

CALC. NO. JAF-CALC-NBS-00223REV. 1IP3 ☐JAF ☐☒

MOD/TASK NO. _____

QA CATEGORY: I PRELIMINARY: _____ FINAL: XPROJECT/TASK: Setpoint Calculations to extend operating cycleSYSTEM NO./NAME: 002 / Nuclear Boiler (ADS)TITLE: 02DPT-116A,B; -117A,B; -118A,B; -119A,B Main Steam Hi Flow PCIS

	NAME	SIGNATURE	DATE
DESIGN ENG.:			
PREPARER:	<u>F. Granitto</u>	<u>F. Granitto</u>	<u>11/17/92</u>
CHECKER:	<u>G. Stranovsky</u>	<u>G. Stranovsky</u>	<u>11/17/92</u>
VERIFIER: NO <input type="checkbox"/>	<u>G. Stranovsky</u>	<u>G. Stranovsky</u>	<u>11/17/92</u>
APPROVED:	<u>A. Petrenko</u>	<u>A. Petrenko</u>	<u>11/17/92</u>

PROBLEM/OBJECTIVE/METHOD

Calculate Instrument Setpoint considering hardware drift and uncertainties for extension of the operating cycle from 18 to 24 months and power uprate.

This calculation has been prepared in accordance with the Methodology outlined in ISA s.67-04 and IES-3.

SYSTEM: 002 NBS

DESIGN BASIS/ASSUMPTIONS

QA CAT: CAT I

1. HELB in the Reactor Building, No Accident in the Drywell.
2. LOCA or HELB in the Drywell, No Accident in the Reactor Building.

SUMMARY/CONCLUSION

The present setpoint is ≤ 106 psid. The calculated setpoint has been determined to be ≤ 110.26 psid and ≤ 112.86 for power uprate. Therefore setpoint change is not required.

REFERENCES

Vendor Manuals, Drawings, Tech. Specs., ISP's, Operating Procedures, EQ reports.

See Section 3.0 of the subject calculation for specific information.

AFFECTED SYSTEMS/COMPONENTS/DOCUMENTS

Nuclear Boiler (ADS)/02DPT-116A, B; -117A, B; -118A, B; -119A, B.

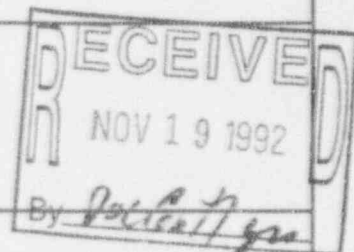
9303290194 930317
PDR ADOCK 05000333
PDR

☐ VOIDED OR☐ SUPERSEDED BY: _____

(CALC. NO.)

☐ VOIDS OR☒ SUPERSEDES: Rev. 0

(CALC. NO.)



IP3 ☐JAF ☒INDEPENDENT DESIGN VERIFICATION
CONTROL SHEETVERIFICATION OF: JAF-CALC-NBS-00223
Document Title/NumberSUBJECT: Mainsteam High Flow PCIS

MOD/TASK NUMBER (If Applicable): _____

QA CATEGORY: IDISCIPLINE REVIEW: ELEC MECH C/F I&C OTHER
(SPECIFY)Check as required ☐ ☐ ☐ ☒ ☐METHOD USED *: DR DRVERIFIER'S NAME: G. STRANOVSKY

VERIFIER'S _____

INITIALS/DATE: GS 11/17/92APPROVED BY: A. Petrenko Date: 11/17/92

REMARKS/SCOPE OF VERIFICATION:

* Methods of verification: Design Review (DR), Alternate Calculations (AC),
Qualification Test (QT)

DESIGN VERIFICATION CHECKLIST
DESIGN REVIEW METHOD

VERIFICATION OF: JAF-CALC-NBS-00223
Document/Title/Number

SUBJECT: Main Steam High Flow PCIS

MOD/TASK NO.: (If Applicable) _____

DISCIPLINE REVIEW

	ELEC	MECH	C/S	I&C	OTHER (SPECIFY)
Check as Required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Yes/No/Not Applicable

1. Were the inputs correctly selected and incorporated into the design? Yes/No/NA
2. Are assumptions necessary to perform the design activity adequately described and reasonable: Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed? Yes/No/NA
3. Are the appropriate quality and quality assurance requirements specified? e.g., safety classification. Yes/No/NA
4. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified and are their requirements for design met? Yes/No/NA
5. Have applicable construction and operating experience been considered? Yes/No/NA
6. Have the design interface requirements been satisfied? Yes/No/NA
7. Was an appropriate design method used? Yes/No/NA
8. Is the output reasonable compared to inputs? Yes/No/NA
9. Are the specified parts, equipment and processes suitable for the required application? Yes/No/NA

