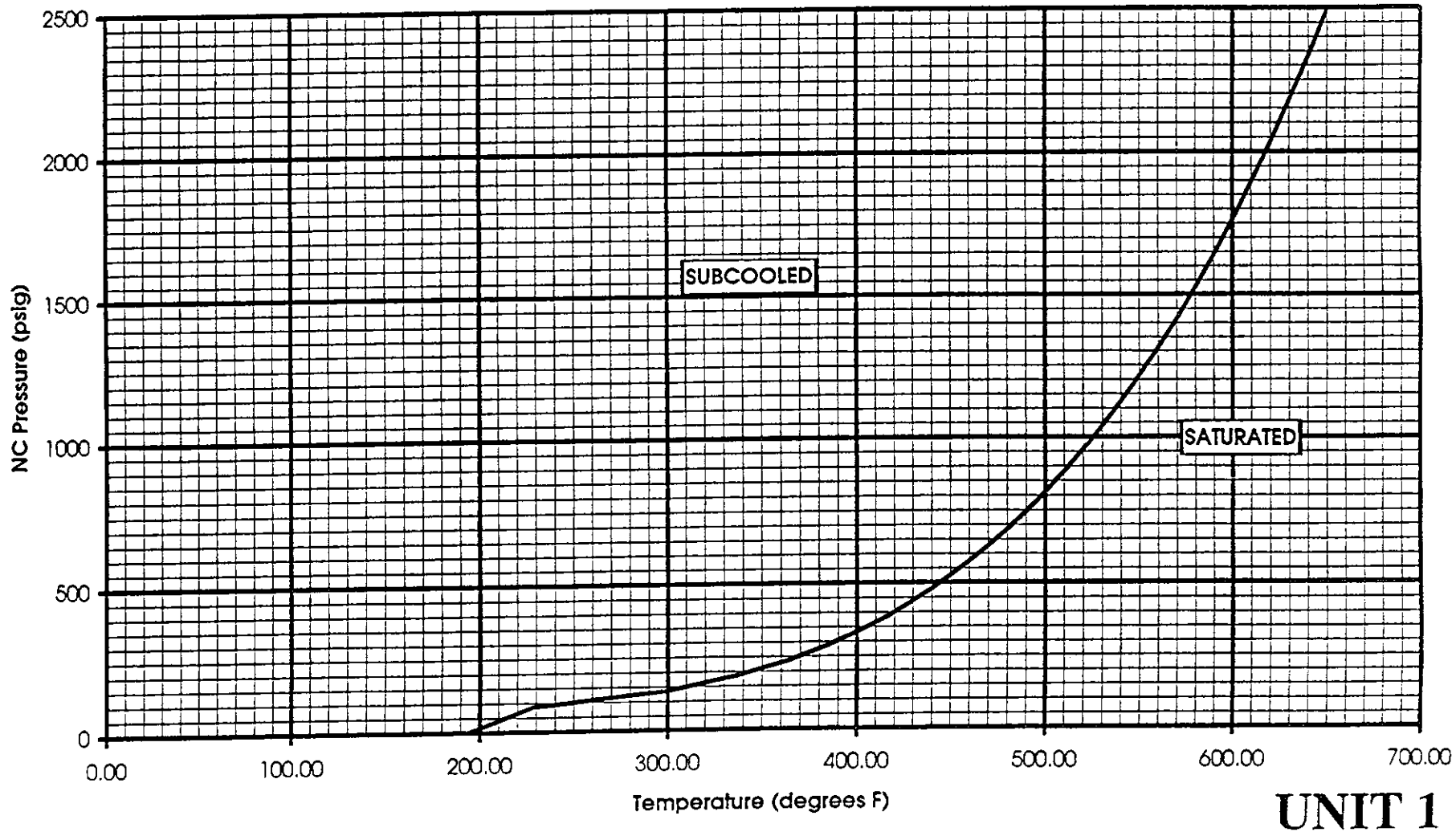
SATURATION CURVE ADJUSTED FOR INSTRUMENT ERROR (WIDE RANGE NC PRESSURE INSTRUMENT)

NC PRESSURE (psig)	SATURATION TEMP. ADJUSTED FOR INSTRUMENT ERROR (^{O}F)
0.0	193.90
35.3	207.84
85.3	228.15
135.3	299.73
185.3	336.80
235.3	363.07
285.3	383.81
335.3	401.13
385.3	416.09
435.3	429.35
485.3	441.28
535.3	452.17
585.3	462.20
635.3	471.53
685.3	480.25
735.3	488.45
785.3	496.21
885.3	510.56
985.3	523.66
1085.3	535.73
1185.3	546.93
1285.3	557.41
1385.3	567.26
1485.3	576.56
1585.3	585.37
1685.3	593.76
1785.3	601.75
1885.3	609.39
1985.3	616.71
2085.3	623.74
2185.3	630.50
2285.3	637.00
2385.3	643.27
2485.3	649.32

References:
1) Calculation File MCC-1552.08-00-0160, Instrument Uncertainties for ICCM and OAC Subcooling Margin, Rev. 1.
2) MCEI-0400-08, ICCM and OAC Error Adjusted Saturation Tables, Rev. 0.
3) IP/0/A/3000/18, ICCM-86 Programming and Operation, approved 12/3/91.

