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Docket No. 50-461

10CFR50.46

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

Subject: Reporting of a Change to the ECCS Evaluation Model Used for Clinton Power Station (CPS)

Dear Madam or Sir:

Pursuant to the requirements of 10CFR50.46(a)(3)(ii), AmerGen Energy Company, LLC, (AmerGen) herein reports a change in the acceptable evaluation model that is used to analyze the loss-of-coolant accident (LOCA). Specifically, the SAFER/GESTR-LOCA evaluation model is replacing the SAFE/REFLOOD evaluation model for Clinton Power Station (CPS). The NRC safety evaluation for the General Electric (GE) SAFER/GESTR-LOCA evaluation model is referenced in a letter from C. O. Thomas (NRC) to J. F. Quirk (GE), *Acceptance for Referencing of Licensing Topical Report NEDE-23785, Revision 1, Volume III(P), "The GESTR-LOCA and SAFER Model for the Evaluation of the Loss-of-Coolant Accident,"* dated June 1, 1984. Since application of the SAFER/GESTR-LOCA Evaluation model yields a significant change to the analyzed peak cladding fuel temperature (PCT) experienced during a design basis LOCA, this report satisfies the 30-day reporting requirement in 10 CFR 50.46(a)(3)(ii) for a significant change to PCT.

Attachment 1 is a summary of the plant-specific analysis for CPS which demonstrates compliance with 10 CFR 50.46 (a)(3)(ii) based on the requirements of 10 CFR 50.46(b) and the requirements contained in the June 1, 1984 NRC letter identified above. It provides a description of the models, inputs, and results of the SAFER/GESTR-LOCA analysis for CPS.

As noted above, the most significant change resulting from the application of SAFER/GESTER-LOCA to CPS is the analyzed PCT. The PCT was evaluated for each fuel type in the CPS reactor, i.e., GE10-type fuel and GE14-type fuel, the latter of which is being used for the first time in the CPS reactor (starting with Cycle 8). Specifically, for the GE10-type fuel, the Licensing Basis PCT for the postulated design-basis LOCA changed from 2150°F to 1450°F. For the GE14-type fuel, which proved to be the limiting fuel type, a

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Licensing Basis PCT of 1550°F was established. These Licensing Basis PCTs were calculated using relaxed ECCS parameters that are more conservative than those used for the original SAFE/REFLOOD analysis (i.e., those parameters that are currently identified in the CPS USAR). All PCT values using SAFER/GESTR-LOCA are well below the 10 CFR 50.46(b)(2) limit of 2200° F.

Because none of the ECCS parameters specified in the Technical Specifications were required to be changed, and because the CPS analysis is compliant with the criteria required for the NRC's generically approved use of the plant-specific SAFER/GESTR-LOCA methodology, NRC review of the application of SAFER/GESTR-LOCA at CPS is not required. However, a safety evaluation in accordance with 10 CFR 50.59, "Changes, Tests, and Experiments," was completed, and the CPS Technical Specifications Bases and the CPS Updated Safety Analysis Report were revised, as necessary, prior to implementing the results of the SAFER/GESTR-LOCA analyses at CPS. SAFER/GESTR-LOCA implementation will thus be complete for plant restart from the current refueling outage which began on October 14, 2000.

Sincerely,

MaReandeau

Michael A. Reandeau
Director-Licensing

RWC/blf

Attachment

cc: NRC Regional Administrator, Region III
NRC Clinton Licensing Project Manager
NRC Resident Office, V-690
Illinois Department of Nuclear Safety

INTRODUCTION

The SAFER and GESTR-LOCA models, commonly known as SAFER/GESTR-LOCA, are coupled mechanistic, reactor system thermal-hydraulic and fuel rod mechanical evaluation models that are used to evaluate boiling water reactor (BWR) loss-of-coolant accidents (LOCAs). The models are conservative but use more realistic correlations than the currently approved analysis. The new analysis also uses more realistic inputs than the inputs that were used for the current analytical basis for the emergency core cooling system (ECCS). The SAFER/GESTR-LOCA models are based on large scale experiments, the development of best-estimate codes, and improved, more realistic BWR licensing models. SAFER/GESTR-LOCA was reviewed and approved by the NRC in letter from C. O. Thomas (NRC) to J. F. Quirk (GE), *Acceptance for Referencing of Licensing Topical Report NEDE-23785, Revision 1, Volume III(P), "The GESTR-LOCA and SAFER Model for the Evaluation of the Loss-of-Coolant Accident"* dated June 1, 1984.