DESIGN VERIFICATION CHECKLIST
DESIGN REVIEW METHOD

Yes/No/Not Applicable

- | | | |
|-----|--|-----------|
| 10. | Are the specified materials compatible with each other and the design environmental conditions to which the materials will be exposed? | Yes/No/NA |
| 11. | Have adequate maintenance features and requirements been satisfied? | Yes/No/NA |
| 12. | Are accessibility and other design provisions adequate for performance of needed maintenance and repair? | Yes/No/NA |
| 13. | Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life? | Yes/No/NA |
| 14. | Has the design properly considered radiation exposure to the public and plant personnel? (ALARA/cobalt reduction) | Yes/No/NA |
| 15. | Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have satisfactorily accomplished? | Yes/No/NA |
| 16. | Have adequate pre-operational and subsequent periodic test requirements been appropriately specified? | Yes/No/NA |
| 17. | Are adequate handling, storage, cleaning and shipping requirements specified? | Yes/No/NA |
| 18. | Are adequate identification requirements specified? | Yes/No/NA |
| 19. | Are the conclusions drawn in the Safety Evaluation fully supported by adequate discussion in the test or Safety Evaluation itself? | Yes/No/NA |
| 20. | Are necessary procedural changes specified and are responsibilities for such changes clearly delineated? | Yes/No/NA |
| 21. | Are requirements for record preparation, review, approval, retention, etc., adequately specified? | Yes/No/NA |
| 22. | Have supplemental reviews by other engineering disciplines (seismic, electrical, etc.) been performed on the integrated design package? | Yes/No/NA |

DESIGN VERIFICATION CHECKLIST
DESIGN REVIEW METHOD

Yes/No/Not Applicable

23. Have the drawings, sketches, calculations etc., included in the integrated design package been reviewed? Yes/No/NA
24. References used as part of the design review which are not listed as part of the design calculation/analysis.

DESIGN VERIFIER: G. Pham 11/17/92
Signature/Date

SE
Title

CALCULATION SHEET

Mod/Proj.No.	JAF-CALC-NBS-00223	Set 1A	Pg. 1 of 8
Subj/Title Q2DPT-116A,B-117A,B-118A,B-119A,B MS HI FLOW PCIS			QA Class I
Prep/Date: 11/16/92 <i>11/16/92</i>	Rev/Date GS 11/17/92	Rev. 1	Ap/Dt <i>11/17/92</i>

1.0 PURPOSE

Calculate instrument setpoints considering hardware drift and uncertainties for extension of the operating cycle from 18 to 24 months and power uprate.

This calculation is being prepared in accordance with the methodology outlined in ISA S.67-04 and IES-3

2.0 ASSUMPTIONS

- 2.1 Temperature and radiation levels in the relay room for the ATTS cabinets is assumed to be normal during the HELB in the reactor building or LOCA in the drywell. Control room and relay room have the same ventilation (air condition) system and do not contain any high energy lines as defined in the Standard Review Plan. EQ radiation calcs show mild rad. environment in these areas for all postulated accidents.
- 2.2 Final values of calculations will be rounded off to achieve a consistent calculation degree of accuracy.
- 2.3 No margin will be applied, since the methodology used in reference 3.12 is inherently conservative.
- 2.4 HELB or LOCA does not occur simultaneously with seismic event.
- 2.5 This Calculation assumes the following scenarios:
 - a) HELB in the Reactor building, no accident in the drywell.
 - b) LOCA or HELB in the drywell, no accident in the Reactor building.
- 2.6 It is assumed that this calculation (for loop Q2DPT-116C) is applicable to loops Q2DPT-116D, - 117C & D, - 118C & D, - 119C & D because the transmitters are located on the same rack and the loops are identical.
- 2.7 Reference 3.11 shows the worst case error for Insulation Resistance Effect (IRE) for the maximum lengths of various instrumentation cable types with various transmitters at JAF under the most severe accident conditions. The maximum error due to degradation of instrument cable insulation resistance is 0.5% of the span which occurs at the low end of the span. Since most setpoints are at the extreme low end of the span, a representative IRE is considered to be 75% of the magnitude of the maximum uncertainty. Thus, $IRE = 3/4 \times 0.5\% \times \text{span}$.

CALCULATION SHEET

Mod/Proj.No.	JAF-CALC-NBS-00223	Set 1A	Pg. 2 of 8
Subj/Title 02DPT-116A,B-117A,B 118A,B-119A,B MS HI FLOW PCIS			QA Class I
Prep/Date: 11/16/92 <i>JS</i>	Rev/Date <i>GS 11/17/92</i>	Rev. 1	Ap/Dt <i>11/17/92</i>

2.8 Master Trip Units Rosemount Model 510DU and 710DU are interchangeable. Uncertainty characteristics are the same for both units.

2.9 In accordance with reference 3.16 we assume the worst case Process Element uncertainty for the flow element to be 5% of the full span.

