



Entergy Nuclear South  
Entergy Operations, Inc.  
17265 River Road  
Killona, LA 70057  
Tel 504-739-6310  
Fax 504-739-6698  
tmitch1@entergy.com

Timothy G. Mitchell  
Director, Engineering  
Waterford 3

W3F1-2004-0111

November 4, 2004

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

**SUBJECT:** Supplement to Amendment Request NPF-38-249,  
Extended Power Uprate  
Waterford Steam Electric Station, Unit 3  
Docket No. 50-382  
License No. NPF-38

**REFERENCES:**

1. Entergy Letter dated November 13, 2003, "License Amendment Request NPF-38-249 Extended Power Uprate"
2. Entergy Letter dated October 8, 2004, "Supplement to Amendment Request NPF-38-249 Extended Power Uprate"
3. NRC Letter dated October 29, 2004, "Waterford Steam Electric Station, Unit 3 (Waterford 3) – Request for Additional Information Related to Revision to Facility Operating License and Technical Specifications – Extended Power Uprate Request (TAC No. MC1355)"
4. Entergy Letter dated July 14, 2004, "Supplement to Amendment Request NPF-38-249 Extended Power Uprate"

Dear Sir or Madam:

By letter (Reference 1), Entergy Operations, Inc. (Entergy) proposed a change to the Waterford Steam Electric Station, Unit 3 (Waterford 3) Operating License and Technical Specifications to increase the unit's rated thermal power level from 3441 megawatts thermal (MWt) to 3716 MWt. Reference 1 included a proposed change to the Technical Specifications regarding the steam generator pressure – low setpoint based on Instrument Society of America (ISA) 67.04 Part 2 Method 3 methodology. The proposed change was supplemented (Reference 2) to update the allowable value.

By letter (Reference 3), the NRC staff issued a Request for Additional Information (RAI) which informed Entergy that the staff can no longer accept any requested Technical Specification (TS) changes that are based upon the use of Method 3 unless the method is modified to alleviate the staff concerns. In response to the RAI, to alleviate the staff's concern, Entergy has added 4 psi to the trip setpoint and allowable value that were previously submitted in Reference 3. Thus the revised trip setpoint is 666 psia and the revised allowable value is 652.4 psia. The steam generator pressure – low trip analytical limit of 576 psia used in the Extended Power Uprate safety analysis remains the same. Thus, the methodology used to develop the revised steam generator pressure – low setpoint and allowable value is based on

A001

a modification of Instrument Society of America (ISA) 67.04 Part 2 Method 3. The method utilized adds margin such that the difference between the allowable value and analytical limit exceeds the non-measurable loop uncertainty. Revised marked-up TS pages 2-3, 3/4 3-19, and 3/4 3-20 are provided in Attachment 1 and supersede those pages previously submitted. Revised marked-up TS Bases pages are provided for information only in Attachment 2 and supersede the equivalent Bases pages previously submitted. The bases for the acceptability of this revised setpoint methodology is provided in Attachment 3.

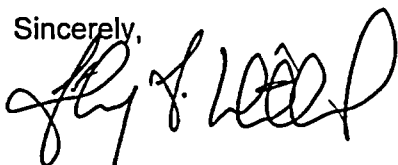
Entergy has followed the Method 3 issue closely and continues to maintain that Method 3 does not pose a significant safety issue. Entergy understands that the NRC staff will be addressing the Method 3 issue on a generic basis and looks forward to participating in the ultimate resolution to this industry issue.

The no significant hazards consideration included in Reference 4 is not affected by any information contained in this supplemental letter. There are no new commitments in this letter.

If you have any questions or require additional information, please contact D. Bryan Miller at 504-739-6692.

I declare under penalty of perjury that the foregoing is true and correct. Executed on November 4, 2004.

Sincerely,



TGM/DBM/cbh

Attachments:

1. Revised Markup of Technical Specification Pages
2. Revised Markup of Technical Specification Bases (For Information Only)
3. Bases for Acceptability of Revised Setpoint Methodology

cc: Dr. Bruce S. Mallett  
U. S. Nuclear Regulatory Commission  
Region IV  
611 Ryan Plaza Drive, Suite 400  
Arlington, TX 76011

NRC Senior Resident Inspector  
Waterford 3  
P.O. Box 822  
Killona, LA 70066-0751

U.S. Nuclear Regulatory Commission  
Attn: Mr. Nageswaran Kalyanam MS O-7D1  
Washington, DC 20555-0001

