ENCLOSURE (5)

CA07018 Revision 0, Main Feedwater Pressure Input Uncertainty to the Caldon CheckPlus LEFM

Calvert Cliffs Nuclear Power Plant, Inc.
February 18, 2009

CALCULATION COVER SHEET

A. INITIATION

Site ☒ CCNPP ☐ NMP ☐ REG

Calculation No.: CA07018 Revision No.: 0

Vendor Calculation (Check one): ☒ Yes ☐ No

Responsible Group: Instrumentation and Controls

Responsible Engineer: David A. Dvorak

B. CALCULATION

ENGINEERING DISCIPLINE: ☐ Civil ☒ Instr & Controls ☐ Nuclear ☐ Electrical ☐ Mechanical ☐ Other

Title: MAIN FEEDWATER PRESSURE INPUT UNCERTAINTY TO CALDON CHECKPLUS LEFM

Unit ☒ 1 ☒ 2 ☐ ISFSI

Proprietary or Safeguards Calculation ☐ YES ☒ NO

Comments: ASSUMPTIONS 6.1 AND 6.5 REQUIRE VERIFICATION.

Vendor Calc No.: CCN-IC-09002 REVISION NO.: 0

Vendor Name: HURST TECHNOLOGIES

Safety Class (Check one): ☐ SR ☐ AUGMENTED QUALITY ☒ NSR

There are assumptions that require Verification during walkdown: Yes TRACKING ID:

This calculation **SUPERSEDES**: N/A

C. REVIEW AND APPROVAL:

Responsible Engineer: Hurst Technologies, Corp

Printed Name and Signature Date

Is Design Verification Required? ☐ Yes ☐ No

If yes, Design Verification Form is ☐ Attached ☐ Filed with:

Independent Reviewer:

Printed Name and Signature Date

Approval:

Printed Name and Signature Date

MAIN FEEDWATER PRESSURE INPUT UNCERTAINTY TO CALDON CHECKPLUS LEFM

For Calvert Cliffs Nuclear Power Plant
Units 1 & 2

Calculation No. CCN-IC-09002 Revision 0

Prepared By Hurst Technologies, Corp.

Project: CCNAKT

Client: Constellation Nuclear
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657-4702

Prepared By:	R.A. Hunter *Robert A. Hunter*	Date:	2/2/09
Checked By:	Kirk R. Melson *Kirk R. Melson*	Date:	2/2/09
Reviewed By:	Kirk R. Melson *Kirk R. Melson*	Date:	2/2/09
Approved By:	Tom H. Crawford III *Tom H. Crawford III*	Date:	2/2/09

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RECORD OF REVISIONS

Rev.	Date	Pages Involved	Description	Originator
0	02/02/09	All	Initial Issue	R.A. Hunter

1.0 PURPOSE

The purpose of this calculation is to determine the total device uncertainty of Main Feedwater pressure transmitters 1(2)-PT-1131A, B and 1(2)-PT-1141A, B (See Assumption 6.1), that provide input to the Caldon CheckPlus LEFM.

Uncertainties are calculated for normal operating (non-harsh) conditions only.

2.0 COMPONENT LISTING

This calculation applies to the following instruments:

Main Feedwater Pressure Transmitters

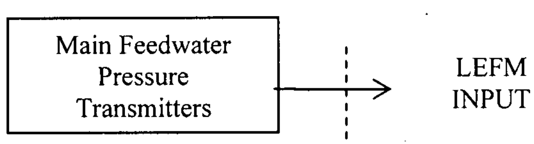
1-PT-1131A, B

2-PT-1131A, B

1-PT-1141A, B

2-PT-1141A, B

3.0 FIGURE



4.0 METHOD OF ANALYSIS

This calculation is performed in accordance with ES-028, Instrument Loop Uncertainty / Setpoint Methodology. This calculation utilizes the Square Root Sum of the Squares (SRSS) methodology when all variables are random, independent and normally distributed. Bias uncertainties are combined algebraically with random uncertainties.

This calculation only determines device uncertainties for Main Feedwater pressure transmitters: 1(2)PT-1131A, B and 1(2)PT-1141A, B.

5.0 DESIGN INPUTS

5.1 MAIN FEEDWATER PRESSURE SENSOR CONSIDERATIONS

TAG NUMBER:	1(2)-PT-1131A, B 1(2)-PT-1141A, B	[7.2]
MANUFACTURER:	Rosemount	[7.2]
MODEL NUMBER:	3051CG5	[7.2]
SPAN:	0 to 1300 psig	[7.2]
UPPER RANGE LIMIT (URL)	2000 psig	[7.1]

5.1.1 Per References 7.1, the Reference Accuracy for Range Code 5 transmitters with a turn down ratio (ratio of URL to Span) of less than 10:1 is ± 0.065% Span. Per Reference 7.1, URL for these transmitters is 2000 psig. Per Reference 7.2, span for these transmitters is 1300 psig, yielding a turn down ratio of 1.54:1 (result of 2000 /1300). Therefore, the sensor Reference Accuracy (RA_S) is given as:

$$RA_s = \pm 0.065\% \text{ Span}$$

5.1.2 Per Reference 7.2, the setting tolerance for these sensors is ± 0.25% Span. Therefore, the Sensor Setting Tolerance (ST_s) is:

$$ST_s = \pm 0.250\% \text{ Span}$$

5.1.3 For conservatism, and to provide flexibility in the choice of test equipment, the Sensor Measurement and Test Equipment Effect (MTE_S) is set equal to the sensor setting tolerance (ST_s). Therefore,

$$MTE_s = \pm 0.250\% \text{ Span}$$

5.1.4 The Drift term (DR_S) is given in Reference 7.1 as ± 0.125% URL for 5 years with temperature variation limited to within ± 50°F, and up to 1000 psi line pressure. Reference 7.1 shows URL for range code 5 transmitters is 2000 psi. Per Reference 7.3, Turbine Building Maximum / Minimum design temperatures are 110°F / 60°F, respectively, ensuring that maximum temperature variation is bounded by ±50°F. Line pressure effects are only applicable to differential pressure transmitters. Therefore, the Sensor Drift (DR_s) is given as:

$$DR_S = \pm\left(\frac{0.125\%\ \text{X}\ 2000\,\text{psi}}{1300\,\text{psi}}\ \text{X}\ 100\%\,\text{Span}\ \text{X}\ \frac{50^\circ\text{F}}{50^\circ\text{F}}\right)\%\,\text{Span}$$

$$DR_s = \pm\ 0.192\%\ \text{Span}$$

5.1.5 Per Reference 7.1, the Sensor Temperature Effect (TE_s) is given as ± (0.0125% URL + 0.0625% Span) per 50°F for Range Code 5. Per Section 7.1, URL for range code 5 transmitters is 2000 psi. Per Reference 7.3, Turbine Building Minimum / Maximum design temperatures are 60°F / 110°F, respectively. Using Minimum / Maximum temperatures for calibration temperature and normal operating temperature ensures that maximum temperature variation (±50°F) is considered in determination of TE_S. Therefore, the Sensor Temperature Effect (TE_s) is given as:

$$TE_s = \pm\ (0.0125\%\,\text{URL} + 0.0625\%\,\text{Span})\ \text{X}\ \frac{50^\circ\text{F}}{50^\circ\text{F}}$$

$$TE_s = \pm\left[\frac{0.0125\%\ \text{X}\ 2000\,\text{psi}}{1300\,\text{psi}} + 0.0625\%\,\text{Span}\right]\text{X}\ \frac{50^\circ\text{F}}{50^\circ\text{F}}$$

$$TE = \pm\ 0.082\%\ \text{Span}$$

5.1.6 Per Reference 7.1, Sensor Power Supply Effect (PSE_S) is less than ± 0.005% Span per volt variation. Reference 7.4 states that, for DC power supplies, considering a 5 volt variation in power supply voltage is conservative. Therefore PSE_S is determined as follows:

$$PSE_S = \pm\ \frac{0.005\%\,\text{Span}}{\text{volt}\,\text{DC}}\ \text{X}\ 5\,\text{volts}\,\text{DC}$$

$$PSE_S = \pm\ 0.025\%\ \text{Span}$$

Per Reference 7.4, uncertainties less than ±0.050% are considered negligible. Therefore,

$$PSE_S = \text{N/A}$$

5.1.7 Per Reference 7.1, Sensor Vibration Effect (VE_S) is negligible except at resonant frequencies. When at resonant frequencies, vibration effect is less than ± 0.1% of URL per g when tested between 15 and 2000 Hz in any axis relative to pipe-mounted process conditions. Per Assumption 6.2, vibration is bounded by 1 g at the test conditions described. Per Reference 7.1, URL for range code 5 transmitters addressed in this calculation is 2000 psi. Reference 7.2 shows calibrated span for these transmitters is 1300 psig. Therefore VE_S is determined as follows:

$$VE_S = \pm \frac{0.1\% \ X \ 2000\,\text{psi}}{1300\,\text{psi}}$$

$$VE_S = \pm\ 0.154\% \text{ Span}$$

5.1.8 Per Reference 7.1, Sensor RFI Effects (RFI_S) is ± 0.1% Span from 20 to 1000 MHz and for field strength up to 30 V/m. Per Assumption 6.3, transmitters addressed in this calculation are not exposed to RFI conditions beyond the limits stated in the specification. Therefore:

$$RFI_S = \pm\ 0.100\% \text{ Span}$$

5.2 PROCESS MEASUREMENT EFFECT CONSIDERATIONS

The transmitters addressed in this calculation are not yet installed, making precise determination of PMEb impossible at this time. It is, however, possible to determine the amount of elevation offset required to produce a statistically significant (i.e. ≥0.05% Span, per Reference 7.4) PMEb term, which can then be evaluated. This will be accomplished by determining the number of feet of elevation difference that would result in a PMEb term of either (+) or (-) 0.05% Span. Success of this process requires that transmitter calibration offsets are calculated and applied as stipulated on Reference 7.2. Per Assumption 6.4 this will be done prior to the initial calibration.

