

December 20, 2011  
HNP-11-097

Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1  
DOCKET NO. 50-400 / RENEWED LICENSE NO. NPF-63

Subject: REQUEST FOR LICENSE AMENDMENT  
MEASUREMENT UNCERTAINTY RECAPTURE POWER UPRATE  
SUPPLEMENTAL INFORMATION

- References:
1. Letter from C.L. Burton to the U.S. NRC, "Request for License Amendment, Measurement Uncertainty Recapture Power Uprate," dated April 28, 2011.
  2. Letter from K. Holbrook to the U.S. NRC, "Response to Request for Additional Information Regarding Measurement Uncertainty Recapture License Amendment Request," dated August 25, 2011.

Ladies and Gentlemen:

By letter dated April 28, 2011, as supplemented on June 23, 2011, Carolina Power & Light Company (CP&L), doing business as Progress Energy Carolinas, Inc., requested approval from the U.S. Nuclear Regulatory Commission (NRC) to increase the core thermal power level of Shearon Harris Nuclear Power Plant, Unit 1 (HNP) from 2,900 megawatts thermal (MWt) to 2,948 MWt, an increase of approximately 1.66 percent over the present licensed power level and to change the power plant technical specifications accordingly.

During the staff review of the request for license amendment, the proprietary Field Commissioning Data Package, containing the procedure and process to validate that the installation meets the design requirements, was made available to the staff for audit. Following that audit and in response to questions from the licensee, the staff acknowledged that it would be useful for the information be docketed. Attachment 2 of the enclosure to this letter provides the subject information for the Shearon Harris docket.

In a telephone discussion with the staff, CP&L also determined that it would be useful to submit draft markups to the Technical Specification Bases related to the implementation of TSTF-493. Those draft markups, provided for information only, are included as attachment 3 of the

enclosure. In addition, it is noted that procedure EGR-NGGC-0153, "Engineering Instrument Setpoints," submitted in reference 2, will be incorporated by reference into the FSAR prior to or concurrent with the implementation of the license amendment.

CP&L has concluded that the information provided in this supplement meets the intent of the original submittal and does not impact the conclusions of the Technical Analysis, No Significant Hazards Consideration, or Environmental Consideration as provided in the original submittal.

Attachment 2 of the enclosure contains proprietary information. CP&L requests that the NRC withhold the information in accordance with 10 CFR 2.390 per the "Application for Withholding Proprietary Information from Public Disclosure," included as attachment 1 of the enclosure.

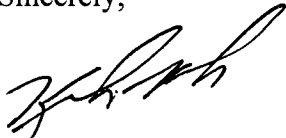
In accordance with 10 CFR 50.91(b), HNP is providing the state of North Carolina with a copy of this response.

This document contains no new Regulatory Commitments.

Please refer any questions regarding this submittal to Mr. David Corlett, Supervisor – HNP Licensing/Regulatory Programs, at (919) 362-3137.

I declare under penalty of perjury that the foregoing is true and correct. Executed on December 20, 2011.

Sincerely,



Keith Holbrook  
Manager, Support Services  
Harris Nuclear Plant

Enclosure: Harris Nuclear Plant Supplemental Information

cc: Regional Administrator, USNRC/Region II (without proprietary information)  
Project Manager, Harris Nuclear Plant, USNRC/NRR  
Resident Inspector, Harris Nuclear Plant, USNRC (without proprietary information)  
Section Chief, NC Division of Environmental Health (without proprietary information)

HNP-11-097

Enclosure

SHEARON HARRIS NUCLEAR POWER PLANT / UNIT NO. 1  
DOCKET NO. 50-400 / RENEWED LICENSE NO. NPF-63

LICENSE AMENDMENT REQUEST  
MEASUREMENT UNCERTAINTY RECAPTURE POWER UPRATE  
TAC ME6169

SUPPLEMENTAL INFORMATION

Attachment 1

Application for Withholding Proprietary  
Information from Public Disclosure

Attachment 2

*Cameron LEFM CHECKPLUS 2010C Flow Measurement System Field  
Commissioning Data Package, December 2010. [PROPRIETARY]*

Attachment 3

Technical Specification Bases Markups  
Related to TSTF-493 (For Information Only)

HNP-11-097

Enclosure

Shearon Harris Nuclear Power Plant / Unit No. 1  
Docket No. 50-400 / Renewed License No. NPF-63

License Amendment Request  
Measurement Uncertainty Recapture Power Uprate  
TAC ME6169