UNIT 1

OP/1/A/6100/22
ENCLOSURE 4.3 - CURVE 1.10B
SATURATION CURVE ADJUSTED FOR INSTRUMENT ERROR
(WIDE RANGE NC PRESSURE SENSOR)



UNIT 1

UNIT 1

OP/1/A/6100/22
ENCLOSURE 4.3
CURVE 1.10C

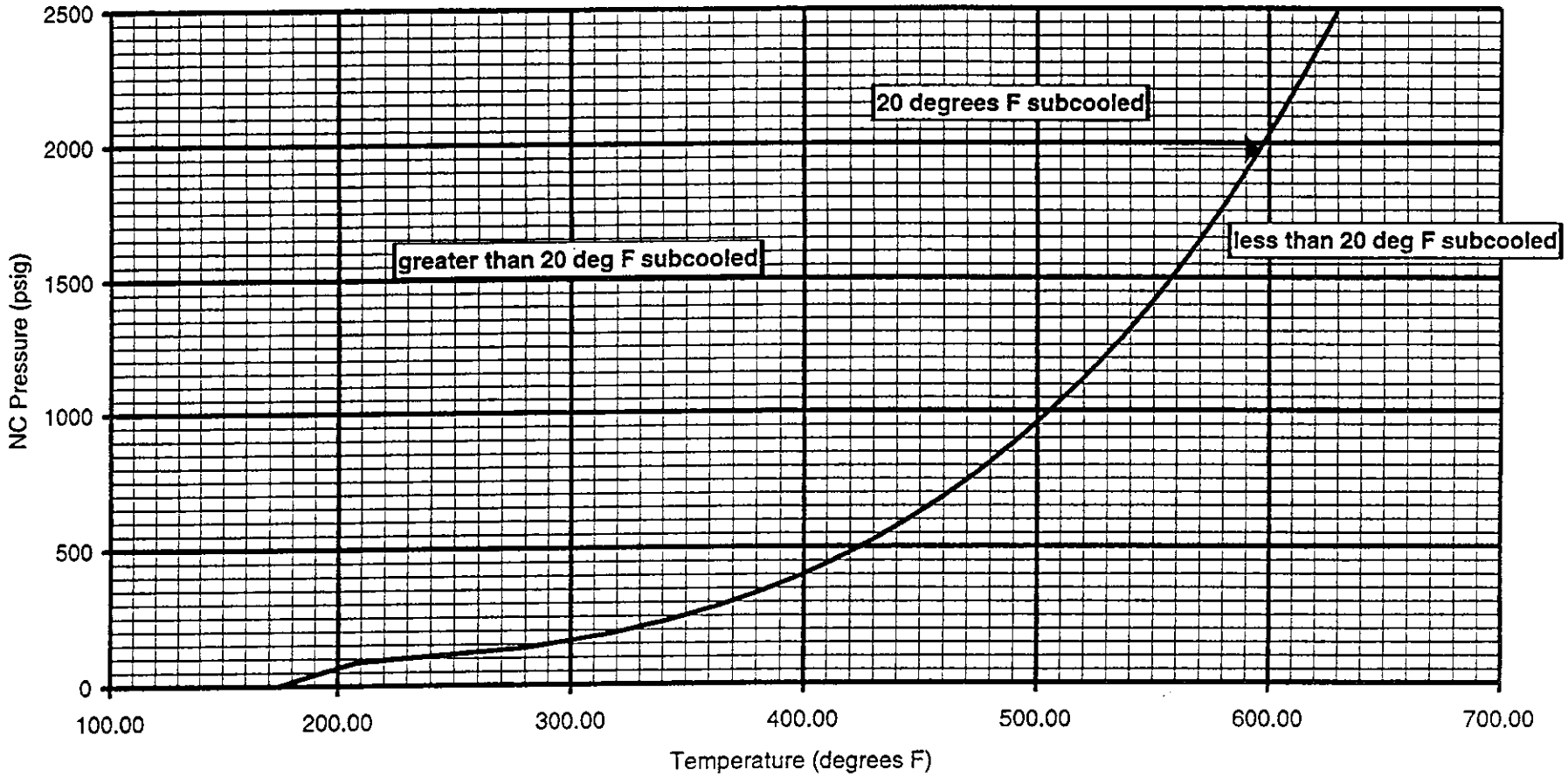
SATURATION CURVE ADJUSTED FOR INSTRUMENT ERROR
WITH 20 DEGREES SUBCOOLING
(WIDE RANGE NC PRESSURE SENSOR)

NC PRESSURE (psig)	SATURATION TEMP. ADJUSTED FOR INSTRUMENT ERROR AND 20 deg F SUBCOOLING(^{o}F)
0.0	173.90
35.3	187.84
85.3	208.15
135.3	279.73
185.3	316.80
235.3	343.07
285.3	363.81
335.3	381.13
385.3	396.09
435.3	409.35
485.3	421.28
535.3	432.17
585.3	442.20
635.3	451.53
685.3	460.25
735.3	468.45
785.3	476.21
885.3	490.56
985.3	503.66
1085.3	515.73
1185.3	526.93
1285.3	537.41
1385.3	547.26
1485.3	556.56
1585.3	565.37
1685.3	573.76
1785.3	581.75
1885.3	589.39
1985.3	596.71
2085.3	603.74
2185.3	610.50
2285.3	617.00
2385.3	623.27
2485.3	629.32

References:
1) Calculation File MCC-1552.08-00-0160, Instrument Uncertainties for ICCM and OAC Subcooling Margin, Rev. 1.
2) MCEI-0400-08, ICCM and OAC Error Adjusted Saturation Tables, Rev. 0.
3) IP/0/A/3000/18, ICCM-86 Programming and Operation, approved 12/3/91.