Wise, Carter, Child & Caraway  
Attn: J. Smith  
P.O. Box 651  
Jackson, MS 39205

Winston & Strawn  
Attn: N.S. Reynolds  
1400 L Street, NW  
Washington, DC 20005-3502

Louisiana Department of Environmental Quality  
Office of Environmental Compliance  
Surveillance Division  
P. O. Box 4312  
Baton Rouge, LA 70821-4312

American Nuclear Insurers  
Attn: Library  
Town Center Suite 300S  
29<sup>th</sup> S. Main Street  
West Hartford, CT 06107-2445

**Attachment 1**

**To**

**W3F1-2004-0111**

**Revised Markup of Technical Specification Pages**

**TABLE 2.2-1  
REACTOR PROTECTIVE INSTRUMENTATION TRIP SETPOINT LIMITS**

| <b>FUNCTIONAL UNIT</b>                | <b>TRIP SETPOINT</b>                | <b>ALLOWABLE VALUES</b>             |
|---------------------------------------|-------------------------------------|-------------------------------------|
| 1. Manual Reactor Trip                | Not Applicable                      | Not Applicable                      |
| 2. Linear Power Level - High          |                                     |                                     |
| Four Reactor Coolant Pumps Operating  | ≤ 108% of RATED THERMAL POWER       | ≤ 108.76% of RATED THERMAL POWER    |
| 3. Logarithmic Power Level - High (1) | ≤ 0.257% of RATED THERMAL POWER (6) | ≤ 0.280% of RATED THERMAL POWER (6) |
| 4. Pressurizer Pressure - High        | ≤ 2350 psia                         | ≤ 2359 psia                         |
| 5. Pressurizer Pressure - Low         | ≥ 1684 psia (2)                     | ≥ 1649.7 psia (2)                   |
| 6. Containment Pressure - High        | ≤ 17.1 psia                         | ≤ 17.4 psia                         |
| 7. Steam Generator Pressure - Low     | ≥ 764 psia (3)                      | ≥ 748.8 psia (3)                    |
| 8. Steam Generator Level - Low        | ≥ 27.4% (4)                         | ≥ 26.48% (4)                        |
| 9. Local Power Density - High         | ≤ 21.0 kW/ft (5)                    | ≤ 21.0 kW/ft (5)                    |
| 10. DNBR - Low                        | ≥ 1.26 (5)                          | ≥ 1.26 (5)                          |
| 11. Steam Generator Level - High      | ≤ 87.7% (4)                         | ≤ 88.62% (4)                        |
| 12. Reactor Protection System Logic   | Not Applicable                      | Not Applicable                      |
| 13. Reactor Trip Breakers             | Not Applicable                      | Not Applicable                      |
| 14. Core Protection Calculators       | Not Applicable                      | Not Applicable                      |
| 15. CEA Calculators                   | Not Applicable                      | Not Applicable                      |
| 16. Reactor Coolant Flow - Low        | ≥ 19.00 psid (7)                    | ≥ 18.47 psid (7)                    |

WATERFORD - UNIT 3
2-3
Amendment No. ~~12,113,145~~

TABLE 3.3-4

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION TRIP VALUES

| <u>FUNCTIONAL UNIT</u>              | <u>TRIP SETPOINT</u>          | <u>ALLOWABLE VALUES</u>         |
|-------------------------------------|-------------------------------|---------------------------------|
| 1. SAFETY INJECTION (SIAS)          |                               |                                 |
| a. Manual (Trip Buttons)            | Not Applicable                | Not Applicable                  |
| b. Containment Pressure - High      | $\leq 17.1$ psia              | $\leq 17.4$ psia                |
| c. Pressurizer Pressure - Low       | $\geq 1684$ psia <sup>m</sup> | $\geq 1649.7$ psia <sup>m</sup> |
| d. Automatic Actuation Logic        | Not Applicable                | Not Applicable                  |
| 2. CONTAINMENT SPRAY (CSAS)         |                               |                                 |
| a. Manual (Trip Buttons)            | Not Applicable                | Not Applicable                  |
| b. Containment Pressure - High-High | $\leq 17.7$ psia              | $\leq 18.0$ psia                |
| c. Automatic Actuation Logic        | Not Applicable                | Not Applicable                  |
| 3. CONTAINMENT ISOLATION (CIAS)     |                               |                                 |
| a. Manual CIAS (Trip Buttons)       | Not Applicable                | Not Applicable                  |
| b. Containment Pressure - High      | $\leq 17.1$ psia              | $\leq 17.4$ psia                |
| c. Pressurizer Pressure - Low       | $\geq 1684$ psia <sup>m</sup> | $\geq 1649.7$ psia <sup>m</sup> |
| d. Automatic Actuation Logic        | Not Applicable                | Not Applicable                  |
| 4. MAIN STEAM LINE ISOLATION        |                               |                                 |
| a. Manual (Trip Buttons)            | Not Applicable                | Not Applicable                  |
| b. Steam Generator Pressure - Low   | $\geq 784$ psia <sup>m</sup>  | $\geq 749.9$ psia <sup>m</sup>  |
| c. Containment Pressure - High      | $\leq 17.1$ psia              | $\leq 17.4$ psia                |
| d. Automatic Actuation Logic        | Not Applicable                | Not Applicable                  |