SUPPLEMENTAL INFORMATION

Attachment 1  
Application for Withholding Proprietary  
Information from Public Disclosure



**Measurement Systems**

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

December 19, 2011  
CAW 11-07

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

**APPLICATION FOR WITHHOLDING PROPRIETARY  
INFORMATION FROM PUBLIC DISCLOSURE**

Subject:

1. Cameron LEFM CheckPlus 2010FC Flow Measurement System “Field Commissioning Data Package for Progress Energy Service Company, LLC Shearon Harris Unit 1 Nuclear Power Station”, FCDP-188 Rev. 0

Gentlemen:

This application for withholding is submitted by Cameron International Corporation, a Delaware Corporation (herein called “Cameron”) on behalf of its operating unit, Caldor 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 11-07 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 11-07 and should be addressed to the undersigned.

Very truly yours,

A handwritten signature in cursive script that reads "Cal Hastings".

Cal Hastings  
General Manager

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

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared Cal 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:

*Cal Hastings*  
\_\_\_\_\_  
Cal Hastings  
General Manager

Sworn to and subscribed before me

this 19<sup>th</sup> day of

December, 2011

*Joann B. Thomas*  
\_\_\_\_\_  
Notary Public

COMMONWEALTH OF PENNSYLVANIA  
Notarial Seal  
Joann B. Thomas, Notary Public  
Findlay Twp., Allegheny County  
My Commission Expires July 28, 2015  
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:

- Cameron LEFM CheckPlus 2010FC Flow Measurement System “Field Commissioning Data Package for Progress Energy Service Company, LLC Shearon Harris Unit 1 Nuclear Power Station”, FCDP-188 Rev. 0

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 System used by Harris Unit 1 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.

HNP-11-097

Enclosure

SHEARON HARRIS NUCLEAR POWER PLANT / UNIT NO. 1  
DOCKET NO. 50-400 / RENEWED LICENSE NO. NPF-63

LICENSE AMENDMENT REQUEST  
MEASUREMENT UNCERTAINTY RECAPTURE POWER UPRATE  
TAC ME6169

SUPPLEMENTAL INFORMATION

Attachment 3  
Technical Specification Bases Markups  
Related to TSTF-493 (For Information Only)

## SAFETY LIMITS

### BASES

#### 2.1.2 REACTOR COOLANT SYSTEM PRESSURE

The restriction of this Safety Limit protects the integrity of the Reactor Coolant System (RCS) from overpressurization and thereby prevents the release of radionuclides contained in the reactor coolant from reaching the containment atmosphere.

The reactor pressure vessel, pressurizer, and the RCS piping, pumps, valves and fittings are designed to Section III, Division I of the ASME Code for Nuclear Power Plants, which permits a maximum transient pressure of 110% to 125% of design pressure (2485 psig) depending on component. The Safety Limit of 2735 psig (110% of design pressure) is therefore consistent with the design criteria and associated Code requirements.

The entire RCS is hydrotested at 125% (3107 psig) of design pressure, to demonstrate integrity prior to initial operation.

#### 2.2 LIMITING SAFETY SYSTEM SETTINGS

##### 2.2.1 REACTOR TRIP SYSTEM INSTRUMENTATION SETPOINTS

The Reactor Trip Setpoint Limits specified in Table 2.2-1 are the nominal values at which the Reactor trips are set for each functional unit. The Trip Setpoints have been selected to ensure that the core and Reactor Coolant System are prevented from exceeding their Safety Limits during normal operation and design basis anticipated operational occurrences and to assist the Engineered Safety Features Actuation System in mitigating the consequences of accidents. The Setpoint for a Reactor Trip System or interlock function is considered to be adjusted consistent with the nominal value when the "as measured" Setpoint is within the band allowed for calibration accuracy. For example, if a bistable has a trip setpoint of 100%, a span of 125%, and a calibration accuracy of 0.5% of span, then the bistable is considered to be adjusted to the trip setpoint as long as the "as measured" value for the bistable is  $\leq 100.62\%$ .