Reference 7.2 uses a conversion factor of 0.0361 psig / inH_2O to calculate offset. Multiplying the conversion factor by $(12\ in)^3\ /\ ft^3$ yields the calibration density, 62.3808 lbm/ft^3.

The following equation is used to calculate the PMEb due to sensing line density variations:

$$\text{PMEb} = \left(\frac{h(\rho_N - \rho_C)}{144}\right)\left(\frac{100\%\ \text{Span}}{1300\,\text{psi}}\right) \qquad \text{[EQ-1]}$$

where,
h = height of sensing line in feet
1300 psi = transmitter span
ρ_N = assumed sensing line fill fluid density during normal operation
ρ_C = assumed sensing line fill fluid density to determine bounding calibration offset

NOTE: The factor 144 is used to convert from lbf/ft^2 to lbf/in^2. At standard gravity, lbf may be replaced with lbm.

Solving for h, EQ-1 can be rearranged as follows as EQ-2:

$$h = \frac{\text{PMEb}\,\%\,\text{Span}\ X\,144\text{in}^2/\text{ft}^2\ X\,1300\,\text{psi}}{(\rho_N - \rho_C)\ X\ 100\%\ \text{Span})} \qquad \text{[EQ-2]}$$

where,
h = height of sensing line in feet (unknown)
PMEb = 0.05% Span

Per Reference 7.3, the design minimum temperature is 60°F and the design maximum temperature is 110°F. To ensure the most conservative result, 60°F is considered calibration temperature and 110°F is the maximum temperature during normal conditions. A conservative process pressure of 1000 psia is used for density determinations.

ρ_N @ 110°F / 1000 psia = 62.04833 lbm/ft^3 Reference 7.5
ρ_C @ 60°F / 1000 psia = 62.56809 lbm/ft^3 Reference 7.5

Note that the calibration density determined above (62.3808 lbm/ft^3) is bounded by these conservative densities ρ_N, and ρ_C.

Substituting in EQ-2 yields:

$$h = \frac{(0.05\%\,\text{Span})(144\,\text{in}^2/\text{ft}^2)(1300\,\text{psig})}{(62.04833 - 62.56809)\ \text{lbm}/\text{ft}^3\ (100\%\,\text{Span})}$$

$$h \approx -180.1 \text{ feet}$$

Note that the negative height is a result of the arbitrary selection of 60°F as calibration temperature and 110°F as maximum normal conditions temperature. Reversing these values would yield the same result, but with a positive value.

Evaluating the calculated h value indicates that any actual elevation difference between transmitter center line and process connection (or tubing high point) of ≤ 180 feet would yield a negligible PMEb of < 0.05% Span. As stated in Assumption 6.5 it is reasonable to assume that the actual elevation difference will be ≤ 180 feet. Therefore:

PMEb = N/A

6.0 ASSUMPTIONS

6.1 ***UNVERIFIED ASSUMPTION*** - It is assumed that a Unit 1 LEFM plant modification will be implemented such that the transmitter calibration, location, manufacturer / model, numbering, installations, and configurations will be as presented in this calculation.

6.2 It is assumed that pipe mounted process vibrations for the transmitters addressed in this calculations are limited to 1 g between 15 and 2000 Hz in any axis.

6.3 It is assumed that transmitter RFI at the location of all transmitters addressed in this calculation is limited to 20 to 1000 MHz, and field strength of 30 V/m.

6.4 It is assumed that transmitter head correction (calibration values offset) is calculated and applied as part of the initial calibration of each transmitter addressed in this calculation, in accordance with the procedure stipulated in Reference 7.2.

6.5 ***UNVERIFIED ASSUMPTION*** - It is assumed that the elevation difference between transmitter centerline and process connection (or high point) is less than 180 feet. This limiting value is conservatively calculated in Section 5.2 to determine the elevation difference that would result in a significant PMEb term. The validity of this assumption is based on the expected elevation difference of less than 10 feet.

7.0 REFERENCES

7.1 Rosemount 3051 Product Data Sheet 00813-0100-4001, Rev. HA, March 2008 (excerpt included in this calculation as Attachment 1)

7.2 BGE Master Calibration Data Sheets (MCDS's):

COMPONENT	REVISION
1-PT-1131A	0*
1-PT-1131B	0*
1-PT-1141A	0*
1-PT-1141B	0*
2-PT-1131A	0
2-PT-1131B	0
2-PT-1141A	0
2-PT-1141B	0

*Unit 1 MCDS's not yet produced (see Assumption 6.1). Initial issue for these new instruments will be Rev. 0.

7.3 BG&E Updated Final Safety Analysis Report, Table 9-18, Revision 38

7.4 Calvert Cliffs Engineering Standard ES-028, "Instrument Loop Uncertainty and Setpoint Methodology", Revision 1

7.5 ASME Steam Tables, 1967

8.0 IDENTIFICATION OF COMPUTER CODES

NONE

9.0 CALCULATION

This calculation determines the Total Device Uncertainty (TDU) and Segment Uncertainty (LU) for Main Feedwater Pressure transmitters that provide input to the LEFM.

9.1 TOTAL DEVICE UNCERTAINTIES

Main Feedwater Pressure Transmitter Uncertainty

The normal uncertainties associated with the sensor (TDU_S) are given as:

$$TDU_S = \pm \sqrt{RA_S^2 + ST_S^2 + MTE_S^2 + DR_S^2 + TE_S + VE_S^2 + RFI_S^2}$$

$TDU_S = \pm\ 0.454\ \%\ \text{Span}$

9.2 SEGMENT UNCERTAINTIES

With only the sensor being addressed in this calculation, there is only one loop segment, comprised of the sensor itself. Therefore loop segment uncertainty (LU1) is equal to TDU_S. Accordingly, LU1 is presented below with results in % Span units and in engineering units (psi), based on a calibrated span of 0 to 1300 psi.

Segment 1: Sensor

The segment uncertainty (LU1) is given as:

$LU1 = \pm\ TDU_s$, therefore:

$LU1 = \pm\ 0.454\%\ \text{Span} = \pm\ 5.902\ \text{psi}$

10.0 CONCLUSIONS

The total device uncertainty (TDU_S) and segment uncertainty (LU1) for the Main Feedwater Pressure transmitters that provide input to the LEFM are as follows:

$TDU_S = \pm\ 0.454\%\ \text{Span} = \pm\ 5.902\ \text{psi}$

$LU1 = \pm\ 0.454\%\ \text{Span} = \pm\ 5.902\ \text{psi}$

ATTACHMENTS

Attachment 1 – Excerpt from Rosemount 3051 Product Data Sheet 00813-0100-4001, Rev. HA, March 2008 [4 pages]

Specifications

PERFORMANCE SPECIFICATIONS

Total Performance is based on combined errors of reference accuracy, ambient temperature effect, and static pressure effect.

This product data sheet covers both HART and fieldbus protocols unless specified.

Conformance To Specification (±3σ (Sigma))

Technology leadership, advanced manufacturing techniques and statistical process control ensure specification conformance to at least ±3σ.

Reference Accuracy(1)

Models	Standard	High Accuracy Option
3051CD, 3051CG		
Range 0 (CD)	±0.10% of span For spans less than 2:1, accuracy = ±0.05% of URL	
Range 1	±0.10% of span For spans less than 15:1, accuracy = $\pm\left[0.025 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span	
Ranges 2-5	±0.065% of span For spans less than 10:1, accuracy = $\pm\left[0.015 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span	Ranges 2-4 High Accuracy Option, P8 ±0.04% of span For spans less than 5:1, accuracy = $\pm\left[0.015 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span
3051T		
Ranges 1-4	±0.065% of span For spans less than 10:1, accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span	Ranges 2-4 High Accuracy Option, P8 ±0.04% of span For spans less than 5:1, accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span
Range 5	±0.075% of span For spans less than 10:1, accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span	
3051CA		
Ranges 1-4	±0.065% of span For spans less than 10:1, accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span	Ranges 2-4 High Accuracy Option, P8 ±0.04% of span For spans less than 5:1, accuracy = $\pm\left[0.0075\left(\frac{URL}{Span}\right)\right]$% of Span
3051H/3051L		
All Ranges	±0.075% of span For spans less than 10:1, accuracy = $\pm\left[0.025 + 0.005\left(\frac{URL}{Span}\right)\right]$% of Span	

(1) For FOUNDATION fieldbus transmitters, use calibrated range in place of span. For zero based spans, reference conditions, silicone oil fill, SST materials, Coplanar flange (3051C) or 1/2 in. - 18 NPT (3051T) process connections, digital trim values set to equal range points.

