PT = CALC

CALC. NO. JAF-CALC-NBS-00224 REV. 1 IP3 [ ] JAF [X]

MOD/TASK NO. _____

QA CATEGORY: I PRELIMINARY: _____ FINAL: X

PROJECT/TASK: Setpoint Calculations to extend operating cycle
SYSTEM NO./NAME: 002 / Nuclear Boiler (ADS)
TITLE: 02DPT-116C,D; -117C,D; -118C,D; -119C,D Main Steam Hi Flow PCIS

	NAME	SIGNATURE	DATE
DESIGN ENG.:			
PREPARER:	F. Granitto	F. Granitto	11/17/92
CHECKER:	G. Stranovsky	G. Stranovsky	11/17/92
VERIFIER: NO [ ]	G. Stranovsky	G. Stranovsky	11/17/92
APPROVED:	A. Petrenko	A. Petrenko	11/19/92

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.

DESIGN BASIS/ASSUMPTIONS

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 ≤ 112.96 psid 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.

002 NBS

CAT I

AFFECTED SYSTEMS/COMPONENTS/DOCUMENTS

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

[ ] VOIDED OR
[ ] SUPERSEDED BY: _____ (CALC. NO.)

[ ] VOIDS OR
[X] SUPERSEDES: Rev. 0 (CALC. NO.)

IP3 ☐

JAF ☑

INDEPENDENT DESIGN VERIFICATION
CONTROL SHEET

VERIFICATION OF: JAF-CALC-NBS-00274
Document Title/Number

SUBJECT: Main Steam High Flow PCIS

MOD/TASK NUMBER (If Applicable):

QA CATEGORY: I

DISCIPLINE REVIEW:	ELEC	MECH	C/S	I&C	OTHER (SPECIFY)
Check as required	☐	☐	☐	☒	☐
METHOD USED *:	DR			DR	
VERIFIER'S NAME:	G. STRANOVSKY				
VERIFIER'S INITIALS/DATE:	GS 11/17/92				

APPROVED 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-00224
Document/Title/Number

SUBJECT: Main Steam High Flow PCIS

MOD/TASK NO.: (If Applicable) _____

DISCIPLINE REVIEW

	EIEC	MECH	C/S	I&C	OTHER (SPECIFY)
Check as Required	☐	☐	☐	☒	☐

		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 inte face 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 partr, 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? 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. Brauer 11/17/92
Signature/Date

SE
Title

_____

CALCULATION SHEET

Mod/Proj.No.	JAF-CALC-NBS-00224	Set 1B	Pg. 1 of 8
Subj/Title 02DPT-116C,D-117C,D-118C,D-119C,D MS HI FLOW PCIS			QA Class I
Prep/Date: 11/16/92	Rev/Date GS 11/17/92	Rev.1	Ap/Dt 11/17/92

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 02DPT-116C) is applicable to loops 02DPT-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 lenghts 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 x 0.5% x span.

2.8 Master Trip Units Rosemount Model 510DU and 710DU are interchangable. 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, -48 Rev. C, -53 Rev. 6; LP-02-39 Rev. 4, -41 Rev. 4; FE-4AT Rev. 2; OP-1-1 Rev. 11; FM-29A Rev. 22; SE-9ADC Rev. 3, -9ACQ Rev. 4; LP-06-1 thru 4 Rev. 3; 7.71-4 Rev. A, -5 Rev. A; FP-27A Rev.14, -27B Rev.11, 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.

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 Permitut 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 Orfice, 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 Uprated Plant Conditions.

3.23 GE-NE-187-50-1191, NSSS Instrument Setpoint Evaluation.

3.24 JAF-CALC-NBI-00192 Reactor Hi Pressure Scram.

4.0 FUNCTIONAL DESCRIPTION

Transmitter 02DPT-116C 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).