UNIT 1

OP/1/A/6100/22
ENCLOSURE 4.3 - CURVE 1.10C
SATURATION CURVE ADJUSTED FOR INSTRUMENT ERROR
WITH 20 DEGREES F SUBCOOLING (WIDE RANGE NC PRESSURE SENSOR)



UNIT 1

OP/1/A/6100/22
ENCLOSURE 4.3
SECTION 2.10.1

THERMAL MARGIN CURVES AT VARIOUS REACTOR VESSEL LEVELS

Purpose:

The thermal margin curves presented in section 2.10.1 are to be used in assessing time to core boiling for loss of decay heat removal capabilities. This information is used in assessing the need for containment closure for periods when either the Reactor Coolant system is not intact (not capable of being pressurized), the Reactor Coolant system level is below 20% Pressurizer cold calibration level (or Corrected Pressurizer Level, P0301) or the decay heat removal function is compromised or degraded.

Use of the Curves:

These curves were developed using decay heat values from DPC-1552.08-0051, "Decay Heat for Mark-BW and OFA Fuel Types". *This calculation is conservative for fuel cycles less than or equal to 459 EFPD.* The decay heat values used should be reevaluated for cycles extending beyond 459 days.

The user should be aware that the information presented in these curves should be used in conjunction with the information in Section 2.10.4 to ensure adequate contingency planning to mitigate core boiling (particularly for reduced inventory coupled with high decay heat conditions). For times when the upper internals are in place (prior to reload), care should be taken to ensure appropriate flow paths are aligned to ensure adequate forced flow through the core upon a loss of decay heat removal capacity. With internals in place and a loss of decay heat removal, resistance across the nozzles would restrict circulation / replenishment flow and could lead to voiding in the top of the core *even with Reactor Coolant level above the upper internals.* This voiding phenomena will not occur if forced flow is initiated prior to the onset of boiling at a flow rate defined in Section 2.10.4 or if the internals are removed. Therefore, when the RCS is no longer intact and the upper internals are installed, Thermal Margin should be determined using the 84" curves as a maximum.

The curves contained in this section contain information on time to core boiling following a complete loss of decay heat removal capability based on various Reactor Coolant system volumes and initial temperatures. To ensure conservatism, for any initial temperature in between the given range, the user should default to the curve with the higher initial temperature in calculation of thermal margin. Likewise, for any initial level in between the given range, the user should default to the curve with the lower level in calculation of thermal margin.

OP/1/A/6100/22
ENCLOSURE 4.3
SECTION 2.10.1

Detailed Discussion of Development and Application of Section 2.10.1

Section 2.10.1 contains thermal margin curves for various Reactor Vessel Levels (9", 60" and 84" above Hot Leg Centerline) based on time to boil verses time after shutdown for pre-refueling and post refueling configurations.

The section entitled the "Use of the Curves" extends the application of thermal margin curves to include fuel cycles less than 459 days. The previous calculations used to determine the thermal margins for time to boil assumed a core burned to 390 EFPD. DPC-1552.08-00-0051, *Decay Heat for Mark-BW and OFA Fuel Types*, has been updated to include fuel cycles up to 459 EFPD.

This calculation was reviewed for any changes to decay heat as a function of the extended burnup. No appreciable change was noted, therefore, based on the conservatism applied in the current calculational methodology for thermal margin determination, the existing thermal margin values will remain conservative. DPC-1552.08-00-0141, *RSG FSAR Analyses - 15.2.6 - Loss of Non-Emergency AC Power*, contains a review of the differences in power fraction of decay heat verses burnup for 390 and 459 day core cycles. In addition, this section addresses the impact of the upper internals and the application of curve 2.10.4 in assessing core flow requirements to mitigate boiling as documented in DPC-1552.08-00-0143, *Upper Internals Spray Nozzle Flow Capability During a Loss of Decay Heat Removal Event.*

In the Initial Conditions section of 2.10.1 the terminology of extended 100% power operation was changed to 100% power operation for a minimum of one week. In the event a unit is shutdown after operating for a period less than one week and thermal margin determination is required, Primary System Engineering should be contacted to determine the changes in the heat load assumptions for the thermal margin determination.