3.0 REFERENCES

- 3.1 JAFNPP Technical Specification Tables 3.2-1 Amend No. 122 Pg. 64, 4.2-1 Amend No. 136 Pg. 78.
- 3.2 JAFNPP Operating Procedure Section 1 Rev. 26.
- 3.3 Rosemount Model 1153 Series B Pressure Transmitters manual, Publication no. 4302.
- 3.4 Rosemount Model 510 DU Trip / Calibration System Operating Manual 4247-1.
- 3.4.1 Rosemount Model 710 Du Trip/ Calibration System Operating Manual 4471-1.
- 3.5 JAFNPP EQ Document: Environmental Parameters After Postulated LOCA and HELB Accidents Rev. 2, 4/17/90.
- 3.6 Rosemount letter dated October 4 1990 from T. J. Layer to G. Stranovsky specifying drift point based on testing.
- 3.7 ISA S67.04 Part 2 Draft 7, "Methodologies For Determination of Setpoints For Nuclear Safety - Related Instrumentations."
- 3.8 ISP - 100A Rev. 13, 100B Rev. 12, 100C Rev. 12, 100D Rev. 17; -101A Rev. 2, 101B Rev. 3, 101C Rev. 2, 101D Rev. 3; -202 Rev. 4.
- 3.9 JAFNPP ATS setpoint determination, dated 3/11/1985, EJS-09-85 from E. J. Schmidt to G. V. Dain - GE.
- 3.10 Drawings: 1.60-32 Rev. C, -38 Rev. C, -43 Rev. C; LP-02-38 Rev. 4, -40 Rev. 4; FE-4AU Rev. 3; OP-1-1 Rev. 11; FM-29A Rev. 22; SE-9ACK Rev. 2, -9ACW Rev. 2; LP-06-1 thru 4 Rev. 3; 7.71-4 Rev. A, -5 Rev. A; FP-27A Rev.14, -27B Rev. 11, 7.71-42 Rev.A, 7.71-42A, GE-528-51393.
- 3.11 General analysis of cable circuitry performance at JAFNPP, Ecotech, Inc., latest issue date 17 July 1987 ETR 2062.1, Rev.1.

CALCULATION SHEET

Mod/Proj.No.	JAF-CALC-NBS-00223	Set 1A	Pg. 3 of 8
Subj/Title 02DPT-116A,B-117A,B-118A,B-119A,B MS HI FLOW PCIS			QA Class I
Prep/Date: 11/16/92 <i>fy</i>	Rev/Date <i>GS</i> 11/17/92	Rev. 1	Ap/Dt <i>11/17/92</i>

- 3.12 NYPA IES-3 rev.0 Instrument Loop Accuracy Calculation.
- 3.13 Master Equipment List MEL dated 4/24/91.
- 3.14 JAFNPP I&C dept., Instrument Setpoint Log.
- 3.15 JAFNPP Document, JAF-RPT-MULT-00206: Consideration of Temperature - Induced Uncertainties in Automatic Actuation Setpoint, dated 3/4/91.
- 3.16 Telecon between F. Granitto and R. Sang of Permutit Co on 4-24-91
- 3.17 I&C handbook by Liptak, section 2.2.3 "on Venturi tubes, Flow nozzles and Flow tubes".
- 3.18 Test Equipment Maintenance Procedure TEM-09 for the analog Trip System Readout Assembly.
- 3.19 Telephone discussion between J. Lazarus - NYPA and T. Layer - Rosemount dated 5/1/91.
- 3.20 ASME MFC-3M-1985 - Measurement of Fluid Flow in Pipes Using Orifice, Nozzle and Venturi.
- 3.21 Telephone conversation between G. Stranovsky NYPA and Ed Schmidt GE dated 6/26/91.
- 3.22 GE-NE-187-40-1191 Dated Nov.1991 Final Up-rated Plant Conditions.
- 3.23 GE-NE-187-50-1191, NSSS Instrument Setpoint Evaluation.
- 3.24 JAF-CALC-NBI-00192, Hi Pressure Scram.

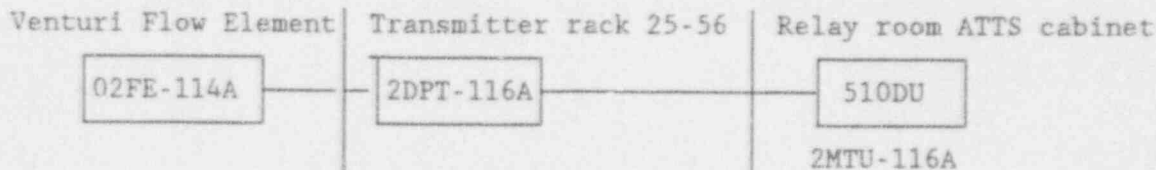
4.0 FUNCTIONAL DESCRIPTION

Transmitter 02DPT-116A is part of an instrument loop which initiates a primary containment isolation which is the closure of MSIVs to prevent core damage and excessive release of radioactivity to the environment due to main steam line high steam flow ($\leq 140\%$ of rated flow).