To accommodate the instrument drift assumed to occur between operational tests and the accuracy to which Setpoints can be measured and calibrated, Allowable Values for the Reactor Trip Setpoints have been specified in Table 2.2-1. Operation with Setpoints less conservative than the Trip Setpoint but within the Allowable Value is acceptable since an allowance has been made in the safety analysis to accommodate this error. An optional provision has been included for determining the OPERABILITY of a channel when its Trip Setpoint is found to exceed the Allowable Value. The methodology of this option utilizes the "as measured" deviation from the specified calibration point for rack and sensor components in conjunction with a statistical combination of the other uncertainties of the instrumentation to measure the process variable and the uncertainties in calibrating the instrumentation. In Equation 2.2-1,  $Z + R \leq S < TA$ , the interactive effects of the errors in the rack and the sensor, and the "as measured" values of the errors are considered. Z, as specified in Table 2.2-1, in percent span, is the statistical summation of

## LIMITING SAFETY SYSTEM SETTINGS

### BASES

#### REACTOR TRIP SYSTEM INSTRUMENTATION SETPOINTS (Continued)

errors assumed in the analysis excluding those associated with the sensor and rack drift and the accuracy of their measurement. TA or Total Allowance is the difference, in percent span, between the Trip Setpoint and the value used in the analysis for Reactor trip. R or Rack Error is the "as measured" deviation, in percent span, for the affected channel from the specified Trip Setpoint. S or Sensor Error is either the "as measured" deviation of the sensor from its calibration point or the value specified in Table 2.2-1, in percent span, from the analysis assumptions. Use of Equation 2.2-1 allows for a sensor drift factor and an increased rack drift factor, and provides a threshold value for determination of OPERABILITY.

The methodology to derive the Trip Setpoints is based upon combining all of the uncertainties in the channels. Inherent to the determination of the Trip Setpoints are the magnitudes of these channel uncertainties. Sensors and other instrumentation utilized in these channels are expected to be capable of operating within the allowances of these uncertainty magnitudes. Rack drift in excess of the Allowable Value exhibits the behavior that the rack has not met its allowance. Being that there is a small statistical chance that this will happen, an infrequent excessive drift is expected. Rack or sensor drift, in excess of the allowance that is more than occasional, may be indicative of more serious problems and should warrant further investigation.

The various Reactor trip circuits automatically open the Reactor trip breakers whenever a condition monitored by the Reactor Trip System reaches a preset or calculated level. In addition to redundant channels and trains, the design approach provides a Reactor Trip System which monitors numerous system variables, therefore providing Trip System functional diversity. The functional capability at the specified trip setting is required for those anticipatory or diverse Reactor trips for which no direct credit was assumed in the safety analysis to enhance the overall reliability of the Reactor Trip System. The Reactor Trip System initiates a Turbine trip signal whenever Reactor trip is initiated. This prevents the reactivity insertion that would otherwise result from excessive Reactor Coolant System cooldown and thus avoids unnecessary actuation of the Engineered Safety Features Actuation System.

← Manual Reactor Trip — Insert 1

The Reactor Trip System includes manual Reactor trip capability.

#### Power Range, Neutron Flux

In each of the Power Range Neutron Flux channels there are two independent bistables, each with its own trip setting used for a High and Low Range trip setting. The Low Setpoint trip provides protection during subcritical and low power operations to mitigate the consequences of a power excursion beginning from low power, and the High Setpoint trip provides protection during power operations to mitigate the consequences of a reactivity excursion from all power levels.

## LIMITING SAFETY SYSTEM SETTINGS

### BASES

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#### Power Range, Neutron Flux (Continued)

The Low Setpoint trip may be manually blocked above P-10 (a power level of approximately 10% of RATED THERMAL POWER) and is automatically reinstated below the P-10 Setpoint.

#### Power Range, Neutron Flux, High Rates

The Power Range Positive Rate trip provides protection against rapid flux increases which are characteristic of a rupture of a control rod drive housing. Specifically, this trip complements the Power Range Neutron Flux High and Low trips to ensure that the criteria are met for rod ejection from mid-power.

The Power Range Negative Rate trip provides protection for control rod drop accidents. At high power a single or multiple rod drop accident could cause local flux peaking which could cause an unconservative local DNBR to exist. The Power Range Negative Rate trip will prevent this from occurring by tripping the reactor.

#### Intermediate and Source Range, Neutron Flux

The Intermediate and Source Range, Neutron Flux trips provide core protection during reactor startup to mitigate the consequences of an uncontrolled rod cluster control assembly bank withdrawal from a subcritical condition. These trips provide redundant protection to the Low Setpoint trip of the Power Range, Neutron Flux channels. The Source Range channels will initiate a Reactor trip at about  $10^5$  counts per second unless manually blocked when P-6 becomes active. The Intermediate Range channels will initiate a Reactor trip at a current level equivalent to approximately 25% of RATED THERMAL POWER unless manually blocked when P-10 becomes active.