I. Initial Conditions

A. 100% power operation (for a minimum of one week) prior to shutdown.

B. Complete Loss of Decay Heat Removal Capability.

C. No mitigative actions are taken.

II. Assumptions and Conservatisms

A. The RCS is depressurized and open to the Reactor Building atmosphere.

B. Water in the lower plenum, the downcomer, the barrel-baffle region, the hot legs, and the cold legs are assumed to be thermally isolated from the core region during the heatup to saturation. Therefore, the volume of water used to determine when the core region reaches saturation consists of the water in and above the active fuel (inside the core barrel but excluding the barrel-baffle region) up to elevation 740.96 feet.

D. Perfect mixing is assumed to occur in the regions being heated to saturation. Therefore, all of the heated water is assumed to reach saturation at the same time.

E. Water volumes in geometrically complex regions are minimized for conservative results.

F. The heating of the reactor vessel internal structures is neglected as an additional conservatism.

G. The effect of the elevation head in the RCS in raising the saturation temperature is considered.

H. Decay heat is calculated based on Mark-BW 3.8% U235 enrichment fuel.

I. Core volumes are calculated assuming Mark-BW fuel rods. Minor differences in volumes of other fuel assembly components are neglected.

III. References

A. DPC-1552.08-00-0014, Loss of Decay Heat Removal

B. DPC-1552.08-00-0051, Decay Heat for Mark-BW and OFA Fuel Types

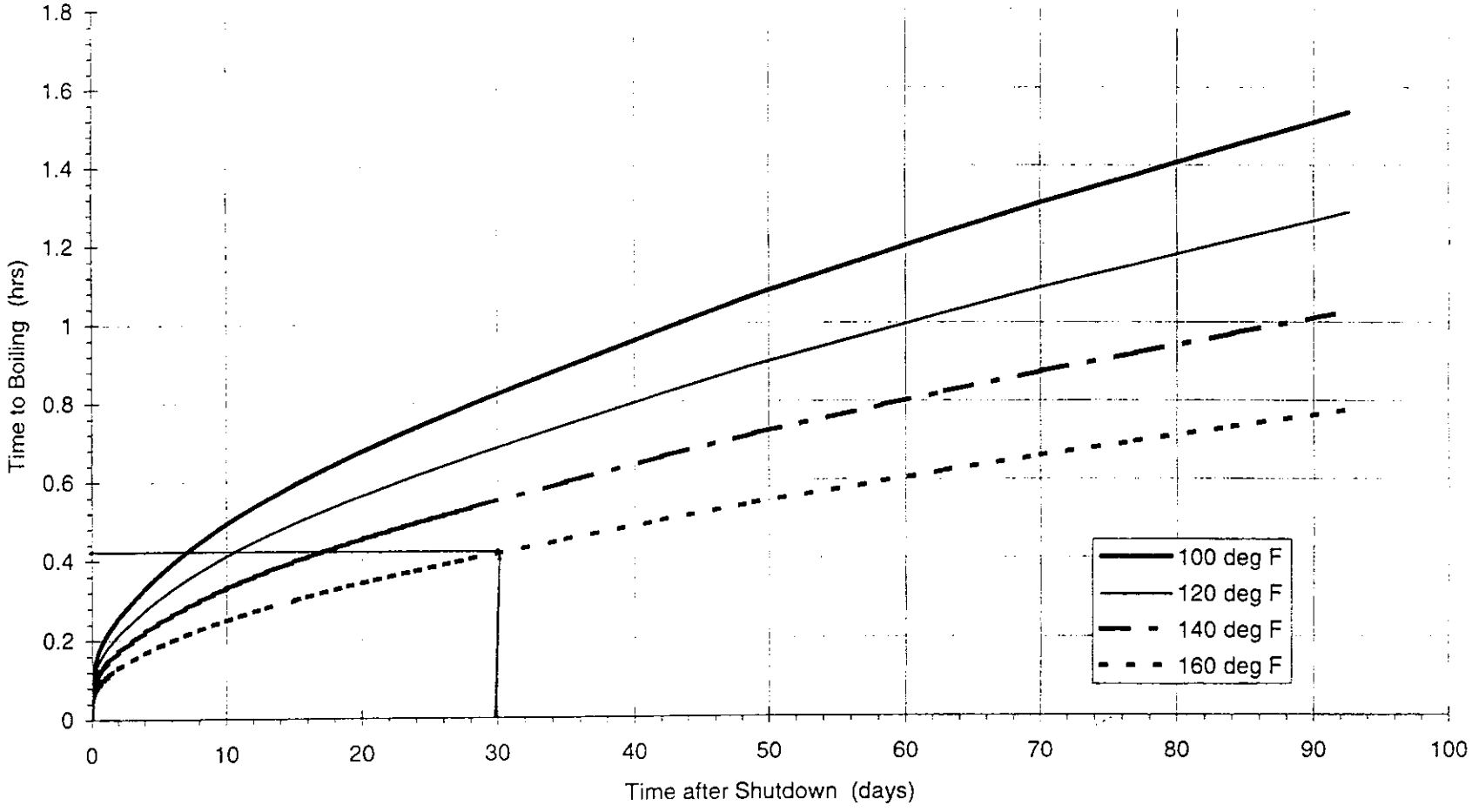
C. DPC-1552.08-00-0089, Time Required After Shutdown Before Entering Mid-Loop Operation