Total Performance

For ±50 °F (28 °C) temperature changes, up to 1000 psi (6,9 MPa) line pressure (CD only), from 1:1 to 5:1 rangedown.

Models		Total Performance
3051C		
	Ranges 2-5	±0.15% of span
3051T		
	Ranges 1-4	±0.15% of span

Long Term Stability

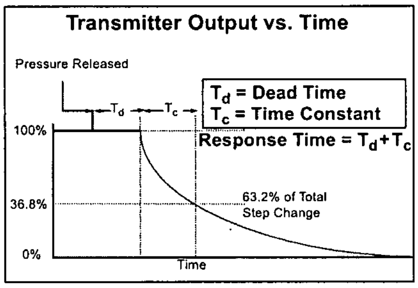
Models		Long Term Stability
3051C		
	Ranges 2-5	±0.125% of URL for 5 years ±50 °F (28 °C) temperature changes, and up to 1000 psi (6,9 MPa) line pressure.
3051CD Low/Draft Range		
	Ranges 0-1	±0.2% of URL for 1 year
3051T		
	Ranges 1-4	±0.125% of URL for 5 years ±50 °F (28 °C) temperature changes, and up to 1000 psi (6,9 MPa) line pressure.
Rosemount 3051H		
	Ranges 2-3	±0.1% of URL for 1 year
	Ranges 4-5	±0.2% of URL for 1 year

Dynamic Performance

	4 - 20 mA (*HART* protocol)(1)	Fieldbus protocol(3)
Total Response Time (T_d + T_c)(2):		
3051C, Ranges 2-5:	100 ms	152 ms
Range 1:	255 ms	307 ms
Range 0:	700 ms	752 ms
3051T:	100 ms	152 ms
3051H/L:	Consult factory	Consult factory
Dead Time (Td)	45 ms (nominal)	97 ms
Update Rate	22 times per second	22 times per second

(1) Dead time and update rate apply to all models and ranges; analog output only
(2) Nominal total response time at 75 °F (24 °C) reference conditions.
(3) Transmitter fieldbus output only, segment macro-cycle not included.

Typical HART Transmitter Response Time



Line Pressure Effect per 1000 psi (6,9 MPa)

For line pressures above 2000 psi (13,7 MPa) and Ranges 4-5, see user manual (Rosemount publication number 00809-0100-4001).

Models		Line Pressure Effect
3051CD		Zero Error(1)
	Range 0	±0.125% of URL/100 psi (6,89 bar)
	Range 1	±0.25% of URL/1000 psi (68,9 bar)
	Ranges 2-3	±0.05% of URL/1000 psi (68,9 bar) for line pressures from 0 to 2000 psi (0 to 13,7 MPa)
		Span Error
	Range 0	±0.15% of reading/100 psi (6,89 bar)
	Range 1	±0.4% of reading/1000 psi (68,9 bar)
	Ranges 2-3	±0.1% of reading/1000 psi (68,9 bar)
3051HD		Zero Error(1)
	All Ranges	±0.1% of URL/1000 psi (68,9 bar) for line pressures from 0 to 2000 psi (0 to 13,7 MPa)
		Span Error
	All Ranges	±0.1% of reading/1000 psi (68,9 bar)

(1) Can be calibrated out at line pressure.

Ambient Temperature Effect per 50°F (28°C)

Models		Ambient Temperature Effect
3051CD/CG		
	Range 0	±(0.25% URL + 0.05% span)
	Range 1	±(0.1% URL + 0.25% span)
	Ranges 2-5	±(0.0125% URL + 0.0625% span) from 1:1 to 5:1
		±(0.025% URL + 0.125% span) from 5:1 to 100:1
3051T		
	Range 1	±(0.025% URL + 0.125% span) from 1:1 to 10:1
		±(0.05% URL + 0.125% span) from 10:1 to 100:1
	Range 2-4	±(0.025% URL + 0.125% span) from 1:1 to 30:1
		±(0.035% URL + 0.125% span) from 30:1 to 100:1
	Range 5	±(0.1% URL + 0.15% span)
3051CA		
	All Ranges	±(0.025% URL + 0.125% span) from 1:1 to 30:1
		±(0.035% URL + 0.125% span) from 30:1 to 100:1
3051H		
	All Ranges	±(0.025% URL + 0.125% span + 0.35 inH_2O) from 1:1 to 30:1
		±(0.035% URL + 0.125% span + 0.35 inH_2O) from 1:1 to 30:1
3051L		See Rosemount Inc. Instrument Toolkit® software.

Mounting Position Effects

Models	Mounting Position Effects
3051C	Zero shifts up to ±1.25 inH_2O (3,11 mbar), which can be calibrated out. No span effect.
3051H	Zero shifts up to ±5 inH_2O (12,43 mbar), which can be calibrated out. No span effect.
3051L	With liquid level diaphragm in vertical plane, zero shift of up to 1 inH_2O (2,49 mbar). With diaphragm in horizontal plane, zero shift of up to 5 inH_2O (12,43 mbar) plus extension length on extended units. All zero shifts can be calibrated out. No span effect.
3051T/CA	Zero shifts up to 2.5 inH_2O (6,22 mbar), which can be calibrated out. No span effect.

Vibration Effect

All Models

Measurement effect due to vibrations is negligible except at resonance frequencies. When at resonance frequencies, vibration effect is less than ±0.1% of URL per g when tested between 15 and 2000 Hz in any axis relative to pipe-mounted process conditions.

Power Supply Effect

All Models

Less than ±0.005% of calibrated span per volt.

RFI Effects

All Models

±0.1% of span from 20 to 1000 MHz and for field strength up to 30 V/m.

Transient Protection (Option Code T1)

All Models:

Meets IEEE C62.41, Category B
- 6 kV crest (0.5 µs - 100 kHz)
- 3 kV crest (8 × 20 microseconds)
- 6 kV crest (1.2 × 50 microseconds)

Meets IEEE C37.90.1, Surge Withstand Capability
- SWC 2.5 kV crest, 1.25 MHz wave form

General Specifications:
- Response Time: < 1 nanosecond
- Peak Surge Current: 5000 amps to housing
- Peak Transient Voltage: 100 V dc
- Loop Impedance: < 25 ohms
- Applicable Standards: IEC61000-4-4, IEC61000-4-5

NOTE:
Calibrations at 68 °F (20 °C) per ASME Z210.1 (ANSI)

FUNCTIONAL SPECIFICATIONS

Range and Sensor Limits

TABLE 1. 3051CD, 3051CG, 3051L, and 3051H Range and Sensor Limits

Range	Minimum Span 3051CD(1), CG, L, H	Range and Sensor Limits Upper (URL)	Lower (LRL) 3051C Differential	3051C/ Gage	3051L Differential	3051L Gage	3051H Differential	3051H Gage
0	0.1 inH_2O (0,25 mbar)	3.0 inH_2O (7,47 mbar)	–3.0 inH_2O (-7,47 mbar)	NA	NA	NA	NA	NA
1	0.5 inH_2O (1,2 mbar)	25 inH_2O (62,3 mbar)	–25 inH_2O (–62,1 mbar)	–25 inH_2O (–62,1 mbar)	NA	NA	NA	NA
2	2.5 inH_2O (6,2 mbar)	250 inH_2O (0,62 bar)	–250 inH_2O (–0,62 bar)	–250 inH_2O (–0,62 bar)	–250 inH_2O (–0,62 bar)	–250 inH_2O (–0,62 bar)	–250 inH_2O (–0,62 bar)	–250 inH_2O (–0,62 bar)
3	10 inH_2O (24,9 mbar)	1000 inH_2O (2,49 bar)	–1000 inH_2O (–2,49 bar)	0.5 psia (34,5 mbar abs)	–1000 inH_2O (–2,49 bar)	0.5 psia (34,5 mbar abs)	–1000 inH_2O (–2,49 bar)	0.5 psia (34,5 mbar abs)
4	3 psi (0,20 bar)	300 psi (20,6 bar)	–300 psi (–20,6 bar)	0.5 psia (34,5 mbar abs)	–300 psi (–20,6 bar)	0.5 psia (34,5 mbar abs)	–300 psi (–20,6 bar)	0.5 psia (34,5 mbar abs)
5	20 psi (1,38 bar)	2000 psi (137,9 bar)	– 2000 psi (–137,9 bar)	0.5 psia (34,5 mbar abs)	NA	NA	– 2000 psi (–137,9 bar)	0.5 psia (34,5 mbar abs)

(1) Range 0 only available with 3051CD. Range 1 only available with 3051CD or 3051CG.