GE showed in NEDE-23785, Revision 1 that SAFER/GESTR-LOCA can be used to conservatively demonstrate conformance with 10 CFR 50.46 and Appendix K criteria. The June 1, 1984 NRC letter documents the approval of SAFER/GESTR-LOCA for BWRs and specifies criteria that must be satisfied in order for a licensee to use SAFER/GESTR-LOCA as the "acceptable evaluation method" identified in 10 CFR 50.46 (a) (3) (ii). Described below is the CPS specific application of SAFER/GESTR-LOCA as well as how the application of SAFER/GESTR-LOCA to CPS meets the criteria in 10 CFR 50.46 and in the June 1, 1984 NRC letter.

The primary reason for the CPS application of SAFER/GESTR-LOCA is that GE-14 type fuel will be used in Cycle 8, and SAFE/REFOOD analyses using GE14 fuel would have resulted in overly restrictive Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) limits. The restrictive MAPLHGR limits would not have allowed AmerGen to take full operational advantage of the GE14 fuel design.

CPS SPECIFIC ANALYSES AND ACCEPTANCE CRITERIA

The analysis performed for CPS, including demonstration of compliance with licensing requirements, was performed using SAFER/GESTR-LOCA models, the criteria in 10 CFR 50.46, the criteria prescribed in the June 1, 1984 NRC letter, and CPS specific inputs. The evaluation methods that were used to analyze the postulated loss of coolant accidents for CPS are the so-called LAMB, SCAT/TASC, SAFER, and GESTR-LOCA methods. (See GE report NEDE-21011-P-A-US, "General Electric Standard Application for Reactor Fuel," dated June 2000 for a description of these models.) These models evaluate the short-term and long-term reactor vessel blowdown response to a pipe rupture, the resultant fuel heat-up, and the subsequent core flooding by the emergency core cooling system (ECCS).

Since SAFER/GESTR-LOCA uses more realistic correlations and improved methods than those previously used, it yields a lower PCT than would be obtained by application of previous methods (such as SAFE/REFLOOD) for the same inputs. At the same time, however, relaxed ECCS parameters may be used in order to calculate a peak cladding temperature (PCT) that is more conservative, i.e., a higher temperature, than that which would be calculated from the current licensing-basis ECCS parameters using SAFER/GESTR-LOCA. Thus, the new relaxed inputs provide added margin between the analyzed parameters and the Technical Specification limits, as well as added margin between the analyzed parameters and the capability of the installed equipment.

The SAFER/GESTR-LOCA licensing methodology approved by the NRC allows the plant-specific break spectrum to be defined using nominal input assumptions. However, the calculations of the limiting PCT to demonstrate conformance with the requirements of 10CFR50.46 must include specific inputs and models documented in Appendix K. The methodology for determination of the "Licensing Basis" PCT is based on a relationship between the "Appendix K" PCT, the "Nominal" PCT and an uncertainty term, all of which are more precisely defined in NEDE-23785 (previously referenced).

10 CFR 50.46 Criteria

Applicable licensing criteria that must be satisfied for assessing ECCS performance are specified in 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Power Reactors," Paragraph b. The criteria are as follows:

1. The calculated maximum fuel cladding temperature, i.e., peak cladding temperature, shall not exceed 2200° F.
2. The calculated total oxidation of the cladding shall nowhere exceed 0.17 times the total cladding thickness before oxidation.
3. The calculated total amount of hydrogen generated from chemical reaction of cladding with water or steam shall not exceed 0.01 times the hypothetical amount that would be generated if all the metal in the cladding cylinder surrounding fuel, excluding the cladding surrounding the plenum volume, were to react.
4. The calculated changes in core geometry shall be such that the core remains amenable to cooling.
5. After any successful initial operation of the ECCS, the calculated core temperature shall be maintained at an acceptably low value and decay heat shall be removed for the extended period of time required by the long-term radioactivity remaining in the core.