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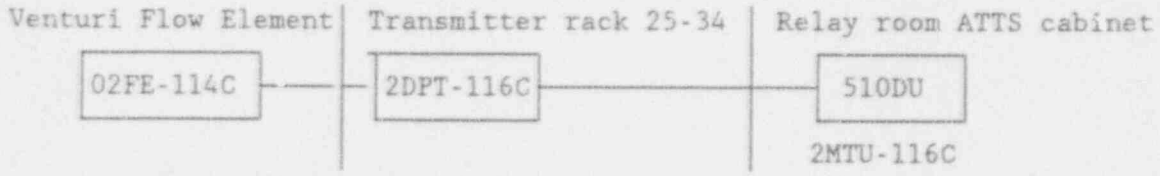
Subj/Title 02DPT-116C,D-117C,D-118C,D-119C,D MS HI FLOW PCIS			QA Class I
Prep/Date: 11/16/92	Rev/Date GE 11/17/92	Rev.1	Ap/Dt 11/17/92

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

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

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

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% x 3/4 x 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-114C, 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 x 116.8 psid
PE = $\pm$5.84 psid

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

RA = Reference accuracy
RA = ±0.25% of calibrated span (ref. 3.3) = ±0.0025 x 150
RA = ±0.375 psid

DR = Drift
DR = ±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 = ±0.72psid

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 HELB accident.

RE = Radiation Effect
In accordance with Ref.3.3, RE = ±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 = ±0.5% of URL = ±0.005 x 300 = ±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 ±0.5% of the URL per 1000 psi for code 7. Normal operating pressure of 1005 psi.
SP = ±0.005 x 300 x 1005/1000 = ±1.51 psid

MTE = Measurement and test equipment effect. Use US Gauge with accuracy of ±0.5% of span. (Use 0 - 150 psid span)
MTE = ±0.005 x 150 = ±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 = ±0.01% span per volt variation. For 24VDC assume + 2.5V.
PS = ±2.5 x 0.0001 x 150 = ±0.038 psid (negligible).

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

$e_1 = \pm(RA^2 + DR^2 + SE^2 + SP^2 + MTE^2)^{1/2}$
$e_1 = \pm(0.375^2 + 0.72^2 + 1.5^2 + 1.51^2 + 0.75^2)^{1/2}$
$e_1 = \pm 2.40$ psid

c) e_2 = Trip Unit

DR = Drift, Trip Unit Per Ref. 3.4
Rosemount 510 DU shows accuracy = ±0.13% of calculated span for 6 months. DR = ±0.0013 x 150 = ±0.195 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.

$e_2 = \pm 0.195$ 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, HELB in RB):

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

9.0 OBTAIN ANALYTICAL LIMIT (AL)

Our AL is Tech Spec limit ≤ 140% of rated Flow. Rated flow is 2.618×10^6 lb/hr. (From data sheet 234A9301RK). 140% of the rated flow is 3.665×10^6 lb/hr. From the steam curve 528-51393 this flow corresponds to 269 feet of water. Multiplied by .4335 it corresponds to 116.2 psid.

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For Power Uprate.

Rated flow is 2.618×10^6 lb/hr. This corresponds to 127.24 ft H_2O 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 x 4.8% = 2.7436×10^6 lb/hr. Ref.3.22 & 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 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 $\leq$ 1062.47 psig or $\leq$ 1077 psia. (Ref. 3.24) Using the pressure correction curve dwg. 7.71-42A, we re-drawed 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. (Attached are both flow and pressure correction diagrams)

TS = AL - (CU + margin) = 119.2 - 6.34 = 112.86 psid.

Mod/Proj.No.	JAF-CALC-NBS-00224	Set 1B	Pg. 8 of 8
Subj/Title 02DPT-116C,D-117C,D-118C,D-119C,D MS HI FLOW PCIS			QA Class I
Prep/Date: 11/16/92	Rev/Date GS 11/17/92	Rev.1	Ap/Dt 11/17/92