TABLE 2. Range and Sensor Limits

Range	3051CA Minimum Span	Range and Sensor Limits Upper (URL)	Lower (LRL)
1	0.3 psia (20,6 mbar)	30 psia (2,07 bar)	0 psia (0 bar)
2	1.5 psia (0,103 bar)	150 psia (10,3 bar)	0 psia (0 bar)
3	8 psia (0,55 bar)	800 psia (55,2 bar)	0 psia (0 bar)
4	40 psia (2,76 bar)	4000 psia (275,8 bar)	0 psia (0 bar)

Range	3051T Minimum Span	Range and Sensor Limits Upper (URL)	Lower (LRL)	Lower(1) (LRL) (Gage)
1	0.3 psi (20,6 mbar)	30 psi (2,07 bar)	0 psia (0 bar)	–14.7 psig (–1,01 bar)
2	1.5 psi (0,103 bar)	150 psi (10,3 bar)	0 psia (0 bar)	–14.7 psig (–1,01 bar)
3	8 psi (0,55 bar)	800 psi (55,2 bar)	0 psia (0 bar)	–14.7 psig (–1,01 bar)
4	40 psi (2,76 bar)	4000 psi (275,8 bar)	0 psia (0 bar)	–14.7 psig (–1,01 bar)
5	2000 psi (137,9 bar)	10000 psi (689,4 bar)	0 psia (0 bar)	–14.7 psig (–1,01 bar)

(1) Assumes atmospheric pressure of 14.7 psig.

ENCLOSURE (6)

Letter from C. R. Hastings (Cameron) to Document Control Desk (NRC), dated February 6, 2009, Application for Withholding Proprietary Information from Public Disclosure

Measurement Systems

Caldon® Ultrasonics Technology Center
1000 McClaren Woods Drive
Coraopolis, PA 15108
Tel 724-273-9300
Fax 724-273-9301
www.c-a-m.com

CAMERON

February 6, 2009
CAW 09-03

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject:

1. Caldon® Ultrasonics Engineering Report: ER-507 Rev. 2, "Bounding Uncertainty Analysis for Thermal Power Determination at Calvert Cliffs Using the LEFM✓ + System"
2. Caldon® Ultrasonics Engineering Report No. ER-724 Rev. 1, "Meter Factor Calculation and Accuracy Assessment for Calvert Cliffs Nuclear Plant Unit 2"
3. Caldon® Ultrasonics Engineering Report No. ER-727 Rev. 2, "Meter Factor Calculation and Accuracy Assessment for Calvert Cliffs Nuclear Plant Unit 1"

Gentlemen:

This application for withholding is submitted by Cameron International Corporation, a Delaware Corporation (herein called "Cameron") on behalf of its operating unit, Caldon Ultrasonics Technology Center, pursuant to the provisions of paragraph (b)(1) of Section 2.390 of the Commission's regulations. It contains trade secrets and/or commercial information proprietary to Cameron and customarily held in confidence.

The proprietary information for which withholding is being requested is identified in the subject submittal. In conformance with 10 CFR Section 2.390, Affidavit CAW 09-03 accompanies this application for withholding setting forth the basis on which the identified proprietary information may be withheld from public disclosure.

Accordingly, it is respectfully requested that the subject information, which is proprietary to Cameron, be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to this application for withholding or the accompanying affidavit should reference CAW 09-03 and should be addressed to the undersigned.

Very truly yours,

CR Hastings

Calvin R. Hastings
General Manager

Enclosures (Only upon separation of the enclosed confidential material should this letter and affidavit be released.)

February 6, 2009
CAW 09-03

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared Calvin R. Hastings, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Cameron International Corporation, a Delaware Corporation (herein called "Cameron") on behalf of its operating unit, Caldon Ultrasonics Technology Center, and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

CR Hastings
Calvin R. Hastings
General Manager

Sworn to and subscribed before me

this 6th day of

February, 2009

Joann B. Thomas
Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Joann B. Thomas, Notary Public
Findlay Twp., Allegheny County
My Commission Expires July 28, 2011
Member, Pennsylvania Association of Notaries

1. I am the General Manager of Caldon Ultrasonics Technology Center, and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rulemaking proceedings, and am authorized to apply for its withholding on behalf of Cameron.

2. I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Cameron application for withholding accompanying this Affidavit.

3. I have personal knowledge of the criteria and procedures utilized by Cameron in designating information as a trade secret, privileged or as confidential commercial or financial information. The material and information provided herewith is so designated by Cameron, in accordance with those criteria and procedures, for the reasons set forth below.

4. Pursuant to the provisions of paragraph (b) (4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

   (i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Cameron.

   (ii) The information is of a type customarily held in confidence by Cameron and not customarily disclosed to the public. Cameron has a rational basis for determining the types of information customarily held in confidence by it and, in that connection utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Cameron policy and provides the rational basis required. Furthermore, the information is submitted voluntarily and need not rely on the evaluation of any rational basis.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Cameron's competitors without license from Cameron constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, and assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Cameron, its customer or suppliers.

(e) It reveals aspects of past, present or future Cameron or customer funded development plans and programs of potential customer value to Cameron.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Cameron system, which include the following:

(a) The use of such information by Cameron gives Cameron a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Cameron competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Cameron ability to sell products or services involving the use of the information.

(c) Use by our competitor would put Cameron at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Cameron of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Cameron in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Cameron capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence, and, under the provisions of 10 CFR §§ 2. 390, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld are the submittals titled:

- Caldon® Ultrasonics Engineering Report: ER-507 Rev. 2, "Bounding Uncertainty Analysis for Thermal Power Determination at Calvert Cliffs Using the LEFM✓+ System"
- Caldon® Ultrasonics Engineering Report No. ER-724 Rev. 1, "Meter Factor Calculation and Accuracy Assessment for Calvert Cliffs Nuclear Plant Unit 2"
- Caldon® Ultrasonics Engineering Report No. ER-727 Rev. 2, "Meter Factor Calculation and Accuracy Assessment for Calvert Cliffs Nuclear Plant Unit 1"

It is designated therein in accordance with 10 CFR §§ 2.390(b)(1)(i)(A,B), with the reason(s) for confidential treatment noted in the submittal and further described in this affidavit. This information is voluntarily submitted for use by the NRC Staff in their review of the accuracy assessment of the proposed methodology for LEFM CheckPlus Systems used by Calvert Cliffs NPP Unit 1 and 2 for an MUR UPRATE.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Cameron because it would enhance the ability of competitors to provide similar flow and temperature measurement systems and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Cameron effort and the expenditure of a considerable sum of money.

In order for competitors of Cameron to duplicate this information, similar products would have to be developed, similar technical programs would have to be performed, and a significant manpower effort, having the requisite talent and experience, would have to be expended for developing analytical methods and receiving NRC approval for those methods.

Further the deponent sayeth not.

ATTACHMENT (2)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

DATED NOVEMBER 17, 2008- MEASUREMENT UNCERTAINTY

RECAPTURE POWER UPRATE

Responses to Reactor Systems Branch request for Additional Information (RAI) dated November 17, 2008

RAI 1:

What are the instructions for transducer replacement uncertainty described in ER-551P, "LEFM CheckPlus Transducer Installation Sensitivity," Revision 3, Dated April 2008?

CCNPP Response:

Transducer replacement uncertainty (or transducer installation variability) has been included in the vendor's calculation of meter uncertainty, Cameron Measurement Systems (Caldon Ultrasonics) Engineering Report ER-507 (Reference 1). This value, 0.16% per LEFM CheckPlus meter, is based upon the results of ER-551P, Revision 3. Since this value is included as part of the original calculations, no additional uncertainty term needs to be applied whenever a transducer is replaced.

RAI 2:

Describe and provide drawings of the location where the ultrasonic flow meters will be installed in the 16" feedwater header for each steam generator.

CCNPP Response:

For both units, the flow meter spool pieces are installed in the Turbine Building downstream of the feedwater regulating valves.

Unit 1: (Refer to Figures 1, 3, and 4)

For 11 Feedwater Header (Loop A of Figure 1), the feedwater piping drops approximately 5'4" below the feedwater regulating valve, then turns south for approximately 9' before turning to the west. The flowmeter is located in the East-West pipe run, approximately 3'3" from the exit of the 90 degree elbow located upstream of the spool piece.

For 12 Feedwater Header (Loop B of Figure 1), the feedwater piping drops approximately 5'4" below the feedwater regulating valve, then turns south for approximately 12' before turning to the west. The flowmeter is located in the East-West pipe run, approximately 7' from the exit of the 90 degree elbow located upstream of the spool piece.