#### Overtemperature $\Delta T$

The Overtemperature  $\Delta T$  trip provides core protection to prevent DNB for all combinations of pressure, power, coolant temperature, and axial power distribution, provided that the transient is slow with respect to transport to and response time of the temperature detectors (about 4 seconds), and pressure is within the range between the Pressurizer High and Low Pressure trips. The Setpoint is automatically varied with: (1) coolant temperature to correct for temperature induced changes in density and heat capacity of water and includes dynamic compensation for transport to and response time of the loop temperature detectors, (2) pressurizer pressure, and (3) axial power distribution. With normal axial power distribution, this Reactor trip limit is always below the core Safety Limit as shown in Figure 2.1-1. If axial peaks are greater than design, as indicated by the difference between top and bottom power range nuclear detectors, the Reactor trip is automatically reduced according to the notations in Table 2.2-1.

## LIMITING SAFETY SYSTEM SETTINGS

### BASES

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#### Overpower $\Delta T$

The Overpower  $\Delta T$  trip provides assurance of fuel integrity (e.g., no fuel pellet melting and less than 1% cladding strain) under all possible overpower conditions, limits the required range for Overtemperature  $\Delta T$  trip, and provides a backup to the High Neutron Flux trip. The Setpoint is automatically varied with: (1) coolant temperature to correct for temperature induced changes in density and heat capacity of water, and (2) rate of change of temperature for dynamic compensation for transport to and response time of the loop temperature detectors, to ensure that the allowable heat generation rate (kW/ft) is not exceeded.

#### Pressurizer Pressure

In each of the pressurizer pressure channels, there are two independent bistables, each with its own trip setting to provide for a High and Low Pressure trip thus limiting the pressure range in which reactor operation is permitted. The Low Setpoint trip protects against low pressure which could lead to DNB by tripping the reactor in the event of a loss of reactor coolant pressure.

On decreasing power the Low Setpoint trip is automatically blocked by the loss of P-7 (a power level of approximately 10% of RATED THERMAL POWER or turbine impulse chamber pressure at approximately 10% of full power equivalent); and on increasing power, automatically reinstated by P-7.

The High Setpoint trip functions in conjunction with the pressurizer relief and safety valves to protect the Reactor Coolant System against system overpressure.

#### Pressurizer Water Level

The Pressurizer High Water Level trip is provided to prevent water relief through the pressurizer safety valves. On decreasing power the Pressurizer High Water Level trip is automatically blocked by the loss of P-7 (a power level of approximately 10% of RATED THERMAL POWER or a turbine impulse chamber pressure at approximately 10% of full power equivalent); and on increasing power, automatically reinstated by P-7.

#### Reactor Coolant Flow

The Reactor Coolant Low Flow trips provide core protection to prevent DNB by mitigating the consequences of a loss of flow resulting from the loss of one or more reactor coolant pumps.

On increasing power above P-7 (a power level of approximately 10% of RATED THERMAL POWER or a turbine impulse chamber pressure at approximately 10% of full power equivalent), an automatic Reactor trip will occur if the flow in more than one loop drops below 90.5% of nominal full loop flow. Above P-8



## LIMITING SAFETY SYSTEM SETTINGS

### BASES

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#### Reactor Coolant Flow (Continued)

(a power level of approximately 49% of RATED THERMAL POWER) an automatic Reactor trip will occur if the flow in any single loop drops below 90.5% of nominal full loop flow. Conversely, on decreasing power between P-8 and the P-7 an automatic Reactor trip will occur on low reactor coolant flow in more than one loop and below P-7 the trip function is automatically blocked.

#### Steam Generator Water Level

The Steam Generator Water Level Low-Low trip protects the reactor from loss of heat sink in the event of a sustained steam/feedwater flow mismatch resulting from loss of normal feedwater. The specified Setpoint provides allowances for starting delays of the Auxiliary Feedwater System.