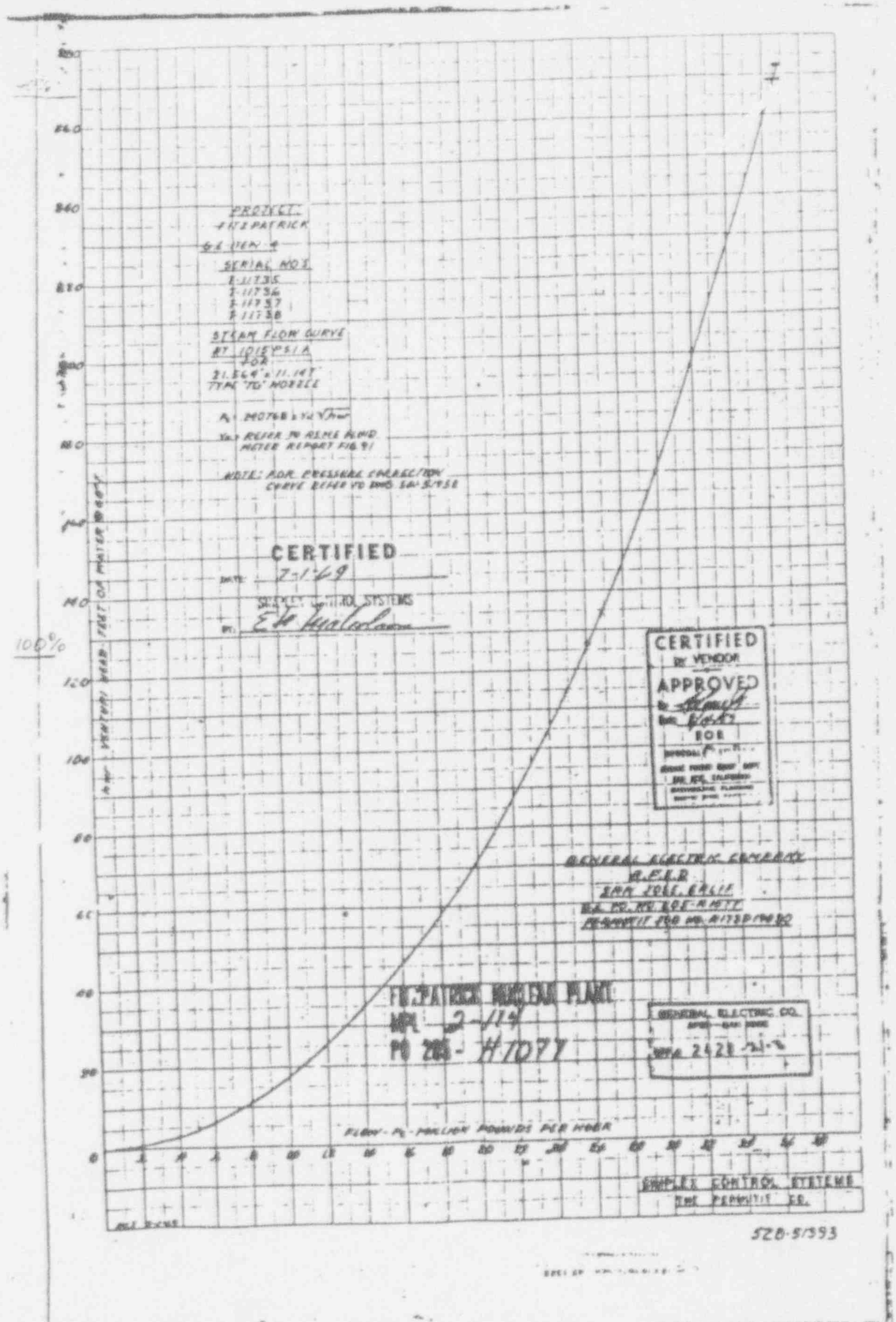
11.0 SUMMARY