Unit 2: (Refer to Figures 2 and 5)

For 21 Feedwater Header (Loop A of Figure 2), the feedwater piping drops approximately 7'4" below the feedwater regulating valve, then turns west. The flowmeter is located in the East-West pipe run, approximately 3'3" from the exit of the 90 degree elbow located upstream of the spool piece.

For 22 Feedwater Header (Loop B of Figure 2), the feedwater piping drops approximately 7'4" below the feedwater regulating valve, the turns to the northwest approximately 2' 10" before turning west. The flowmeter is located in the East-West pipe run, approximately 10'2" from the exit of the 45 degree elbow located upstream of the spool piece.

Figure 1: Unit 1 Caldon LEFM CheckPlus Spool Piece Locations

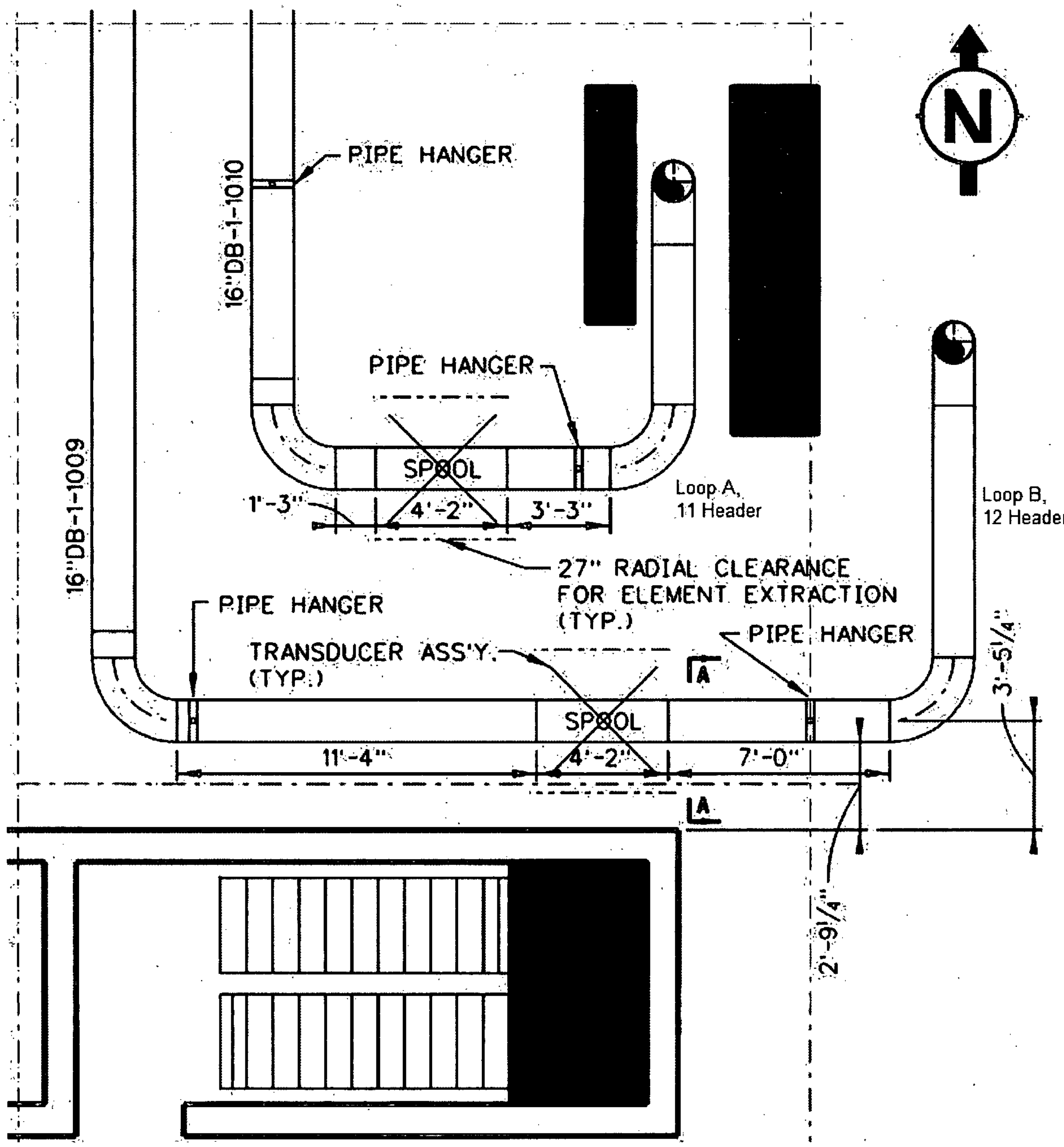


Figure 2: Unit 2 Caldon LEFM CheckPlus Spool Piece Locations

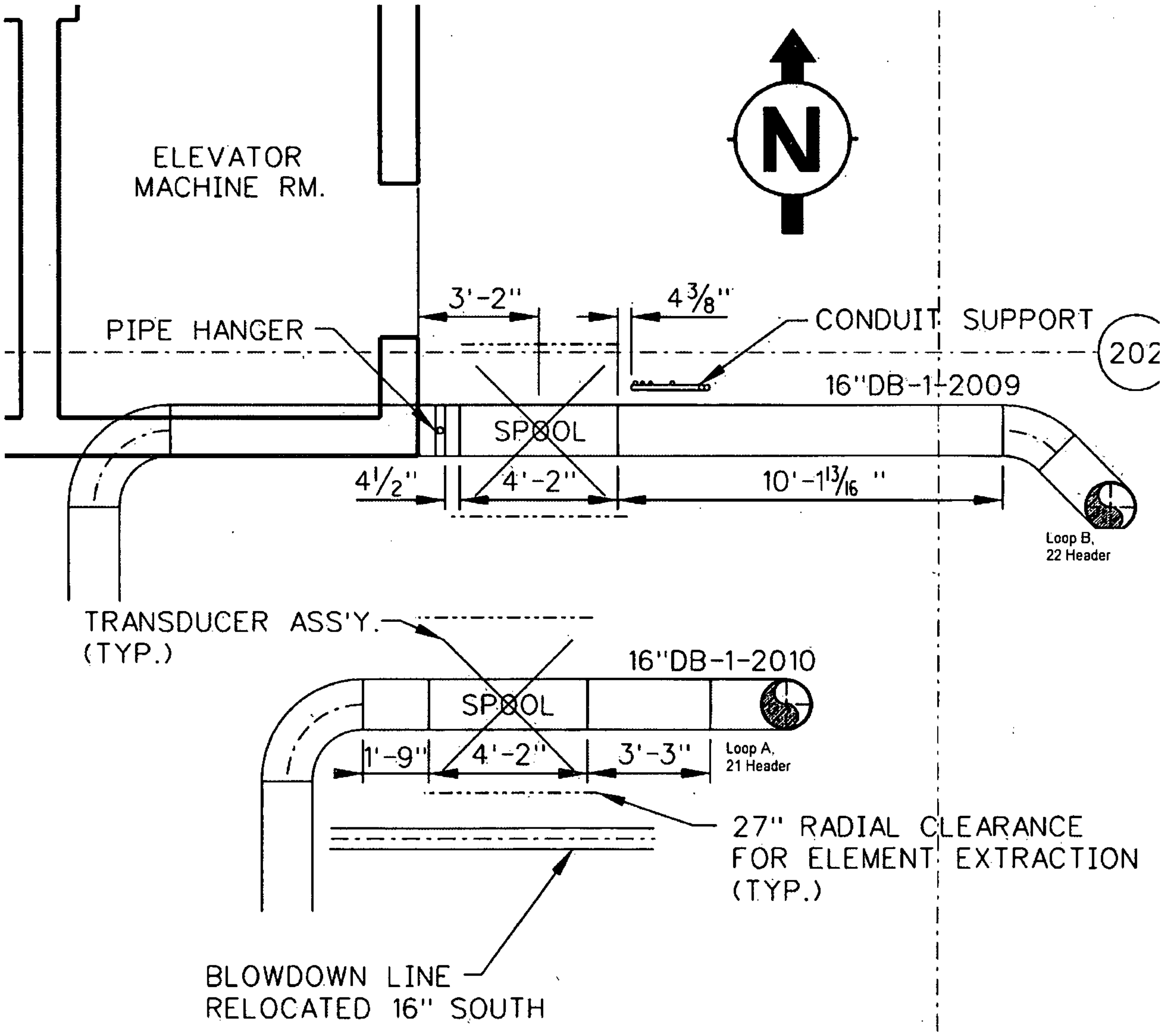


Figure 3: 11 Feedwater Header Piping Isometric (Existing configuration – pre-spool piece installation)