CALCULATION SHEET

Mod/Proj.No.	JAF-CALC-NBS-00223	Set 1A	Pg. 4 of 8
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Prep/Date: 11/16/92 <i>fy</i>	Rev/Date <i>GS 11/17/92</i>	Rev. 1	Ap/Dt <i>11/17/92</i>

5.0 BLOCK DIAGRAM



Uncertainty Allowances To Address

- (1) Process Measurement Effect
- (2) Equipment Uncertainties
- (3) Calibration Uncertainties
- (4) Other Uncertainties

6.0 DETERMINE UNCERTAINTY EQUATIONS

$$CU = \pm (PM^2 + PE^2 + e_1^2 + e_2^2 + IRE^2 + PS^2)^{1/2} - B$$

$$e = \pm \frac{(RA^2 + DR^2 + TE^2 + RE^2 + SE^2 + HE^2 + SP^2 + MTE^2)^{1/2}}{2}$$

In accordance with Ref. 3.7 the following applies:

PM : Effects are not applicable to this configuration/application

IRE: Based on Ref.3.11 and assumption 2.7, $IRE = 0.5\% \times 3/4 \times \text{span}$

B = 0 There are no known bias or dependent uncertainty based on review of Reference 3.3.

7.0 DETERMINE UNCERTAINTY DATA

7.1 In accordance with assumption 2.5, consider normal conditions in the drywell and HELB in the reactor building.

- a) Determine uncertainty associated with Flow Element - 02FE-114A, Permutit Model TG Venturi type.

PE = Primary element uncertainty

PE = $\pm 5\%$ of full span (ref.3.16, and assumption 2.9)

PE = $\pm 0.05 \times 116.8 \text{ psid}$

PE = $\pm 5.84 \text{ psid}$

CALCULATION SHEET

Mod/Proj.No.	JAF-CALC-NBS-00223	Set 1A	Pg. 5 of 8
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Prep/Date: 11/16/92 <i>FS</i>	Rev/Date <i>GS 11/17/92</i>	Rev. 1	Ap/Dt <i>11/17/92</i>

b) Calculate uncertainty associated with e = transmitter - Rosemount 1153DB7RC.

RA = Reference accuracy

RA = $\pm 0.25\%$ of calibrated span (ref. 3.3) = $\pm 0.0025 \times 150$

RA = ± 0.375 psid

DR = Drift

DR = $\pm 0.2\%$ of URL for 18 months. (ref. 3.6) For 30 months:

DR = $\pm [(0.002 \times 300)^2 + (0.002 \times 300 \times 12/18)^2]^{1/2}$

DR = ± 0.72 psid

TE = Temperature effect.

These components are required for Main Steam Line Break only.

MSLB accident does not cause a harsh environment in the Reactor Building therefore, TE = 0. The components are not required to function during a HELLB accident.

RE = Radiation Effect

In accordance with Ref.3.3, RE = $\pm 4.0\%$ of URL accuracy during and after testing to 2.2×10^7 rads.

Ref. 3.5 shows max. accident radiation in this area to be 1.45×10^2 rads. Since this is negligible compared to the tested level, this term is assumed to be 0.

SE = Seismic Effect

SE = Ref. 3.3 shows SE = $\pm 0.5\%$ of URL = $\pm 0.005 \times 300 = \pm 1.5$ psid.

Comparing the TE and SE, account for worst case SE. Set TE = 0

HE = Humidity Effect = 0 (ref. 3.3)

SP = Static pressure effect

SP = Ref. 3.3 shows static pressure effect to be $\pm 0.5\%$ of the URL per 1000 psi for code 7. Normal operating pressure of 1005 psi.

SP = $\pm 0.005 \times 300 \times 1005/1000 = \pm 1.51$ psid

MTE = Measurement and test equipment effect. Use US Gauge with accuracy of $\pm 0.5\%$ of span. (Use 0 - 150 psid span)

MTE = $\pm 0.005 \times 150 = \pm 0.75$ psid

Use fluke, range 0-20 V DC, accuracy 0.05% of reading +2 digits. Using 0 - 5 VDC, MTE= negligible.

Total MTE = ± 0.75 psid

PS = Power Supply Effect

PS = Ref. 3.3 = $\pm 0.01\%$ span per volt variation. For 24VDC assume + 2.5V.

PS = $\pm 2.5 \times 0.0001 \times 150 = \pm 0.038$ psid (negligible).

IRE = Insulation resistance effect

Since considering Seismic effect ($SE > [TE + IRE]$), set IRE = 0.