WATERFORD - UNIT 3

3/4 3-19

AMENDMENT NO. 436, -156



666

652.4

TABLE J-4 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION TRIP VALUES

| <u>FUNCTIONAL UNIT</u>                                     | <u>TRIP VALUE</u>          | <u>ALLOWABLE VALUES</u>     |
|--|----------------------------|-----------------------------|
| <b>5. SAFETY INJECTION SYSTEM SUMP RECIRCULATION (RAS)</b> |                            |                             |
| a. Manual RAS (Trip Buttons)                               | Not Applicable             | Not Applicable              |
| b. Refueling Water Storage Pool - Low                      | 10.0% (57,967 gallons)     | 9.08% (52,634 gallons)      |
| c. Automatic Actuation Logic                               | Not Applicable             | Not Applicable              |
| <b>6. LOSS OF POWER</b>                                    |                            |                             |
| a. 4.16 kV Emergency Bus Undervoltage (Loss of Voltage)    | ≥ 3245 volts               | ≥ 3245 volts                |
| b. 480 V Emergency Bus Undervoltage                        | ≥ 372 volts                | ≥ 354 volts                 |
| c. 4.16 kV Emergency Bus Undervoltage (Degraded Voltage)   | ≥ 3875 volts               | ≥ 3860 volts                |
| <b>7. EMERGENCY FEEDWATER (EFAS)</b>                       |                            |                             |
| a. Manual (Trip Buttons)                                   | Not Applicable             | Not Applicable              |
| b. Steam Generator (1&2) Level - Low                       | ≥ 27.4% <sup>(3) (4)</sup> | ≥ 26.48% <sup>(3) (4)</sup> |
| c. Steam Generator ΔP - High (SG-1 > SG-2) ≤ 123 psid      |                            | ≤ 134 psid                  |
| d. Steam Generator ΔP - High (SG-2 > SG-1) ≤ 123 psid      | 666                        | 652.4                       |
| e. Steam Generator (1&2) Pressure - Low                    | ≥ 764 psia <sup>(2)</sup>  | ≥ 749.8 psia <sup>(2)</sup> |
| f. Automatic Actuation Logic                               | Not Applicable             | Not Applicable              |
| g. Control Valve Logic (Wide Range SG Level - Low)         | ≥ 36.3% <sup>(3) (5)</sup> | ≥ 35.3% <sup>(3) (5)</sup>  |