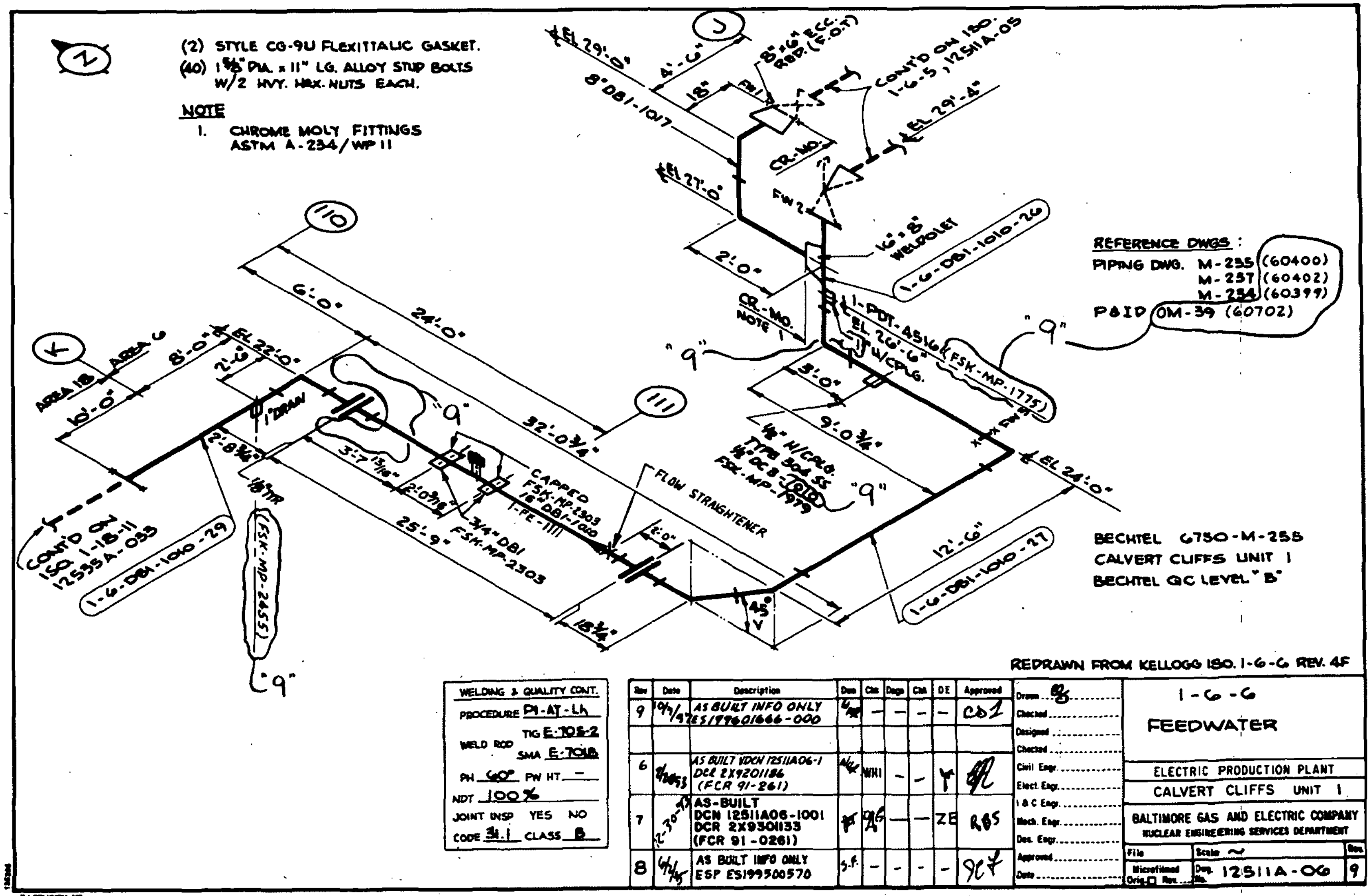


Figure 4: 12 Feedwater Header Piping Isometric (Existing configuration – pre-spool piece installation)

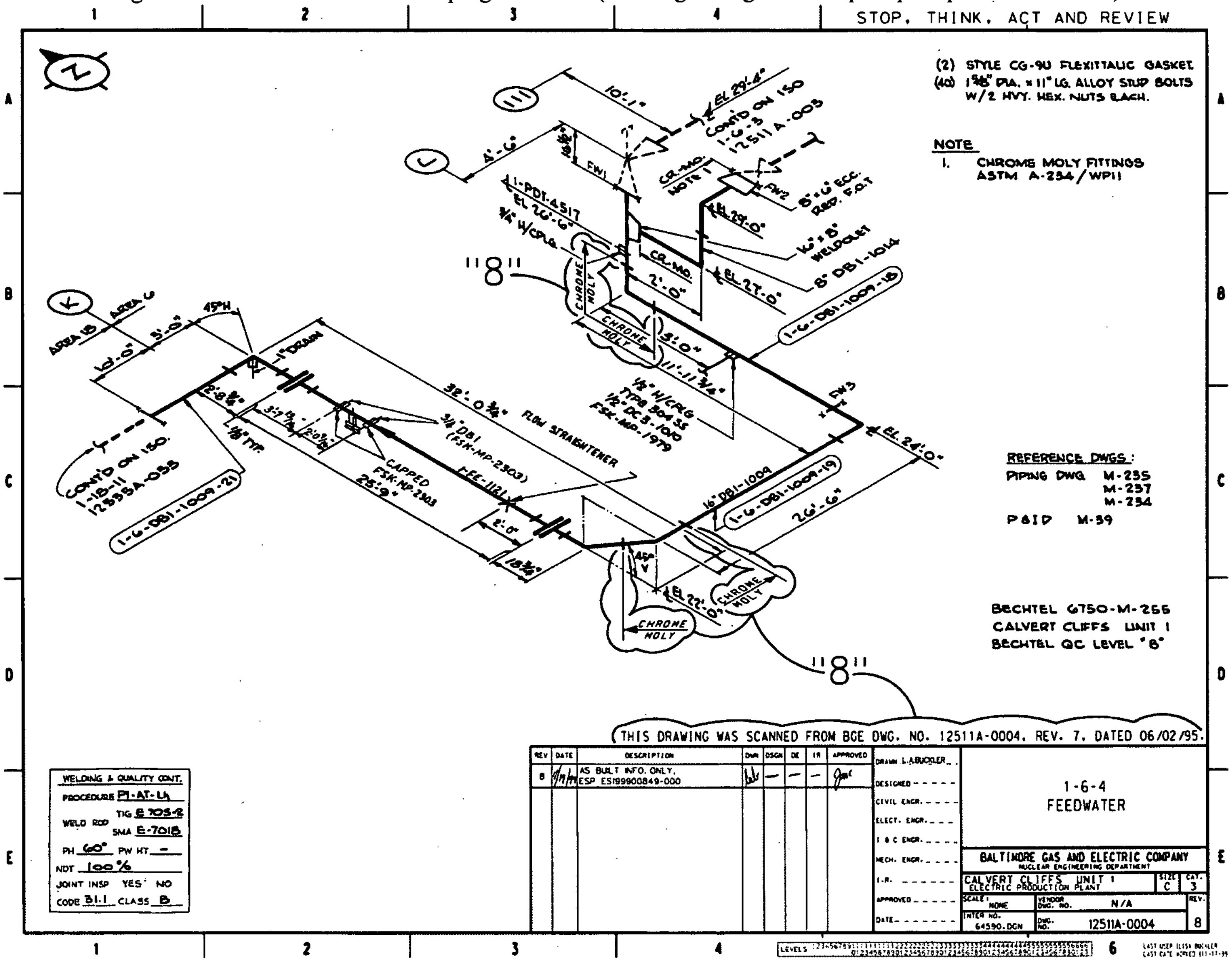
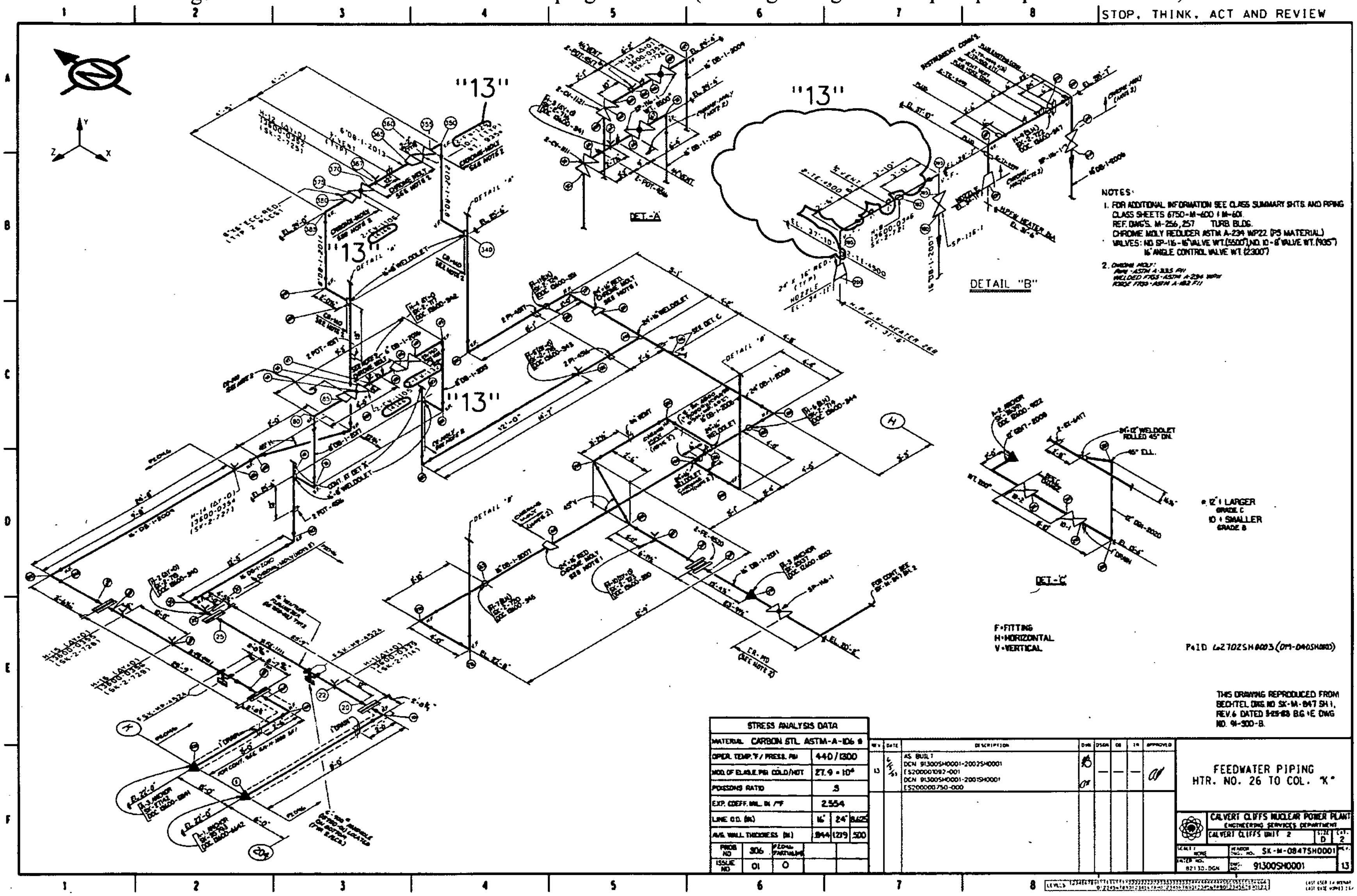