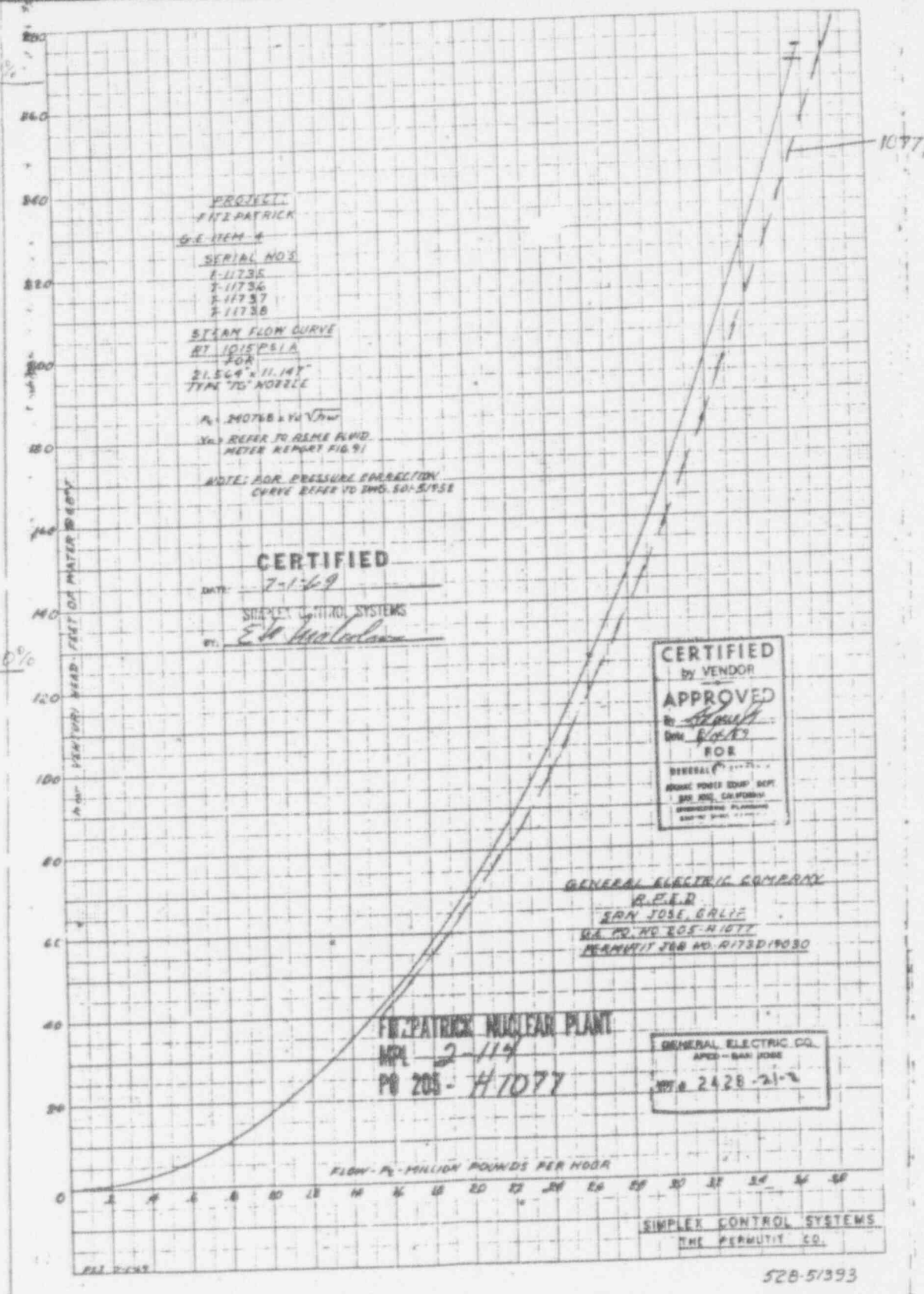
Our present setpoint is ≤106 psid.