CALCULATION SHEET

Mod/Proj.No.	JAF-CALC-NBS-00223	Set 1A	Pg. 6 of 8
Subj/Title 02DPT-116A,B-117A,B-118A,B-119A,B MS HI FLOW PCIS			QA Class I
Prep/Date: 11/16/92 <i>JS</i>	Rev/Date 65 11/17/92	Rev. 1	Ap/Dt <i>JS</i> 11/17/92

$$e_1 = \pm(RA^2 + DR^2 + SE^2 + SP^2 + MTE^2)^{1/2}$$

$$e_1 = \pm(0.375^2 + 0.72^2 + 1.5^2 + 1.51^2 + 0.75^2)^{1/2}$$

$$e_1 = \pm 2.40 \text{ psid}$$

c) e_2 = Trip Unit

DR = Drift, Trip Unit Per Ref. 3.4

Rosemount 510 DU shows accuracy = $\pm 0.13\%$ of calculated span for 6 months. $DR = \pm 0.0013 \times 150 = \pm 0.195 \text{ psid}$.

Digital trip unit is utilized therefore $RA = 0$. (ref. 3.4)

TE, HE, RE = 0 (ass.2.1)

SP = N/A

SE = 0, (Exceeds seismic response spectra, operates up to 11g's)

MTE = Use Rosemount Digital Readout Assembly. Accuracy - .0625% of the span (16 mA) - negligible. ref. 3.18.

$$e_2 = \pm 0.195 \text{ psid}$$

- 7.2 In accordance with ass. 2.5, considering LOCA or HELB in the drywell and normal conditions in the reactor building. Calculations for this scenario are not pursued any further since these conditions do not affect the steam flow.

8.0 CALCULATE CHANNEL UNCERTAINTY.

For case 7.1 (normal conditions in the drywell, LOCA in RB):

$$CU = \pm(5.84^2 + 2.40^2 + 0.195^2 + 0.563^2)^{1/2} = 6.34 \text{ psid.}$$

9.0 OBTAIN ANALYTICAL LIMIT (AL)

Existing Conditions.

Our AL is Tech Spec limit $\leq 140\%$ of rated Flow. Rated flow is $2.618 \times 10^6 \text{ lb/hr}$. (Ref. instrument data sheet 234A9301RK)
 140% of rated flow is $3.665 \times 10^6 \text{ lb/hr}$. From the steam curve 528-51393 this flow corresponds to 269 feet of water. Multiplied by .4335 it corresponds to 116.6 psid.

CALCULATION SHEET

Mod/Proj.No.	JAF-CALC-NBS-00223	Set 1A	Pg. 7 of 8
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Prep/Date: 11/16/92 <i>JL</i>	Rev/Date 6S 11/17/92	Rev. 1	Ap/Dt <i>11/17/92</i>

For Power Uprate.

Rated flow is 2.618×10^6 lb/hr. This corresponds to 127.24 ft H₂O dif (from steam flow curve 528-51393). This corresponds to 55.1 psid.

Pow. Uprate will increase the steam flow by 4.8%. This increase corresponds to 2.618×10^6 lb/hr \times 4.8% = 2.7436×10^6 lb/hr. Ref. 3.22 and 3.23.

Our AL is Tech. Spec. limit $\leq 140\%$ of the power uprate flow.
 $2.7436 \times 10^6 \times 140\% = 3.841 \times 10^6$ lb/hr.

10.0 DETERMINE SETPOINT (TS)

For the existing conditions.

$$TS = AL - (CU + margin) = 116.6 - (6.34) = 110.26 \text{ psid.}$$

For the power uprate.

Due to increased pressure of 35 psia, the operating pressure will increase to 1055 psia (1040 psig).
 To be conservative we examine the setpoint near the power uprated Hi pressure trip, calculated to be ≤ 1062.47 psig or ≤ 1077 psia. (ref.3.24) Using the pressure correction curve dwg.7.71-42A, we re-drew the steam flow diagram 525-51393. Dotted line represents the corrected steam flow diagram for 1077 psia. The 3.841×10^6 lb/hr flow corresponds to approx. 275 feet of water, multiplied by .4335 is 119.2 psid. (Steam flow and pressure correction diagrams are attached)

$$TS = AL - (CU + margin) = 119.2 - 6.34 = 112.86 \text{ psid.}$$

CALCULATION SHEET

Mod/Proj.No.	JAF-CALC-NBS-00223	Set 1A	Pg. 8 of 8
Subj/Title 02DPT-116A,B-117A,B-118A,B-119A,B MS HI FLOW PCIS			QA Class I
Prep/Date: 11/16/92 <i>JG</i>	Rev/Date <i>63 11/17/92</i>	Rev. 1	Ap/Dt <i>11/17/92</i>

1.0 SUMMARY

Our present setpoint is ≤ 106 psid.

Calculation determined the setpoint to be ≤ 110.26 psid for the existing condition, and ≤ 112.86 psid for the power uprate.