Figure 5: 21 and 22 Feedwater Header Piping Isometric (Existing configuration – pre-spool piece installation)



RAI 3:

Describe the location where the two pressure transmitters will be installed.

CCNPP Response:

The two pressure transmitters for each feedwater header are located downstream of the flow meter spool pieces, in the same east-west section of pipe to ensure negligible pressure drop. The pressure transmitters will be located within 14' of the spool pieces.

RAI 4:

Describe the test configuration and test specifics of the hydraulic testing performed at Alden Labs. Please provide drawings of the test configuration and explain any differences between the as-tested and installed configuration.

CCNPP Response:

The Unit 1 and Unit 2 test plans are included as ALD-1116 Revision 0, "Hydraulic Calibration Plan for Calvert Cliffs NPP Unit 2 Loops A and B, LEFM CheckPlus 16" Chordal Spool Pieces" (Enclosure 1) and ALD-1115 Revision 0, "Hydraulic Calibration Plan for Calvert Cliffs NPP Unit 2 Loops A and B, LEFM CheckPlus 16" Chordal Spool Pieces" (Enclosure 2), respectively. The only significant difference in the test configuration is that a mitered 90 degree elbow was used in lieu of the feedwater regulating valve. In order to envelope the effects of the feedwater regulating valve on flow conditions at the meter, different flow orifices and flow straighteners were installed in the pipe as specified in the test plan.

RAI 5:

Attachment 2, Section 1.5, Table I-1, Explain how the plant computer calculation entries were determined.

CCNPP Response:

Per the vendor technical documentation for the plant computer, enthalpies are calculated to within +/-0.1 BTU/lbm (Table I-2 of Section 1.5). The values provided in Table I-1 represent the contribution to calorimetric uncertainty from this error. For example, the contribution to calorimetric uncertainty from an error in the plant computer calculation of feedwater enthalpy for one feedwater loop is the product of the feedwater flow used in the evaluation of uncertainty, 6209.05 klbm/hr, and the error in the calculation of enthalpy, or

(6209.05 klbm/hr)(+/-0.1 BTU/lbm) = +/-0.6209 MBTU/hr.

The contribution to calorimetric uncertainty from both loops is then

(+/-0.6209 MBTU/hr) [sqrt(2)] = +/-0.8781 MBTU/hr.

Since the only value of interest is the negative contribution to uncertainty, the uncertainty may be reduced by the value of (1.645/1.96) to -0.7370 MBTU/hr, the value documented in Table I-1, column labeled "Random Inputs to Uncertainty." (Reference 3)

The value in the "Effective Random Contribution" column is the contribution to calorimetric uncertainty found by "linearizing" the contribution to calorimetric uncertainty and is found by squaring the random contribution to uncertainty from the computation of feedwater enthalpy and dividing by the total contribution to calorimetric uncertainty from all random terms,

$(-0.7370 \text{ MBTU/hr})^2/(-33.4895 \text{ MBTU/hr}) = -0.0162 \text{ MBTU/hr}$.

Since the total secondary calorimetric uncertainty consists of both random and bias terms, the value in "Combined Uncertainty" column is the sum of the random and bias contributions of each term to calorimetric uncertainty. There is no bias associated with the computation of feedwater enthalpy; hence, the combined uncertainty is the same as the effective random contribution. This value is also expressed in % Rated Thermal Power by converting the combined uncertainty to megawatts and dividing by the amount of the proposed uprate. The contribution of the error in the calculation of feedwater enthalpy to the calorimetric uncertainty is found by dividing by the total calorimetric uncertainty.

RAI 6:

In Enclosure 1, Section 7.2.2.3, Feedwater Temperature, Part F, Define $TP_{FW\text{-}IND(m)}$, $TP_{FW\text{-}IND(M)}$, *and* $TP_{FW\text{-}IND(M1)}$.

CCNPP Response:

There was a typographical error in the table listed in Enclosure 1, Section 7.2.2.3 which incorrectly labeled the terms. For clarity purposes a revised table is shown below:

$T_{FW\text{-}IND(m)}$ deg. F	U_{TFW}	$T_{FW\text{-}ACT(m)}$ deg. F	Reference Sections
432	1.88	430.12	5.4.2, 4.2.1

$T_{FW\text{-}IND(M)}$ deg. F	U_{TFW}	$T_{FW\text{-}ACT(M)}$ deg. F	Reference Sections
443	1.88	441.12	5.4.2, 4.2.1

$T_{FW\text{-}IND(M1)}$ deg. F	U_{TFW}	$T_{FW\text{-}ACT(M1)}$ deg. F	Reference Sections
454	1.88	452.12	4.2.1

The terms $T_{FW\text{-}IND(m)}$ and $T_{FW\text{-}IND(M)}$ represent average values for Unit 1 and Unit 2 feedwater temperature respectively. The values for each unit were selected by determining an average, indicated feedwater temperature at the present value of 100% power (2700 MWth) based on historical data. That value was then extrapolated to the uprated power of 2737 MWth and the uncertainty of the temperature instrumentation was applied. Because of differences between the secondary systems of Calvert Cliffs Unit 1 and Unit 2, the feedwater temperature in Unit 1 is lower than the feedwater temperature for Unit 2.

The value $T_{FW\text{-}IND(M1)}$ was an additional value selected to represent feedwater temperature that would be well above the indicated values for Unit 1 and Unit 2.

In the table above, the actual values of feedwater temperature ($T_{FW\text{-}ACT(m)}$, $T_{FW\text{-}ACT(M)}$, and $T_{FM\text{-}ACT(M1)}$) were found by subtracting the instrument uncertainty (U_{TFW}) from each of the indicated temperatures ($T_{FW\text{-}IND(m)}$, $T_{FW\text{-}IND(M)}$, and $T_{FW\text{-}IND(M1)}$). Subtracting the instrument uncertainty from the projected indicated value with result in a negative contribution to calorimetric uncertainty (the direction of interest) when evaluating the effect of temperature uncertainty on calorimetric uncertainty.

All three values were used to evaluate calorimetric uncertainty to determine the most bounding calorimetric uncertainty. The results of the calculation found that calorimetric uncertainty was maximized at the lower values of feedwater temperature corresponding to the projected Unit 1 temperature.

RAI 7:

Section 7.2.2.3, Feedwater Temperature, Part F of Enclosure 1 states, "Calorimetric uncertainty will be evaluated at both minimum and maximum feedwater temperatures, with indicated temperature greater than actual temperature." Please explain the entries in the three tables.

CCNPP Response:

See the above response to RAI 6.