Conformance with Criteria 1, 2, and 3 for CPS is addressed in the discussion of this attachment. Conformance with criterion 4 is demonstrated by conformance with Criteria 1 and 2 as indicated in GE NEDO-20566A, "General Electric Company Analytical Model for Loss-of-Coolant Analysis in Accordance With 10 CFR 50 Appendix K," dated September 1986. Conformance with Criterion 5 is based on and documented in NEDO-20566A, and is unchanged by the application of SAFER/GESTR-LOCA.

NRC June 1, 1984 SAFER/GESTR Acceptance Criteria

Section 3.2 of the June 1, 1984 NRC letter identified conditions that must be satisfied in order for SAFER/GESTR-LOCA to be an acceptable evaluation model for a BWR. These conditions are as follows:

1. The generic Appendix K PCT versus break size curve exhibits the same trends as the generic Nominal PCT versus break size curve for a given class of plants.
2. The limiting LOCA determined from Nominal PCT calculations is the same as that determined from the Appendix K PCT calculations for a given class of plants.
3. Both the generic Nominal PCT versus break size curve and the Appendix K PCT versus break size curve for a given class of plants are shown to be applicable on a plant-specific basis. Necessary conditions for demonstrating applicability include:
   a. Calculation of a sufficient number of plant-specific PCT points to verify the shape of the curve.
   b. Confirmation that plant specific Licensing Basis PCT calculations match the trend of the generic curve, PCT versus break size, for that plant class.
   c. Confirmation that plant-specific operating parameters have been conservatively bounded by the models and the inputs used in the generic calculations.
   d. Confirmation that the plant-specific ECCS configuration is consistent with the referenced plant class ECCS configuration.

Demonstration that Conditions 1 and 2 are satisfied by the SAFER/GESTR-LOCA evaluation model is documented in NEDE-23785. Demonstration that Condition 3 requirements are satisfied by the CPS specific analysis is discussed in the "Conformance to Acceptance Criteria" section of this attachment.

In addition, the NRC SER dated June 1, 1984, section 3.4 concluded that the plant specific analysis for PCT values must meet the following acceptance criteria.

1. The Upper Bound PCT must be less than the Licensing Basis PCT.
2. The Upper Bound PCT calculation is valid for up to 1600° F, without further justification.

Conformance to these criteria is also discussed in the "Conformance to Acceptance Criteria" section.

SAFER/GESTR-LOCA ANALYTICAL INPUTS AND LIMITS

The CPS specific analysis included consideration of the following conditions: Maximum Extended Operating Domain (MEOD) which includes Maximum Extended Load Line Limit (MELLL) and Increased Core Flow (ICF), Single-Loop Operation (SLO), and a Feedwater Temperature Reduction of 50° F (FWTR) for two-loop operation. With respect to assumed fuel types, GE10 and GE14 fuel types were both included in the basis for the analyses. (GE8-type fuel was also included, although at present there is no longer any GE8 fuel in the CPS reactor.) The analysis was performed for the current CPS core rated

thermal power of 2894 MWt. However, consistent with the current licensing basis, a core thermal power of 3015 MWt was used for Appendix K calculation purposes. (3015 MWt corresponds to 104.2% of rated power based on 105% of rated steam flow.)

The analysis was performed using the plant parameters in Table 1 for a spectrum of line breaks in the recirculation system and for limiting line breaks in non-recirculation systems as described in the CPS Updated Safety Analysis Report (USAR). Also, analyses were performed assuming limiting single failures that affect ECCS availability in order to determine the worse-case single failure conditions. The results from the worst-case single failure analysis are a basis for comparison to NRC criteria.