UNIT 1

OP/1/A/6100/022

Enclosure 4.3 - Section 2.10.1.A

Loss of Decay Heat Removal
with Water Level 9" Above Hot Leg Centerline
(Prior to Offload)



UNIT 1

UNIT 1

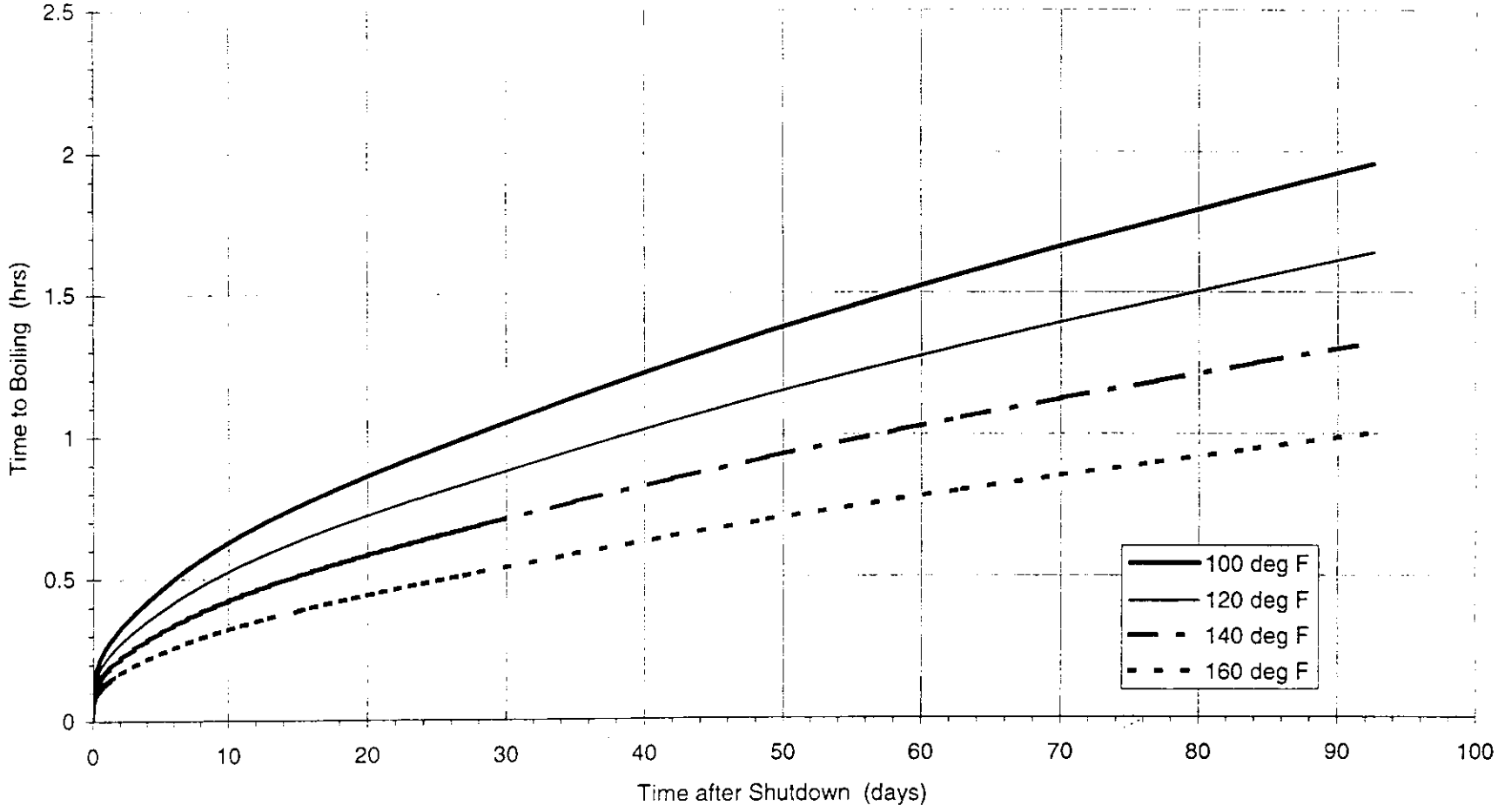
OP/1/A/6100/022

Enclosure 4.3 - Section 2.10.1.B

Loss of Decay Heat Removal

with Water Level 60" Above Hot Leg Centerline

(Prior to Offload)