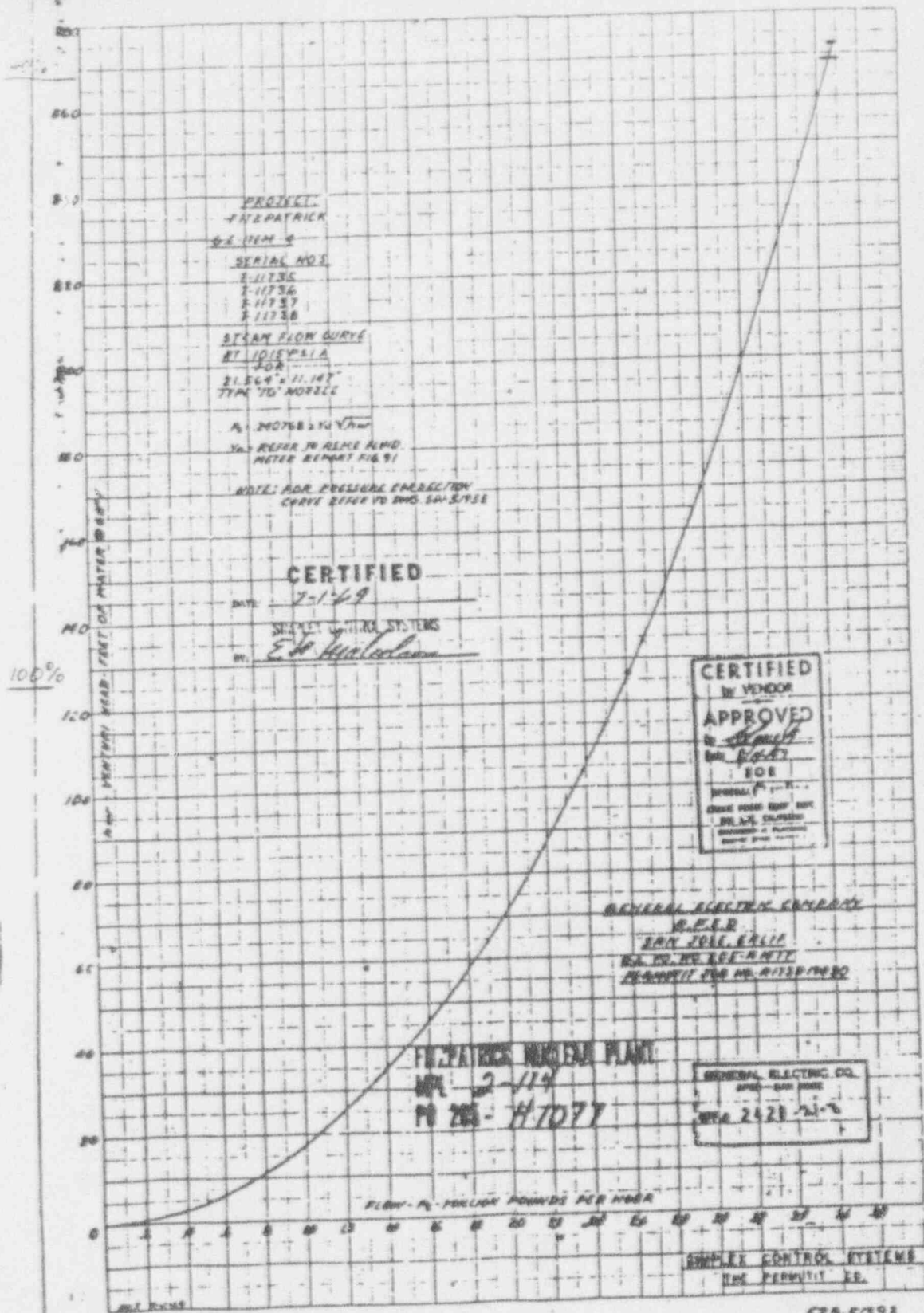
No Trip setpoint change is required.

Existing conditions
(1015 psia)

Power Uprate
(1077 psia)

Rated flow 55.1 psid
Tech. Spec. 116.6 psid
(140% RF)
Calc. setp. 110.26 psid
Actual setp. 106 psid