WATERFORD - UNIT 3

3/4 3-20

Amendment No. 19,74,113,136

**Attachment 2**

**To**

**W3F1-2004-0111**

**Revised Markup of Technical Specification Bases (For Information Only)**



TABLE B 3/4.0-1  
ANALYTICAL-INDICATED VALUES

*New TS Based*

| TS          | Parameter                       | Analytical Value       | Indicated / Plant Value | Comments  |
|-------------|---------------------------------|------------------------|-------------------------|---|
| 1.24        | RATED THERMAL POWER             | 3735 MWt               | 3716 MWt                |   |
| Table 2.2-1 | #2 Linear Power Level High      | 115%                   | ≤108%                   |   |
| Table 2.2-1 | #3 Logarithmic Power Level High | 4.4%                   | ≤0.257%                 |   |
| Table 2.2-1 | #4 Pressurizer Pressure High    | 2422 psia              | ≤2350 psia              |   |
| Table 2.2-1 | #5 Pressurizer Pressure Low     | 1560 psia              | ≥1684 psia              |   |
| Table 2.2-1 | #6 Containment Pressure High    | 19.7 psia              | ≤17.1 psia              |   |
| Table 2.2-1 | #7 Steam Generator Pressure Low | 576 psia               | ≥666 psia               |   |
| Table 2.2-1 | #8 Steam Generator Level Low    | 5%NR                   | ≥27.4%NR                |   |
| Table 2.2-1 | #9 Local Power Density High     | 21kW/ft                | ≤21kW/ft                |   |
| Table 2.2-1 | #10 DNBR Low                    | 1.26                   | ≥1.26                   |   |
| Table 2.2-1 | #11 Steam Generator Level High  | 90% (NR)               | ≤87.7% (NR)             |   |
| Table 2.2-1 | #16 Reactor Coolant Flow Low    | 60% flow               | ≥19.00 psid             | Analysis utilizes units in % flow while indications are in psid |
| 3.1.2.7     | BAMT Boron Concentration        | ≥4551 ppm<br>≤6187 ppm | ≥4900 ppm<br>≤6125 ppm  |   |
| 3.1.2.7     | RWSP Volume                     | NA                     | ≥12% level              | Modes 5 & 6   |
| 3.1.2.7     | RWSP Boron Concentration        | 2029 ppm               | ≥2050 ppm               |   |
| 4.1.2.7     | RAB Air Temperature             | 50°F                   | ≥55°F                   |   |
| 4.1.2.7     | BAMT Solution Temperature       | 49°F                   | ≥60°F                   |   |
| 4.1.2.8     | RAB Air Temperature             | ≥50°F                  | ≥55°F                   |   |
| 4.1.2.8     | BAMT Solution Temperature       | 49°F                   | ≥ 60°F                  |   |

*New 75 Balls*  
**TABLE B 3/4.0-1**  
**ANALYTICAL-INDICATED VALUES**

| TS          | Parameter   | Analytical Value         | Indicated / Plant Value  | Comments   |
|-------------|---|--------------------------|--------------------------|--|
| 3.2.6       | RCS Cold Leg Temperature                            | ≥533°F<br>≤552°F         | ≥536°F<br>≤549°F         |  |
| 3.2.8       | Pressurizer Pressure                                | ≥2090 psia<br>≤2310 psia | ≥2125 psia<br>≤2275 psia |  |
| Table 3.3-4 | #1.b, 3.b & 4.c Containment Pressure High           | 19.7 psia                | ≤17.1 psia               |  |
| Table 3.3-4 | #1.c & 3.c Pressurizer Pressure Low                 | 1560 psia                | ≥1684 psia               | @ NOP  |
| Table 3.3-4 | #2.b Containment Pressure High High                 | 19.7 psia                | ≤17.7 psia               |  |
| Table 3.3-4 | #4.b & 7.e Steam Generator Pressure Low             | 576 psia                 | ≥666 psia                | @NOP   |
| Table 3.3-4 | #5.b RWSP Level for RAS                             | 28,843 gal.              | ≥10% level               | Analysis utilizes units in gallons while indications are in %. |
| Table 3.3-4 | #6.a 4.16 kV 1E Bus Undervoltage (Loss of Voltage)  | 3245 volts               | ≥3245 volts              |  |
| Table 3.3-4 | #6.b 480 V 1E Bus Undervoltage                      | 354 volts                | ≥372 volts               |  |
| Table 3.3-4 | #6.c 4.16 kV 1E Bus Undervoltage (Degraded Voltage) | 3860 volts               | ≥3875 volts              |  |
| Table 3.3-4 | #7.b Steam Generator Level Low                      | 5% (NR)                  | ≥27.4% (NR)              |  |
| Table 3.3-4 | #7.c & 7.d Steam Generator Delta Pressure High      | 230 psid                 | ≤123 psid                |  |
| Table 3.3-4 | #7.g Control Valve Logic (WR SG Level Low)          | 21.3% level              | ≥36.3% level             |  |
| 3.4.5.2c    | Primary – Secondary Leakage                         | 75 gpd                   | ≤75 gpd                  | per SG   |

**Attachment 3**

**To**

**W3F1-2004-0111**

**Bases for Acceptability of Revised Setpoint Methodology**

### **Bases for Acceptability of Revised Setpoint Methodology**

The NRC staff requested, in a letter dated October 29, 2004, "Waterford Steam Electric Station, Unit 3 (Waterford 3) – Request for Additional Information Related to Revision to Facility Operating License and Technical Specifications – Extended Power Uprate Request (TAC No. MC1355)," that Entergy Operations, Inc. (Entergy) consider the following examples of acceptable actions regarding the Waterford Steam Electric Station, Unit 3 (Waterford 3) Extended Power Uprate (EPU) license amendment request:

1. Demonstrate that the approach used to develop the proposed limits provides adequate assurance that the plant will operate in accordance with the safety analyses. Show that Operability is ensured in the Technical Specifications (TS).
2. Suspend consideration of setpoint-related aspects of your request pending generic resolution of the staff concern.
3. Revise your request to incorporate Method 1, Method 2, or Performance-Based TS.
4. Revise your request to incorporate some other approach that you demonstrate to provide adequate confidence that the plant will operate in accordance with the safety analyses and show that Operability is ensured in the TSs.