As noted previously, relaxed ECCS input parameters were assumed for the SAFER/GESTR-LOCA analyses in order to provide additional margin between the analytical limits and the TS limits for ECCS equipment parameters. These parameters are shown in Table 2, Column 3 ("SAFER/GESTR Analysis Values") and were assumed for the analysis, including determination of PCT, and for the determination of other associated parameters. The values in Table 2, Column 4 ("Current Design Basis Values") are the approved analytical values from which the Technical Specification limits are derived, and that were previously used for the SAFE/REFLOOD analysis.

Conservative fuel parameters were used for the analysis based on the most limiting combination of power and exposure. Table 3 provides the fuel parameters that were used for the calculations, including Maximum Average Planar Linear Heat Generation Rate (MAPLHGR), Peak Linear Heat Generation Rate (PLHGR), and Minimum Critical Power Ratio (MPCR) for the GE14, GE10 and GE8 fuel types. The fuel parameters were adjusted by a factor of 1.02 to reflect Appendix K requirements.

RESULTS OF THE SAFER/GESTR CALCULATIONS

The SAFER/GESTR analyses determined the GE14 fuel to be the limiting fuel type. The limiting fault is a 100% recirculation suction line break, i.e., the design basis accident (DBA), and the worst-case single system failure is failure of the High Pressure Core Spray (HPCS) system. Table 4 provides the calculated values for PCT (for 100 percent core flow and nominal feedwater temperature) using the original design basis parameters, i.e., non-relaxed parameters, versus the calculated values for PCT using the relaxed parameters, i.e., SAFER/GESTR Base Case Values. As a result of the relaxation, the limiting 10 CFR 50 Appendix K PCT increased from 1176° F to 1547° F.

Table 5 provides a summary of key results obtained for the DBA (assuming failure of the HPCS/diesel generator system) for each considered fuel type. The limiting Upper Bound PCT was calculated to be 1450° F for GE14 fuel, 1410° F for GE10 fuel, and 1440° F for GE8 fuel. The corresponding Licensing Basis PCTs were 1550° F, 1430° F, and 1450° F for the GE14, GE10, and GE8 fuel, respectively. In addition, the maximum local oxidation fraction was less than 1.0 %, and the core-wide metal-water-reaction fraction was less than 0.1% (for all fuel types). Based on the fact that the PCT is less than 2200° F and the maximum local oxidation fraction is less than 1.0 %, Table 5 indicates that the core will maintain a coolable geometry. In addition, and as also indicated on Table 5, as long as the

reflood water level is above the top of active fuel (TAF) or at the top of the jet pumps with one core spray system available, adequate long-term cooling will be achieved.

CONFORMANCE TO ACCEPTANCE CRITERIA

As noted above, Table 5 shows that all 10 CFR 50.46 criteria are met. The indicated results compare favorably with results from the generic analysis which indicates that the reactor recirculation line break is the limiting DBA, and that HPCS failure is the worst-case single failure for BWR6 plants.

To demonstrate that the NRC criteria in the June 1, 1984 letter, Section 3.2, Condition 3 are met, the results of the CPS SAFER/GESTR-LOCA analysis are compared with the criteria in Section 3.2, as follows.

1. Analyzed break sizes ranged from 0.03 ft^2 to 2.207 ft^2 (an effective size of 2.223 ft^2). This range of break sizes provided a sufficient number of PCT points to verify the shape of the PCT curves as a function of break size.
2. The nominal and Appendix K PCT results were compared to assure that the curves obtained for PCT as a function of break size were consistent with one another and with the generic BWR6 break spectrum curves in NEDE-23785. The results confirmed that the CPS-specific Appendix K PCT calculations match the trend of the generic curve for the BWR6 plants.
3. A comparison of the Table 2 parameters with the parameters in NEDE-23785-1-PA for a BWR6 indicates that the CPS specific operating parameters are conservatively bounded by the model and inputs used in the generic calculations.
4. A comparison of the CPS ECCS configuration with the reference BWR6 ECCS configuration indicates that the CPS ECCS configuration is consistent with the reference BWR6 in NEDE-23785. (Also, the limiting single failure, i.e., the HPCS diesel/generator failure, for the CPS specific analysis is the same limiting single failure as in generic case.)