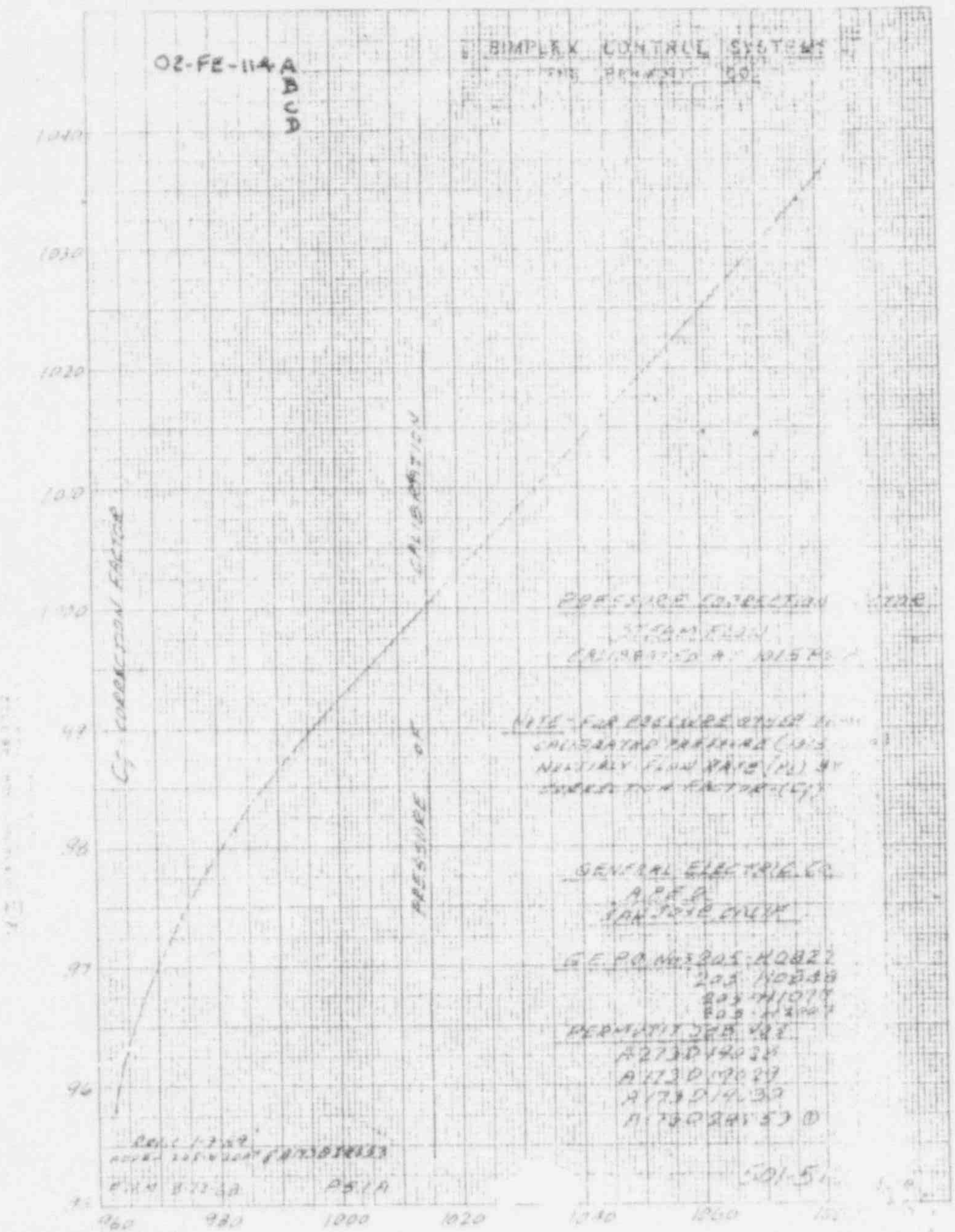
Calculation determined the setpoint to be ≤ 110.26 psid for the existing condition, and ≤ 112.86 psid for the power uprate.

No Trip setpoint change is required.