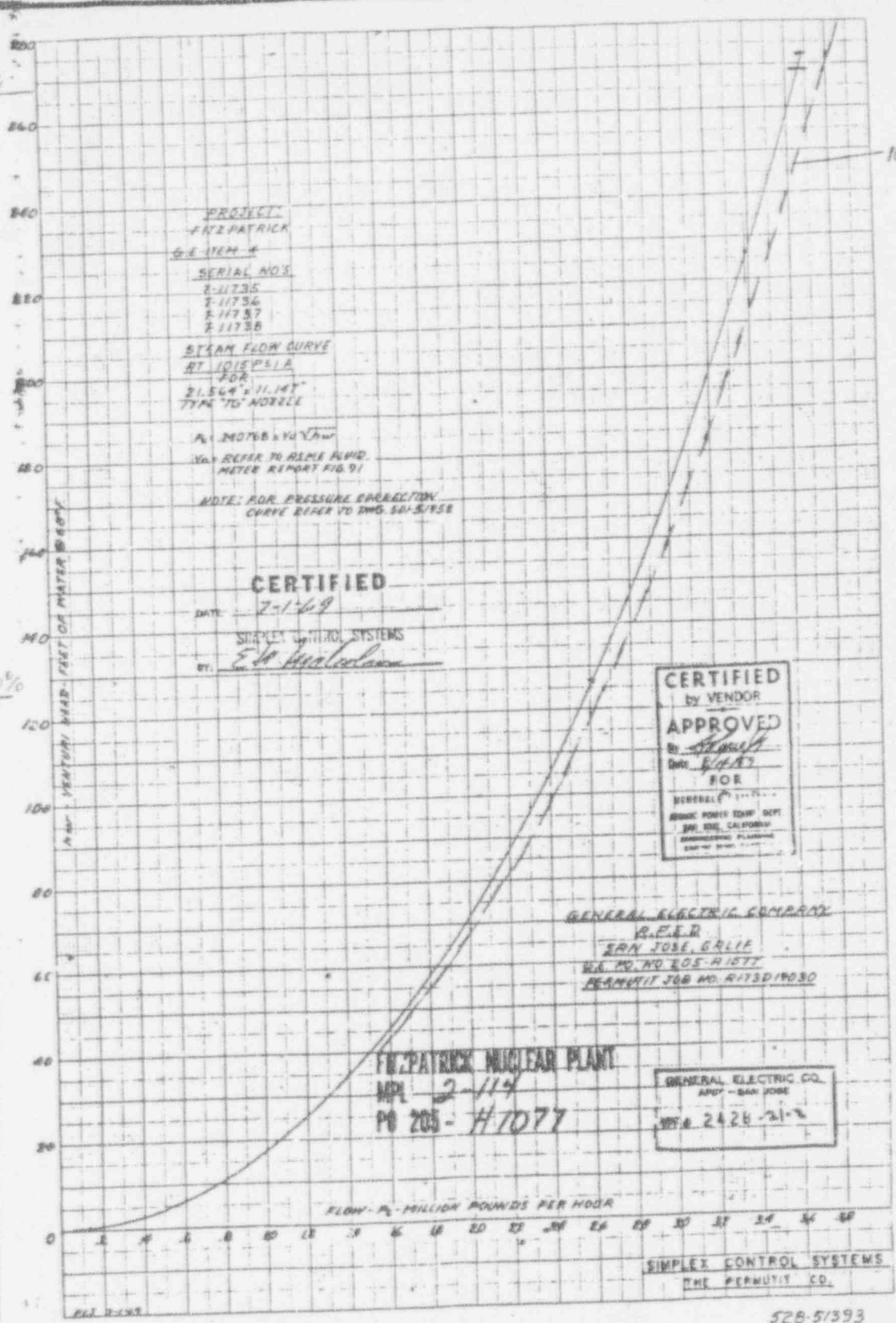
56.3 psid
119.2 psid
112.86 psid
106 psid



140%
249

1077 psia

100%
psia



JAMES A. FITZPATRICK NUCLEAR POWER PLANT

DOCUMENTATION OF TELEPHONE DISCUSSION

DATE: 6/26/91 TIME: 3pm MODIFICATION NO.: _____

SUBJECT: Steam flow setpoint 108 psid.

REFERENCES: 30 month plant extension, setpoint calculations

	NAME	ORGANIZATION
PARTICIPANTS:	<u>G. Stranovsky</u>	<u>NYPA</u>
	<u>Ed Schmidt</u>	<u>G.E.</u>
	_____	_____
	_____	_____

SUMMARY OF DISCUSSION: GS: We do not know how the existing setpoint ^{108 psid} shown on GE drawing 1.60-25 and approved by GE when we installed ATTS, equals 140% of the steam flow. Ed: After examining the pump curve, he has no idea why this number was chosen. It appears that 108 psid includes uncertainties associated with the flow element. It is a conservative number, but it does not represent 140% of the steam flow.

GS: We will use in our calculations 140% of rated flow = 116 psid. However, the existing setpoint 106 psid is OK.

AGREEMENTS/COMMITMENTS: _____

Prepared by: G. Stranovsky

Date: 6/27/91

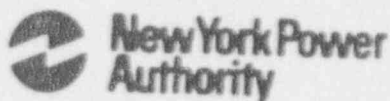
Title: Sen. O & M eng.