The proposed "steam generator pressure- low" trip setpoint and allowable value have been derived using a method consistent with action 4 above. Waterford 3 historically has added margin to the total loop uncertainty (TLU) to establish a conservative trip setpoint to provide assurance with more than adequate confidence the plant would operate in accordance with the safety analyses. Additionally, the calculated allowable value (AV) was the acceptance criterion used to confirm the measurable portions of the channel functioned within statistical predictions, thus assuring the analytical limit would be protected by the trip setpoint. However, to address the NRC Staff concerns with Instrument Society of America (ISA) 67.04 Method 3 (Method 3), Waterford 3 has revised the trip setpoint and allowable value to add 4 psi more margin. With this change, the AV derived by deducting the periodic test error (PTE) from the trip setpoint will be greater than the analytical limit plus non-measurable error effects. The non-measurable error effects include both the 95/95 error effects plus the applicable non-random biases. The proposed values will continue to assure that the plant will operate in accordance with the safety analyses and that operability is ensured in the TSs.

The addition of 4 psi margin to the steam generator pressure - low trip setpoint total loop uncertainty preserves the methodology for the derivation of setpoints and allowable values as described in the Waterford 3 current licensing basis. This assures consistency between this trip setpoint and other trip setpoints within the current licensing basis. Additionally, the additional 4 psi of margin ensures that the difference between the steam generator pressure - low allowable value and analytical limit exceeds the non-measurable loop uncertainty.

A simple check calculation is provided below.

### Simple Check Calculation

|  |                  |
|--|------------------|
| Proposed Trip setpoint:                            | 666 psia         |
| Periodic test error (PTE):                         | <u>-13.6 psi</u> |
| Proposed allowable value:<br>(Trip setpoint – PTE) | 652.4 psia       |

|                                      |                  |
|--------------------------------------|------------------|
| Analytical limit (AL):               | 576 psia         |
| Non-measurable uncertainties + bias: | <u>+76.1 psi</u> |
| AL + Non-measurable uncertainty:     | 652.1 psia       |

Thus, the proposed trip setpoint less the PTE is greater than AL plus the non-measurable uncertainties. Entergy believes this addresses the staff's interpretation that the AV protect the analytical limit with greater than 95% probability and with 95% confidence.