#### Steam/Feedwater Flow Mismatch and Low Steam Generator Water Level

The Steam/Feedwater Flow Mismatch in coincidence with a Steam Generator Low Water Level trip is not used in the transient and accident analyses but is included in Table 2.2-1 to ensure the functional capability of the specified trip settings and thereby enhance the overall reliability of the Reactor Trip System. This trip is redundant to the Steam Generator Water Level Low-Low trip. The Steam/Feedwater Flow Mismatch portion of this trip is activated when the steam flow exceeds the feedwater flow by the setpoint value. The Steam Generator Low Water level portion of the trip is activated when the setpoint value is reached, as indicated by the narrow range instrument. These trip values include sufficient allowance in excess of normal operating values to preclude spurious trips but will initiate a Reactor trip before the steam generators are dry. Therefore, the required capacity and starting time requirements of the auxiliary feedwater pumps are reduced and the resulting thermal transient on the Reactor Coolant System and steam generators is minimized.

#### Undervoltage and Underfrequency - Reactor Coolant Pump Buses

The Undervoltage and Underfrequency Reactor Coolant Pump Bus trips provide core protection against DNB as a result of complete loss of forced coolant flow. The specified Setpoints assure a Reactor trip signal is generated before the Low Flow Trip Setpoint is reached. Time delays are incorporated in the Underfrequency and Undervoltage trips to prevent spurious Reactor trips from momentary electrical power transients.

On decreasing power the Undervoltage and Underfrequency Reactor Coolant Pump Bus trips are automatically blocked by the loss of P-7 (a power-level of approximately 10% of RATED THERMAL POWER or a turbine impulse chamber pressure

## LIMITING SAFETY SYSTEM SETTINGS

### BASES

#### Undervoltage and Underfrequency - Reactor Coolant Pump Busses (Continued)

at approximately 10% of full power equivalent); and on increasing power, reinstated automatically by P-7.

#### Turbine Trip

A Turbine trip initiates a Reactor trip. On decreasing power the Reactor trip from the Turbine trip is automatically blocked by the loss of P-7 (a power level of approximately 10% of RATED THERMAL POWER or a turbine impulse chamber pressure at approximately 10% of full power equivalent); and on increasing power, reinstated automatically by P-7.

#### Safety Injection Input from ESF

If a Reactor trip has not already been generated by the Reactor Trip System instrumentation, the ESF automatic actuation logic channels will initiate a Reactor trip upon any signal which initiates a Safety Injection. The ESF instrumentation channels which initiate a Safety Injection signal are shown in Table 3.3-3.

#### Reactor Trip System Interlocks

The Reactor Trip System interlocks perform the following functions:

- P-6 On increasing power P-6 allows the manual block of the Source Range trip (i.e., prevents premature block of Source Range trip), and deenergizes the high voltage to the detectors. On decreasing power, Source Range Level trips are automatically reactivated and high voltage restored.
- P-7 On increasing power P-7 automatically enables Reactor trips on low flow in more than one reactor coolant loop, reactor coolant pump motor undervoltage and underfrequency, turbine trip, pressurizer low pressure and pressurizer high level. On decreasing power, the above listed trips are automatically blocked.
- P-8 On increasing power, P-8 automatically enables Reactor trips on low flow in one or more reactor coolant loops. On decreasing power, the P-8 automatically blocks the above listed trips.
- P-10 On increasing power, P-10 allows the manual block of the Intermediate Range trip and the Low Setpoint Power Range trip; and automatically blocks the Source Range trip and deenergizes the Source Range high voltage power. On decreasing power, the Intermediate Range trip and the Low Setpoint Power Range trip are automatically reactivated. Provides input to P-7.
- P-13 Provides input to P-7.

## **RTS BASES - Insert 1**

Consistent with the NRC approved Technical Specification Task Force (TSTF) Traveler 493, Revision 4, "Clarify Application of Setpoint Methodology for LSSS Functions," Notes 7 and 8 have been added to Table 2.2-1 that require verifying trip setpoint setting values during surveillance testing of the Power Range Neutron Flux High and Low setpoints, and Power Range Neutron Flux High Positive Rate and High Negative Rate. In accordance with 10 CFR 50.36 these functions are Limiting Safety System Settings. Adding test requirements ensures that instruments will function as required to initiate protective systems or actuate mitigating systems at the point assumed in the applicable safety analysis. These notes address two NRC staff concerns with Technical Specification Allowable Values. The first concern was that calculated Allowable Values may be non-conservative depending upon the evaluation of instrument performance history, and the as-left requirements of the calibration procedures could have an adverse effect on equipment operability. The second concern was using Allowable Values as the limiting setting for assessing instrument channel operability may not be fully in compliance with the intent of 10 CFR 50.36, and the existing surveillance requirements would not provide adequate assurance that instruments will always actuate safety functions at the point assumed in the applicable safety analysis.