Regarding the acceptance criteria in the NRC SER dated June 1, 1984, the Licensing Basis PCT is 1550° F and is greater than the Upper Bound PCT of 1450° F. This satisfies the acceptance criterion that the Licensing Basis PCT should be larger than the Upper Bound PCT. Also, the Upper Bound PCT is less than 1600° F which satisfies the acceptance criterion that the Upper Bound PCT should be less than 1600° F.

Finally, regarding the use of relaxed ECCS parameters in the analysis, and as explained previously, the results obtained from the use of such parameters versus the less conservative, original design-basis input parameters resulted in an increase in the Appendix K PCT by 371° F to 1547° F for GE14 fuel. It may be noted that if the relaxed parameters were not applied, the CPS analysis would closely agree with the generic results.

CONCLUSION

LOCA analyses have been performed for CPS using the GE SAFER/GESTR-LOCA application methodology that was approved by the NRC. These analyses were performed in accordance with the NRC Safety Evaluation Report (SER) requirements for the use of the SAFER/GESTR-LOCA methodology. As indicated above, all licensing acceptance criteria in 10 CFR 50.46, in 10 CFR 50 Appendix K, and in the NRC SER dated June 1, 1984 were met. The results demonstrate that the limiting Licensing Basis PCT occurs for the recirculation suction DBA.

Overall, the use of the SAFER/GESTR-LOCA Methodology to perform CPS specific ECCS analyses meets all acceptance criteria. The SAFER/GESTR-LOCA results may be used to provide a new LOCA Licensing Basis for CPS and are valid for fuel designs with a comparable geometry to the GE14, GE10, and GE8 fuel types using the parameters in Table 3.

TABLE 1. PLANT OPERATIONAL PARAMETERS USED IN THE CPS SAFER/GESTR-LOCA ANALYSIS

Plant Parameters	Nominal	Appendix K
Core Thermal Power (MWt)	2894	3015
Corresponding Power (% of 2894 MWt)	100	104.2
Vessel Steam Output (Mlb/hr)	12.45	13.07
Vessel Steam Output (% of rated)	100	105
Core Flow (Mlb/hr)	84.5	84.5
Core Flow (% of rated)	100	100
Vessel Steam Dome Pressure (psia)	1040	1060
Maximum Recirculation Suction Line Break Area (ft^2)	2.207	2.207
Bottom Head Drain Line Break Area (ft^2)	0.0155	0.0155

TABLE 2. COMPARISON OF SAFER/GESTR-LOCA ANALYSES ECCS PARAMETERS TO THE ANALYTICAL BASIS ECCS PARAMETERS

1. Low Pressure Coolant Injection (LPCI) System

Parameter	Units	SAFER/GESTR Analysis Values	Current Design Basis Values[1]
a. Maximum vessel pressure at which flow may commence	psid (vessel to drywell)	225	225
b. Minimum rated flow inside shroud at 20 psid			
• One LPCI pump	gpm	4400	4967
• Two LPCI pumps	gpm	8800	9933
• Three LPCI pumps	gpm	13200	14900
c. Minimum flow at 0 psid (vessel-to-drywell)			
• One LPCI pump into shroud	gpm	4800	5300
• Two LPCI pumps into shroud	gpm	9600	10600
• Three LPCI pumps into shroud	gpm	14400	15900
d. Initiating signal			
• Low-low-low water level (level 1)	Inches above vessel zero	360.0	368.0
Or			
• High drywell pressure	psig	2.0	2.0
e. Pressure at which injection valve may open	psig	315	415
f. Maximum time from initiating signal until power can be supplied to the valve with emergency power	seconds	23[2]	12
g. Maximum time from initiating signal to pump at rated speed and capable of rated flow with emergency diesel power	seconds	48[2]	27
h. Injection valve stroke time-opening after pressure permissive	seconds	55	30

[1] Design Basis Values are the analytical values used as the basis for the original plant design and license.