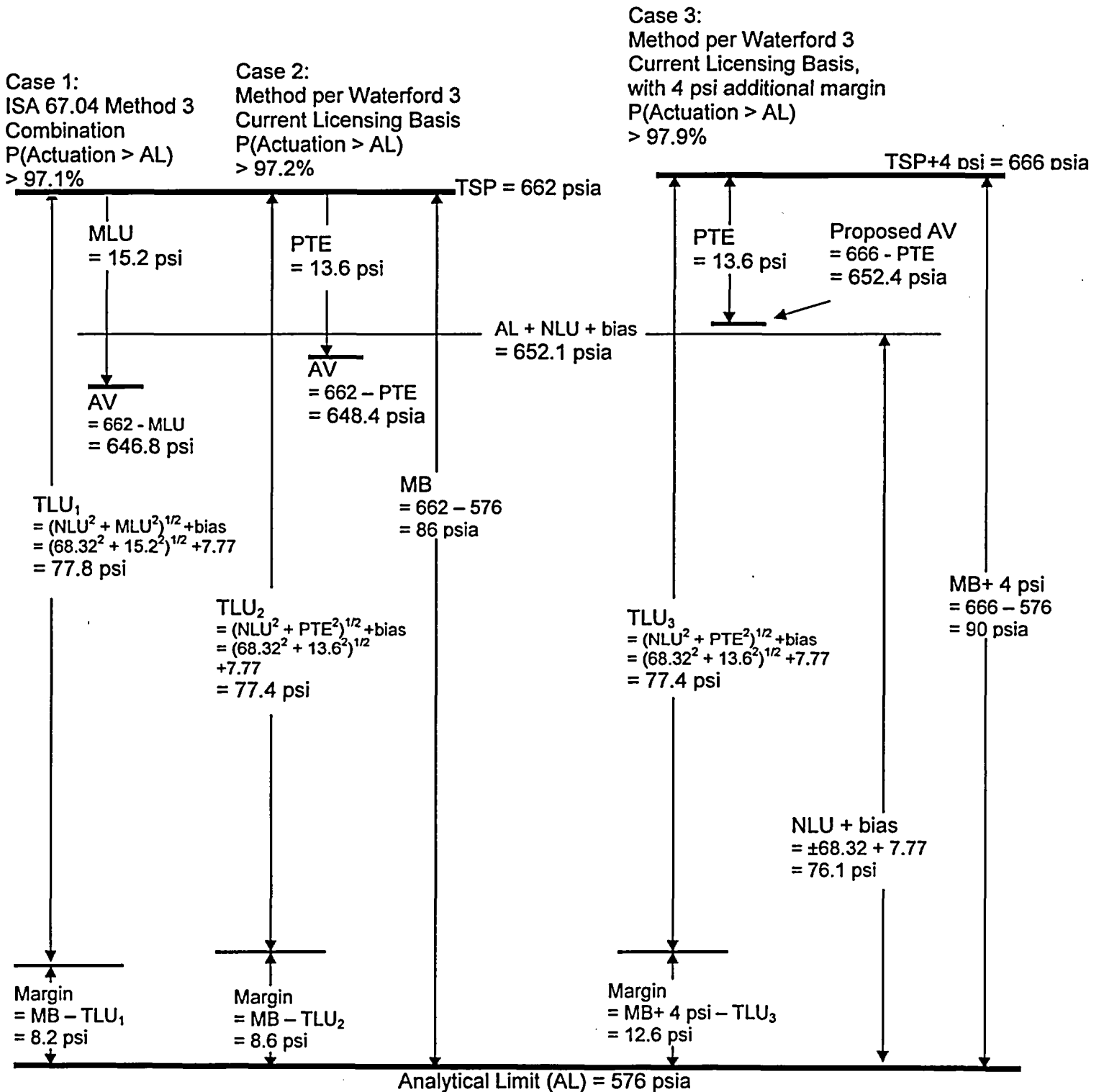
An illustration, provided below, reflects the previously proposed trip setpoint, revised setpoint, and AV as derived using three different methods:

- by ISA 67.04 Method 3,
- the Waterford 3 current licensing basis (similar to Method 3), and
- Waterford 3 current licensing basis plus 4 psi.

The staff has indicated that setpoint AVs established by means of Method 3 do not provide adequate assurance that a plant will operate in accordance with the assumptions upon which the plant safety analyses have been based.

Waterford 3 respectfully maintains its position that the trip setpoint and allowable value using Method 3 does provide adequate assurance the plant will operate in accordance with the plant safety analyses. This is demonstrated in the illustration below which includes the probability that the trip will occur at a value greater than the analytical limit for this parameter for each method. Maintaining the proposed trip setpoint as the limiting safety system setting (LSSS) derived and maintained in accordance with Waterford 3 TS assures with greater than 95/95 confidence the analytical limit will be protected. The allowable value as currently listed in Waterford 3 TS is used to determine that plant protection system trip modules perform as statistically predicted to assure the trip setpoint (i.e., LSSS) protects the AL.

The figure below illustrates the relationship between the proposed trip setpoint, new proposed setpoint, AV and AL, based on three calculation methods. NLU is the combination of the random portion of the non-measurable loop uncertainty effects. MLU is the combination of the random portion of the measurable effects, combined as they would be combined for the derivation of the TLU used to determine the trip setpoint.



The terms used in the figure above are defined below:

- AL Analytical Limit
- AV Allowable Value
- MB Measurement Band; difference between the trip setpoint and AL
- MLU Measurable Loop Uncertainty, the combination of the random portion of the measurable effects, combined as they would be combined for the derivation of the TLU used to determine the trip setpoint.
- NLU Non-measurable Loop Uncertainty (also known as nCOT), the combination of the random portion of the non-measurable loop uncertainty effects
- PTE Periodic Test Error, the combination of the random portion of the measurable effects, combined as they would be combined in accordance Waterford 3 Technical Specifications for the derivation of the AV.
- TLU Total Loop Uncertainty, the combination the non-measurable random effects, measurable random effects, and biases
- TSP Trip Setpoint (i.e., LSSS at Waterford 3)