Note 7 requires an instrument performance evaluation when the as-found instrument setpoint setting is outside its as-found tolerance. The instrument performance evaluation verifies that the instrument will continue to behave in accordance with safety analysis assumptions and the instrument performance assumptions in the setpoint methodology. The purpose of this assessment is to provide confidence in the instrument performance prior to returning the instrument to service. If the as-found Nominal Trip Setpoint (NTSP) is non-conservative with respect to the Allowable Value, the channel is declared inoperable. If the actual channel setting is found to be conservative with respect to the Allowable Value but is beyond the as-found tolerance band, the channel is OPERABLE but degraded. The degraded channel condition will be further evaluated during performance of the surveillance. This evaluation will consist of resetting the channel setpoint to the NTSP (within the allowed tolerance), and evaluating the channel response. If the channel is functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition is entered into the corrective action program for further analysis and trending.

Note 8 requires that the as-left instrument channel setting be returned to within the as-left tolerance of the NTSP. Setpoint calculations assume that the instrument setpoint is left at the NTSP within a specific as-left tolerance. A tolerance is necessary because no device perfectly measures the process. Additionally, it is not possible to read and adjust a setting to an absolute value due to the readability and/or accuracy of the test instruments or the ability to adjust

potentiometers. The as-left tolerance is considered in the setpoint calculation. Failure to set the actual plant trip setpoint to the NTSP or more conservative than the NTSP and within the as-left tolerance would invalidate the assumptions in the setpoint calculation, because any subsequent instrument drift would not start from the expected as-left setpoint. The determination will consider whether the instrument is degraded or is capable of being reset and performing its specified safety function. If the channel is determined to be functioning as required (i.e., the channel can be adjusted to within the as-left tolerance and is determined to be functioning normally based on the determination performed prior to returning the channel to service), then the channel is OPERABLE and can be restored to service. If the as-left instrument setting cannot be returned to a setting within the NTSP as-left tolerance band, the instrument would be declared inoperable.

The methodologies for calculating the NTSPs, as-found tolerance band and as-left tolerance band are specified in HNP procedure EGR-NGGC-0153, "Engineering Instrument Setpoints." This procedure is incorporated by reference in the FSAR.

Limiting Trip Setpoint (LTSP) is generic terminology for the setpoint value calculated by means of the plant-specific setpoint methodology documented in the FSAR or a document incorporated by reference into the FSAR. HNP uses the plant-specific term NTSP in place of the generic term LTSP. The NTSP is the LTSP with margin added, and is always equal to or more conservative than the LTSP. The NTSP may use a setting value that is more conservative than the LTSP, but for Technical Specification compliance with 10 CFR 50.36, the plant-specific setpoint term NTSP is cited in the second note. The NTSP meets the definition of a Limiting Safety System Setting per 10 CFR 50.36 and is a predetermined setting for a protective channel chosen to ensure that automatic protective actions will prevent exceeding Safety Limits during normal operation and design basis anticipated operational occurrences, and assist the Engineered Safety Features Actuation System in mitigating the consequences of accidents. The Allowable Value is the least conservative value of the as-found setpoint that the channel can have when tested, such that a channel is OPERABLE if the as-found setpoint is within the as-found tolerance and is conservative with respect to the Allowable Value during a CHANNEL CALIBRATION or CHANNEL OPERATIONAL TEST. As such, the Allowable Value differs from the NTSP by an amount greater than or equal to the expected instrument channel uncertainties such as drift, during the surveillance interval. In this manner, the actual NTSP setting ensures that a Safety Limit is not exceeded at any given point of time as long as the channel has not drifted beyond expected tolerances during the surveillance interval. Although the channel is OPERABLE under these circumstances, the trip setpoint must be left adjusted to a value within the as-left tolerance band, in accordance with uncertainty assumptions stated in the setpoint methodology (as-left criteria), and confirmed to be operating within the statistical allowances of the uncertainty terms assigned (as-found criteria).

Field setting is the term used for the actual setpoint implemented in the plant surveillance procedures, where margin has been added to the calculated field setting. The as-found and as-left tolerances apply to the field setting implemented in the surveillance procedures to confirm channel performance. A trip setpoint may be set more conservative than the NTSP as necessary in response to plant conditions. However, in this case, the instrument operability must be verified based on the field setting and not the NTSP.