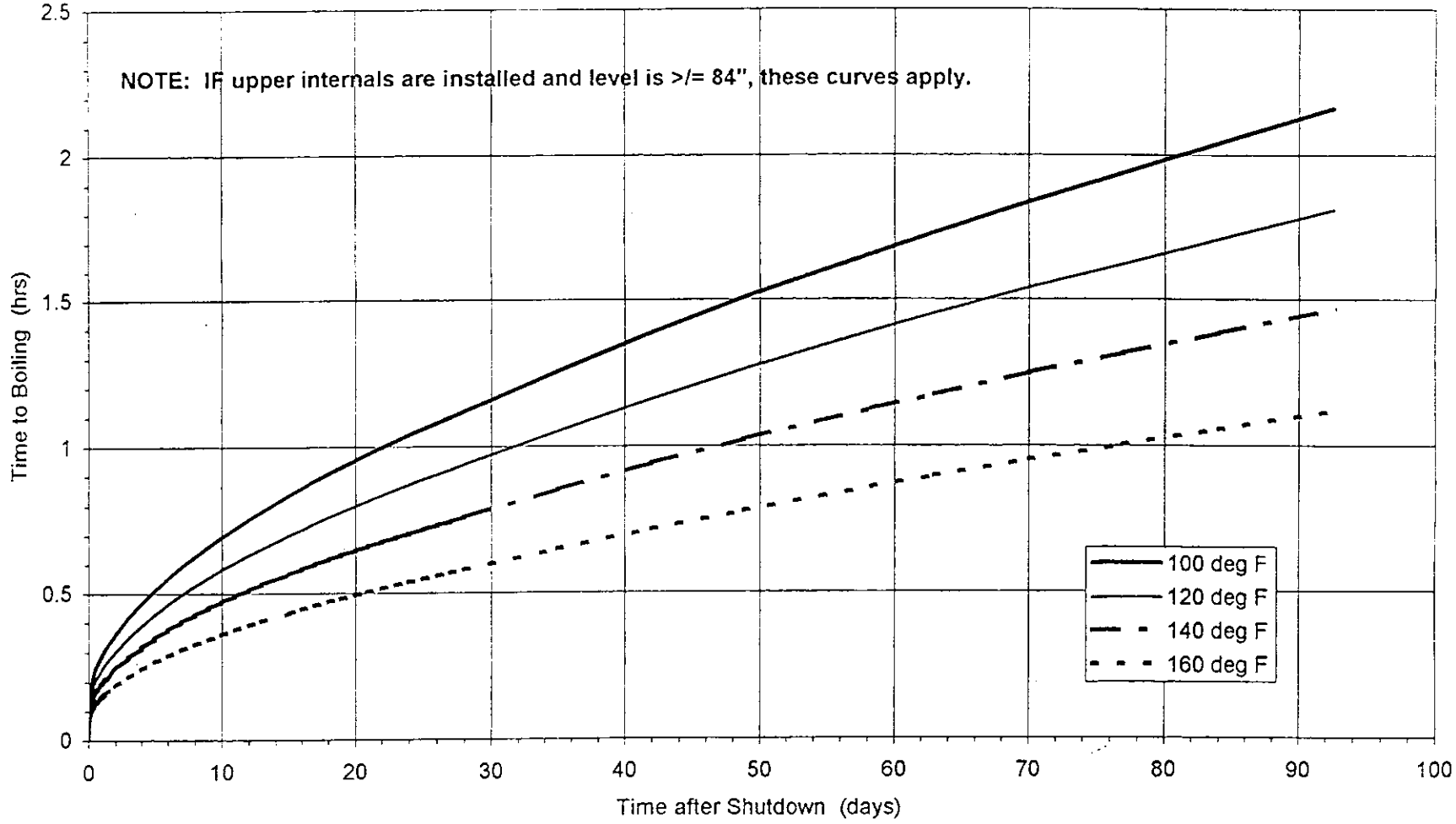


UNIT 1

UNI. 1

Enclosure 4.3 - Section 2.10.1.C

Loss of Decay Heat Removal with Water Level 84" Above Hot Leg Centerline (Prior to Offload)