Existing Conditions 1015 psia		Power Uprate 1077 psia
Rated flow	55.1 psid	56.3 psid
Tech. Specs (140% RF)	116.6 psid	119.2 psid
Calc. Setpoint	110.26 psid	112.86 psid
Actual Setp.	106 psid	106 psid


PROJECT:
FITZPATRICK
GE ITEM 4
SERIAL NO'S
STEAM FLOW CURVE
FOR
TYPE "TG" NOZZLE
NOTE: FOR PRESSURE CORRECTION
CERTIFIED
CERTIFIED BY VENDOR
APPROVED
FOR
100%
GENERAL ELECTRIC COMPANY
SAN JOSE, CALIF.
FITZPATRICK NUCLEAR PLANT
GENERAL ELECTRIC CO.
FLOW - MILLION POUNDS PER HOUR
SIMPLEX CONTROL SYSTEMS
THE PERMUTIT CO.
52B-51393


PROJECT
FITZPATRICK
G.E. ITEM 4
SERIAL NOS.
1-11735
2-11736
3-11737
4-11738
STEAM FLOW CURVE
AT 1015 PSIA
FOR
21.564" x 11.141"
TYPE "D" NOZZLE
W = 340768 x Y d √hw
Y d = REFER TO ASME FLUID METER REPORT FIG 9.1
NOTE: FOR PRESSURE CORRECTION CURVE REFER TO DWG. 501-5/1958
CERTIFIED
DATE: 7-1-69
SIMPLEX CONTROL SYSTEMS
BY: E.H. MacLachlan
CERTIFIED by VENDOR
APPROVED
FOR
GENERAL ELECTRIC COMPANY
A.P.E.D.
SAN JOSE, CALIF.
U.S. PO. NO 205-H1077
PERMUTIT JOB NO. A173D19030
FITZPATRICK NUCLEAR PLANT
MPL 2-114
PO 205 - H1077
GENERAL ELECTRIC CO.
APED — SAN JOSE
SPEC # 2428-21-2
FLOW - Wt - MILLION POUNDS PER HOUR
SIMPLEX CONTROL SYSTEMS
THE PERMUTIT CO.
528-51393



JAMES A. FITZPATRICK NUCLEAR POWER PLANT
POWER AUTHORITY OF THE STATE OF NEW YORK

File No. 11825- 7.71-42A
Title Pr. Corre. Curve Main Steam Flow Element 02-FE-114A,B,C,D
Vendor P. O. No.

Equip. No.
Sent Design 5/6/71
From To WCP
Supersedes NEW
Superseded By
11825-

AUDITED MAY 07 1971 W.C.P.

Design Distribution
Mechanical
Electrical
Concrete
Steel
Architectural
Bldg. Service
Instruments
Hangers
Vessels

STATUS

STONE & WEBSTER ENG. CORP.
Date 5/6/71 By

11825-7.71-42A

New York Power Authority

TSSO-1
Figure 1

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 extention, setpoint calculations

PARTICIPANTS:	NAME	ORGANIZATION
	G. Stramowsky	NYPA
	Ed Schmidt	G.E.

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. Stramowsky Date: 6/27/91

Title: Sen. O & M eng.

Reviewer _____ Date: _____

Title: _____

Distribution: (other than participants)

New York Power Authority

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 H_2O diff.

$269.64 \times (.4335) = 116.88$ psid

RATED FLOW = 2.618×10^6 lb/hr at 127.24 ft H_2O diff.

$127.24 \times (.4335) = 55.1$ psid.

How did you get 108 psid ?

I must be missing something.

George

GENERAL ELECTRIC

234A9301 RK
CONT ON SHEET 25 SH NO. 24

REV NO 4

234A9301 RK
CONT ON SHEET 25 SH NO. 24

TITLE INSTRUMENT DATA SHEET

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		3.565x10^6 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 mm H$_2$O @ 70,000 gpm	4	229.64 ft. H$_2$O @ 588°F @ max flow	4				
CONN TO ITEM NO	FT-2-110A-D		FT-6-607 DPS-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			
	21A1368 & 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 (DRFT GR DEPT)
SAN JOSE, CALIF (LOCATION)

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CONT ON SHEET 25 SH NO. 24

CODE IDENT NO.

CI

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 PERMUTIT 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 committ 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 conlusions 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 4/25/91
SIGNATURE DATE