RAI 8:

Section 7.5.2 of Enclosure 1; Explain what is referenced from Section 4.2.1.

CCNPP Response:

Section 4.2.1 should not have been referenced. The calculation in Section 7.5.2 is based upon assumed flow uncertainty from section 5.1.2 and the projected flow, Section 5.4.2.

RAI 9:

Section I.7 Of Attachment 2 of the subject license amendment request states (about the LEFM CheckPlus system operating in a degraded condition):

In this condition, the system basically operates as the LEFM check system described in References I-1 and I-2, capable of supporting uprates on the order of the requested 1.38% uprate. However, if the site-specific uncertainty analysis for the LEFM CheckPlus system does not support the uprate, the 30-day outage time will not be adopted.

a. *The term "basically" is unclear. What provides the necessary assurance that, in a degraded condition, the system still operates in a manner that supports the requested uprate?*

   CCNPP Response:

   Each metering section spool piece for the Caldon LEFM CheckPlus System consists of two sets of transducers. The system is capable of supporting an Appendix K uprate up to 1.7%, depending on the results of site specific uncertainty analysis (Reference 1). The Caldon LEFM Check spool piece, which consists of only one set of ultrasonic transducers, is capable of supporting an Appendix K uprate up to 1.4% (Reference 2). Hence, the Caldon LEFM CheckPlus spool piece is essentially the combination of two LEFM Check spool pieces.

   The degraded condition is a failure in one set of transducers in the LEFM CheckPlus system. The remaining set of transducers is fully operational. This condition is reported as an "Alert" condition by the Caldon LEFM CheckPlus System and annunciated in the Control Room. In an "Alert" condition, the measured flow is based upon only the fully operational set of transducers (similar to operation using the LEFM Check system which only has one set of transducers). Consequently, in an "Alert" condition, the Caldon LEFM CheckPlus System is bound by the uncertainties of the

LEFM check system and is the basis for the 30 day allowed outage time. The "Alert" condition is also referred to as the "Maintenance" mode of operation. Those conditions resulting in an "Alert" condition are provided in Reference 4.

At the time of our original submittal the vendor's uncertainty calculations were not completed so our submittal indicated use of the 30 day allowed outage time would be used only if the calorimetric uncertainty in the "Alert" condition supported Calvert Cliffs proposed uprate of 2737 MWth (1.38%). The vendor's evaluation of meter uncertainty which includes the uncertainty of the system while in the "Maintenance" mode of operation is now completed and reviewed. The uncertainty calculations demonstrate the Caldon LEFM CheckPlus System in the "Alert" condition can support operation at the proposed uprate value. As a result, Calvert Cliffs will adopt use of the 30 day allowed outage time when the Caldon LEFM CheckPlus System is in the "Alert" condition.

b. *What is meant by the phrase, "If the site-specific uncertainty analysis for the LEFM CheckPlus system does not support the uprate"? Will approval for an uprate be requested if the site specific uncertainty analysis does not support the uprate? Please clarify this sentence.*

CCNPP Response:

See the above response to RAI 9.a. The intent of the sentence was to indicate that the use of the 30 day allowed outage time when the LEFM CheckPlus system is in an "Alert" condition was predicated on the final uncertainty calculations demonstrating the system could support operating at the requested uprate power level (2737 MWth) while in the "Alert" condition. At the time of our submittal the final uncertainty calculations was not completed so a final definitive answer could not be provided. The vendor's final uncertainty calculations have now been completed and reviewed. The results indicate the Caldon LEFM CheckPlus System in the "Alert" condition can support operation at the proposed uprate value. As a result, Calvert Cliffs will adopt the 30 day allowed outage time when the Caldon LEFM CheckPlus System is in the "Alert" condition. A more complete discussion of this issue is provided in our response to RAI #1.2 in Attachment (1).

REFERENCES

1. Caldon ER-157P, Supplement to Topical Report ER-80P: Basis for a Power Uprate with the LEFM Check or CheckPlus System, Revision 5, dated October 2001, approved by NRC SER, dated December 20, 2001

2. Caldon ER-80P, Improving Thermal Power Accuracy and Plant Safety While Increasing Operating Power Level Using the LEFM Check System, dated March 1997 approved by NRC SER, dated March 8, 1999

3. ISA-67.04.02-2000, Methodologies For The Determination of Setpoints For Nuclear Safety-Related Instrumentation

4. Letter from Mr. D. R. Bauder (CCNPP) to Document Control Desk (NRC), dated December 3, 2008, Response to Request for Additional Information – License Amendment for Measurement Uncertainty Recapture Power Uprate- Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2

ENCLOSURES

(1) Proprietary – ALD-1115 Revision 0, "Hydraulic Calibration Plan for Calvert Cliffs NPP Unit 2 Loops A and B, LEFM CheckPlus 16" Chordal Spool Pieces"

(2) Proprietary – ALD-1116 Revision 0, "Hydraulic Calibration Plan for Calvert Cliffs NPP Unit 1 Loops A and B, LEFM CheckPlus 16" Chordal Spool Pieces"

(3) Letter from C. R. Hastings (Cameron) to Document Control Desk (NRC), dated January 29, 2009, Application for Withholding Proprietary Information From Public Disclosure

ENCLOSURE (3)

Letter from C. R. Hastings (Cameron) to Document Control Desk (NRC), dated January 29, 2009, Application for Withholding Proprietary Information From Public Disclosure

Measurement Systems

Caldon® Ultrasonics Technology Center
1000 McClaren Woods Drive
Coraopolis, PA 15108
Tel 724-273-9300
Fax 724-273-9301
www.c-a-m.com

CAMERON

January 29, 2009
CAW 09-02

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject:

1. Cameron ALD-1115 Rev. 0 " Hydraulic Calibration Plan for Calvert Cliffs NPP Unit 2 Loops A and B LEFM✓+ 16" Chordal Spool Pieces"
2. Cameron ALD-1116 Rev. 0 " Hydraulic Calibration Plan for Calvert Cliffs NPP Unit 1 Loops A & B LEFM✓+ 16" Chordal Spool Pieces"

Gentlemen:

This application for withholding is submitted by Cameron International Corporation, a Delaware Corporation (herein called "Cameron") on behalf of its operating unit, Caldon Ultrasonics Technology Center, pursuant to the provisions of paragraph (b)(1) of Section 2.390 of the Commission's regulations. It contains trade secrets and/or commercial information proprietary to Cameron and customarily held in confidence.

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Accordingly, it is respectfully requested that the subject information, which is proprietary to Cameron, be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to this application for withholding or the accompanying affidavit should reference CAW 09-02 and should be addressed to the undersigned.

Very truly yours,

CR Hastings

Calvin R. Hastings
General Manager

Enclosures (Only upon separation of the enclosed confidential material should this letter and affidavit be released.)

January 29, 2009
CAW 09-02

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared Calvin R. Hastings, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Cameron International Corporation, a Delaware Corporation (herein called "Cameron") on behalf of its operating unit, Caldon Ultrasonics Technology Center, and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

CR Hastings
Calvin R. Hastings
General Manager

Sworn to and subscribed before me

this 29th day of

January, 2009

Joann B Thomas
Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Joann B. Thomas, Notary Public
Findlay Twp., Allegheny County
My Commission Expires July 28, 2011
Member, Pennsylvania Association of Notaries

January 29, 2009
CAW 09-02

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2. I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Cameron application for withholding accompanying this Affidavit.

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(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

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(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Cameron, its customer or suppliers.

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(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Cameron system, which include the following:

(a) The use of such information by Cameron gives Cameron a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Cameron competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Cameron ability to sell products or services involving the use of the information.

(c) Use by our competitor would put Cameron at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Cameron of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Cameron in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Cameron capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence, and, under the provisions of 10 CFR §§ 2. 390, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld are the submittals titled:

- Cameron ALD-1115 Rev. 0 " Hydraulic Calibration Plan for Calvert Cliffs NPP Unit 2 Loops A and B LEFM✓ + 16" Chordal Spool Pieces"
- Cameron ALD-1116 Rev. 0 " Hydraulic Calibration Plan for Calvert Cliffs NPP Unit 1 Loops A & B LEFM✓ + 16" Chordal Spool Pieces"

It is designated therein in accordance with 10 CFR §§ 2.390(b)(1)(i)(A,B), with the reason(s) for confidential treatment noted in the submittal and further described in this affidavit. This information is voluntarily submitted for use by the NRC Staff in their review of the accuracy assessment of the proposed methodology for LEFM CheckPlus Systems used by Calvert Cliffs NPP Unit 1 and 2 for an MUR UPRATE.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Cameron because it would enhance the ability of competitors to provide similar flow and temperature measurement systems and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Cameron effort and the expenditure of a considerable sum of money.

In order for competitors of Cameron to duplicate this information, similar products would have to be developed, similar technical programs would have to be performed, and a significant manpower effort, having the requisite talent and experience, would have to be expended for developing analytical methods and receiving NRC approval for those methods.

Further the deponent sayeth not.