UNIT 1

UNIT 1

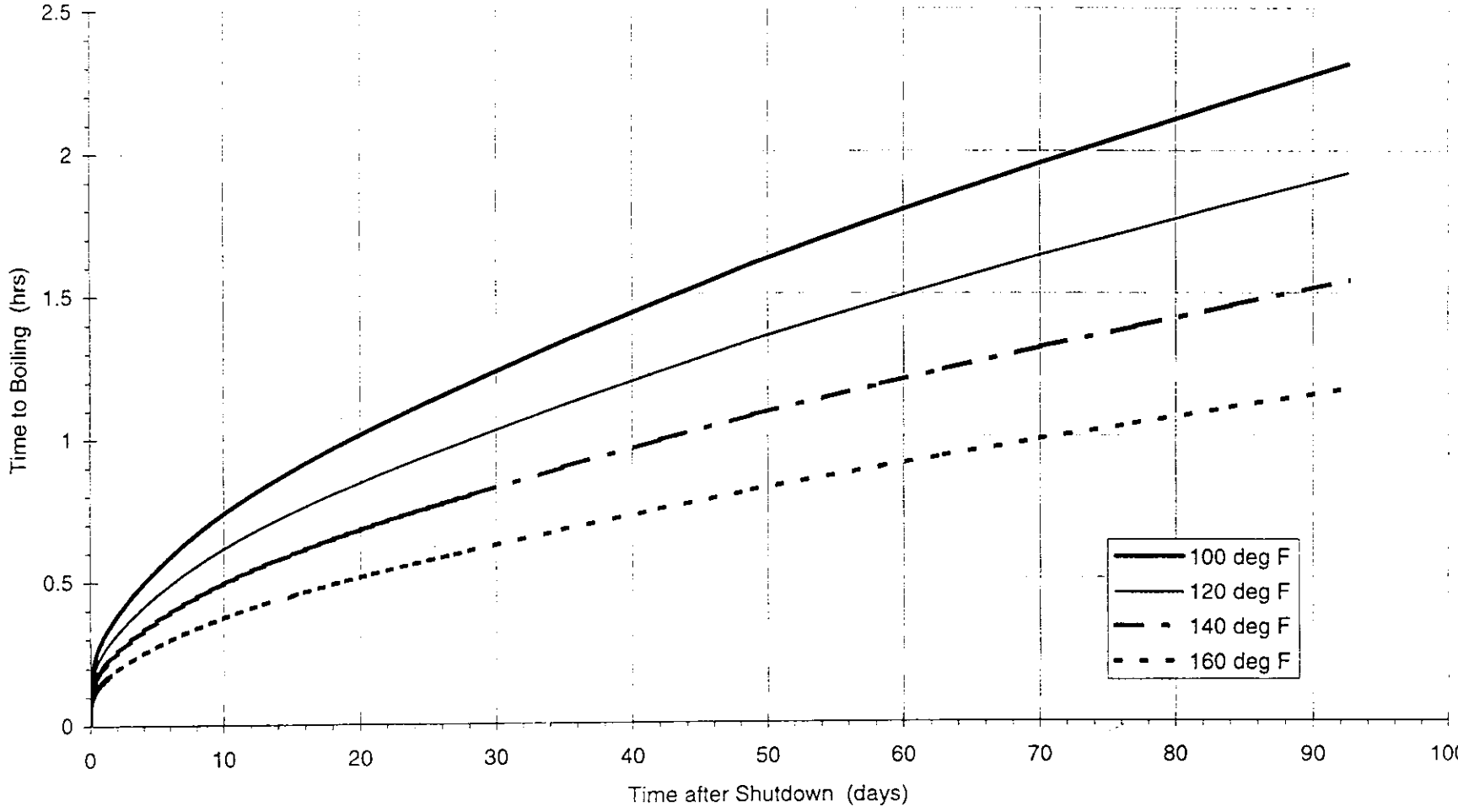
OP/1/A/6100/022

Enclosure 4.3 - Section 2.10.1.D

Loss of Decay Heat Removal

with Water Level 9" Above Hot Leg Centerline

(After Reload)