Reviewer: _____

Date: _____

Title: _____

Distribution: (other than participants)



NUCLEAR GENERATION DEPARTMENT - WHITE PLAINS

SENDING NUMBER: 914-681-6536

CONFIRMATION: 914-681-6276

DATE

6/24/91

TO: ED SCHMIDT - GE
408 - 925 - 4344

FROM: GEORGE STRANOVSKY

PHONE: 914-681-6854

NUMBER OF PAGES BEING SENT, INCLUDING COVER SHEET:

3

MESSAGE: FULL FLOW (140% of RATED FLOW) = 3.665×10^6 lb/hr at 269.64 ft H₂O diff.

$$269.64 \times (.4335) = 116.88 \text{ psid.}$$

RATED FLOW = 2.618×10^6 lb/hr at 127.24 ft H₂O diff.

$$127.24 \times (.4335) = 55.1 \text{ psid.}$$

How did you get 108 psid?
I must be missing something.

George.

GENERAL ELECTRIC

234A9301 RK

CONT ON SHEET 25 SH NO. 24

234A9301 RK		TITLE INSTRUMENT DATA SHEET		234A9301 RK	
CONT ON SHEET 25 SH NO. 24		FIRST MADE FOR FLOW ELEMENT			
* ITEM (TAG) NO	FE-2-109 A-B	FE-2-114 A-D			REVISIONS
* QUANTITY	2	4			4
* SERVICE	Recirc. Pump	Primary Steam			
	Flow	Flow Restrictor			
ELEMENT: TYPE					
MATERIAL					
PIPE SECTION LG					
* PROCESS FLUID	Demin. Water	Steam			
* DESIGN TEMP	575°F	575°F			
* DESIGN PRESS	1274 psig	1150 psig			
* MAX FLOW	70,000 gpm	3.56x10 ⁶ lb/hr (Notes 1 & 2)			
* NORMAL TEMP	532°F	550°F			
* NORMAL PRESS	1200 psig	1015 psig			
* NORMAL FLOW	45,400 gpm	2.618x10 ⁶ lb/hr @ 127.24 ft.			4
* SP GRAVITY	~1	2.34 lb/ft ³			
* LINE SIZE/SCH/MATL	28"/Min.Wall/SS	24"/100/CS			
TAP SIZE					
FLANGE SIZE/RATING					
* METER DIFF-MAX FLOW	1162.66 ft ³ /hr @ 70,000 gpm	4	289.64 ft ³ /hr @ 5888 lb/hr max flow	4	
CONN TO ITEM NO	FT-2-110A-D		FT-2-116-119		Note 1:
* REQD ACCURACY	± 1400 gpm		± 7.5 x10 ⁴ lb/hr		Flow range and
RATED ACCURACY					differential based
PURCHASE SPEC					on differential
VENDOR					press.switch op-
CAT NO					erator for steam
* LOCATION	Local	Local			line isolation
* P&ID	719E415BA	719E415BA			Note 2:
NOTES:	See Pur.Spec.	See Pur.Spec.			Choke flow
	21A136B & VPF	21A1058AJ	4	5.235x10 ⁶ lb/hr	4
	#2651-1-3	VPF			
SUPPLY	DB	DB			
Essential Class.	NE/A/-	E/A/1			
* TO BE FILLED IN BY APED					PRINTS TO
BWKS		DIV OR DEPT		234A9301 RK	
SAN JOSE, CALIF		LOCATION		CONT ON SHEET 25 SH NO. 24	
CI		CODE IDENT NO.			

NEW YORK POWER AUTHORITY
NUCLEAR ENGINEERING & DESIGN SECTION
TELEPHONE DISCUSSION DOCUMENTATION FORM

CALL DATE 4/24/91 TIME 3:15 PM OUTGOING XXX
INCOMING _____

BETWEEN Fernando Granitto OF THE AUTHORITY

AND Roger Sang OF PERMITIT CO.

AND _____ OF _____

REFERENCE _____

SUBJECT Permutit Venturi Type Flow Element, Model TG

DISCUSSION/ACTION:

On 4/24/91 at approx. 3:15 pm. I discussed with Applications Engineer Roger Sang
about the expected value for the uncertainty of the Main Steam Flow Element. Mr. R.
Sang explained that since the element for the Main Steam Flow was not calibrated
when it was installed, the accuracy would be in the range of .5% to 5% of the full
span. Mr. Sang would not commit to a set percentage since the flow element was
uncalibrated and the media being saturated steam. Previous discussions with Mr. R.
Sang resulted with the same conclusions as on the 4/24/91. Mr. R. Sang also stated
in these discussions that he would send documentation on the Venturi Flow Element.
As of the 4/24/91 I have not received the documentation.

DISTRIBUTION:

NUC GEN FILES NO. FG-01-91

MOD FILE NO. _____

Fernando Granitto
SIGNATURE

4/25/91
DATE

ATTACHMENT 3 TO JPN-93-016

NYPA Calculation JAF-CALC-NBS-00224, Revision 1,
"02DPT-116C,D; -117C,D; -118C,D; -119C,D Main Steam Hi Flow PCIS",
November 17, 1992

New York Power Authority
James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
DPR-59