UNIT 1

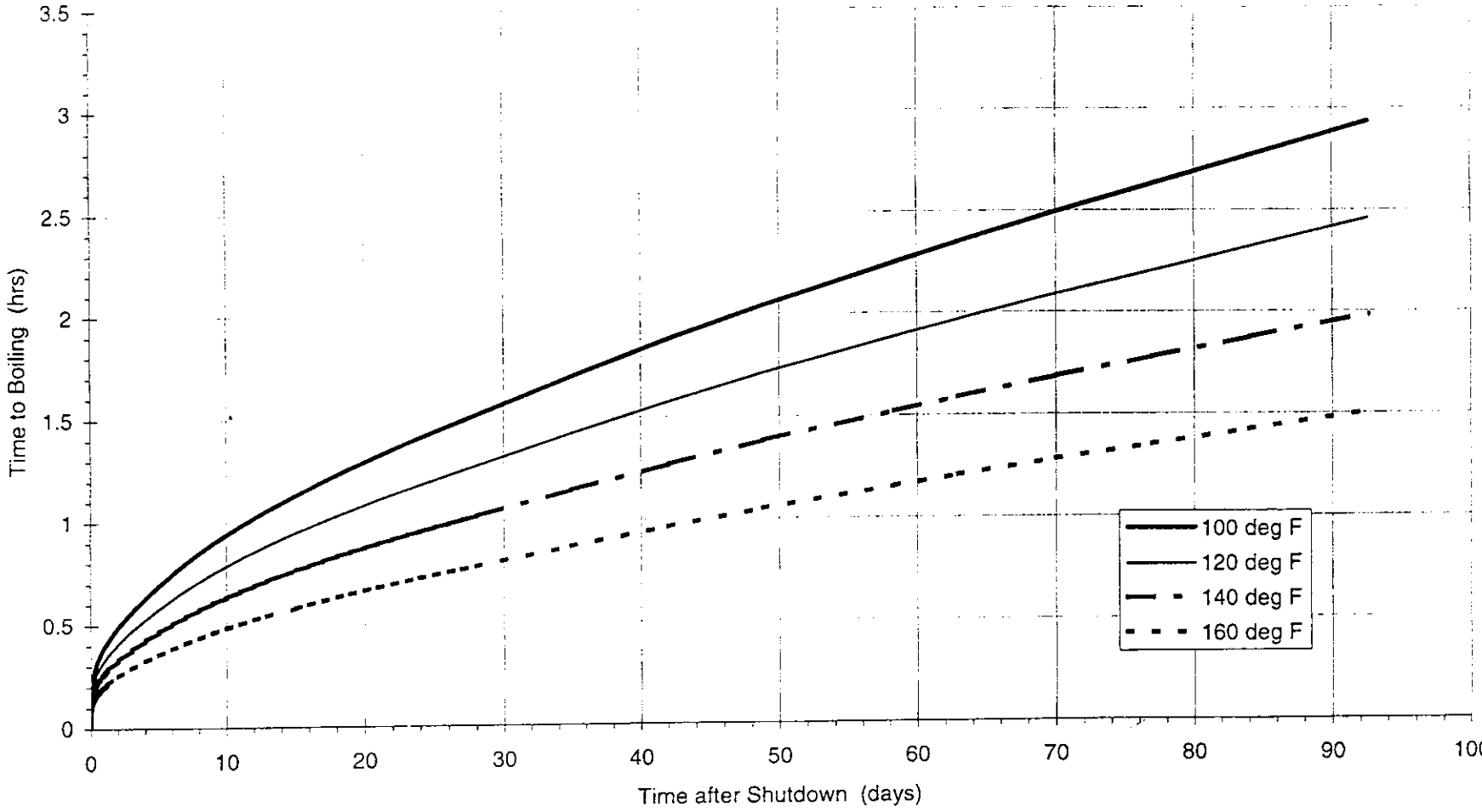
OP/1/A/6100/022

Enclosure 4.3 - Section 2.10.1.E

Loss of Decay Heat Removal

with Water Level 60" Above Hot Leg Centerline

(After Reload)

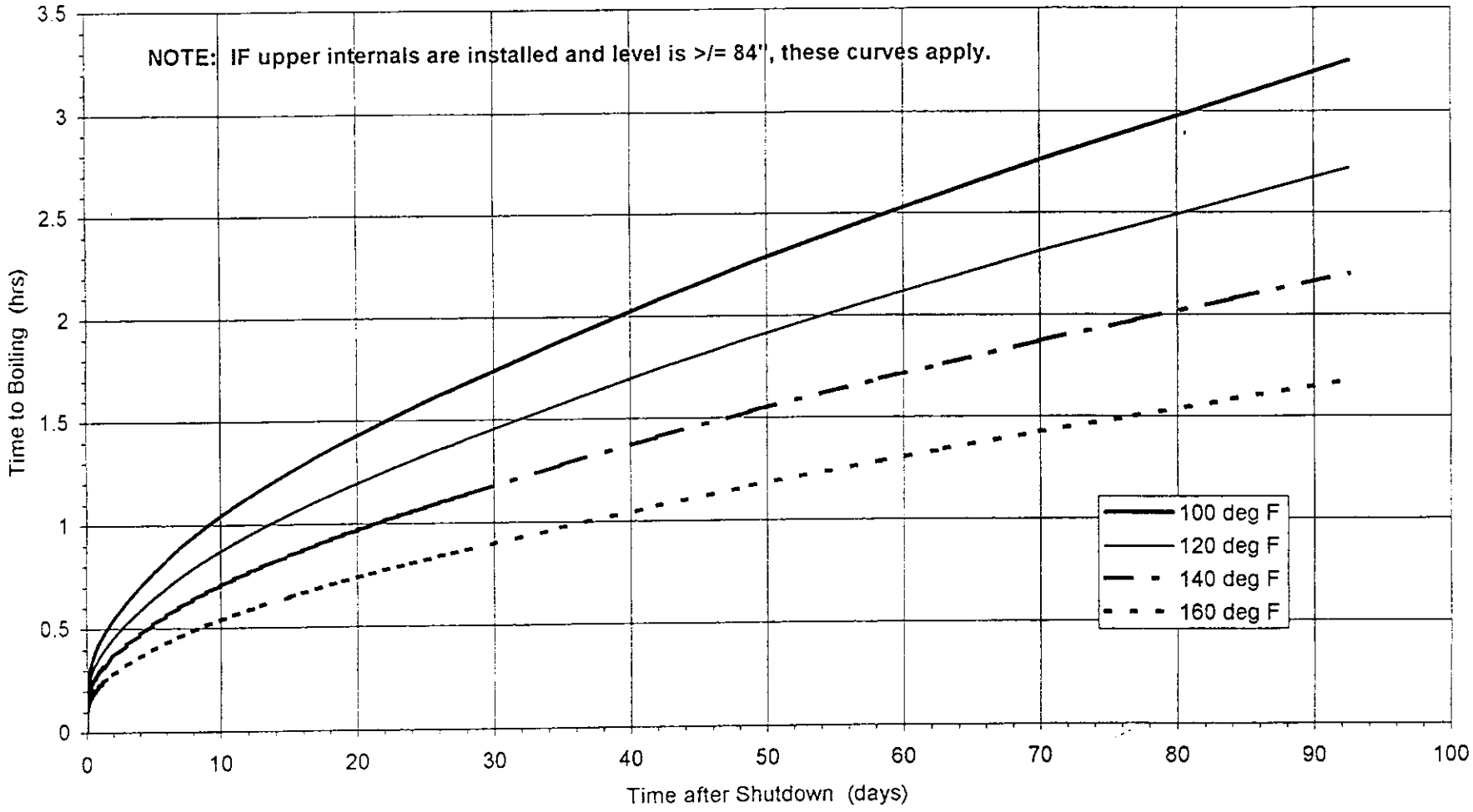


UNIT 1

UNIT 1

Enclosure 4.3 - Section 2.10.1.F

Loss of Decay Heat Removal
with Water Level 84" Above Hot Leg Centerline
(After Reload)



UNIT 1