[2] Includes an additional 1 second for instrument response time.

TABLE 2. COMPARISON OF SAFER/GESTR-LOCA ANALYSES ECCS PARAMETERS TO THE ANALYTICAL ECCS PARAMETERS (continued)

2. Low Pressure Core Spray (LPCS)

Variable	Units	SAFER/GESTR Analysis Values	Current Design Basis Values
a. Maximum vessel pressure at which flow may commence	Psid (vessel To drywell)	265	265
b. Minimum flow inside the shroud at vessel pressure	gpm @ psid (vessel to drywell	4400 113	4900 113
c. Minimum flow at 0 psid (vessel to drywell	gpm	4900	5500
d. Initiating signal • Low-low-low water level (Level 1) or • High drywell pressure	 inches above vessel zero psig	 360.0 2.0	 368.0 2.0
e. Pressure at which injection valve may open	psig	315	415
f. Maximum time from initiating signal until power can be supplied to the valve with emergency diesel power	seconds	23[1]	12
g. Maximum time from initiating signal to pump up to speed and capable of rated flow with emergency diesel power	seconds	48[1]	27
h. Injection valve stroke time-opening	seconds	55	29

[1] Includes an additional 1 second for instrument response time.

TABLE 2. COMPARISON OF SAFER/GESTR-LOCA ANALYSES ECCS PARAMETERS TO THE ANALYTICAL BASIS ECCS PARAMETERS (continued)

3. High Pressure Core Spray (HPCS) System

Variable	Units	SAFER/GESTR Analysis Values	Current Design Basis Values
a. Maximum vessel pressure at which pump can inject water	psid	1103	1200
b. Minimum flow inside the shroud at vessel to drywell pressure	gpm/psid	800/1103 4000/200	467/1200 1400/1147 4900/200
c. Minimum flow at 0 psid vessel to drywell pressure	gpm	4900	4900
d. Initiating signal			
• Low-low level (Level 2)	inches above vessel zero	456	468
Or			
• High drywell pressure	psig	2.0	2.0
e. Maximum allowable time delay from initiating signal to rated flow available (including injection valve stroke time opening) with emergency diesel power	seconds	47	27

TABLE 2. COMPARISON OF SAFER/GESTR-LOCA ANALYSES ECCS PARAMETERS TO THE ANALYTICAL BASIS ECCS PARAMETERS (continued)

4. Automatic Depressurization System (ADS)

Variable	Units	SAFER/GESTR Analysis Values	Current Design Basis Values
a. Total number of relief valves installed with ADS function		7	7
b. Pressure at which flow capacity in 4.c. and 4.e. are quoted (vessel to suppression pool)	psid	1190	1190
c. Minimum flow capacity at pressure given in 4.b. with all available ADS valves assumed in analysis	lbm/hr	6.4745×10^6	6.4745×10^6
d. Total number of relief valves assumed in analysis		6	6
e. Minimum flow rate at pressure given 4.b. with number of relief valves given in 4.d.	lbm/hr	5.5496×10^6	5.5496×10^6
f. Initiating signal			
• Low-low-low water level (Level 1) and	inches above vessel zero	360.0	368.0
• High drywell pressure	psig	2	2
Or			
• Low-low-low water level (Level 1) and	inches above Vessel zero	360.0	368.0
• High drywell pressure Bypass timer timed out			
g. High drywell pressure bypass timer	seconds	420	420
ADS timer delay from initiating signal completed to the time valves are open with confirming signal that one LPCI or LPCS pump is running.	seconds	125	120

TABLE 3. FUEL PARAMETERS IN THE CPS ANALYSIS

Fuel Parameters	Analysis Values		
	GE14	GE10	GE8
MAPLHGR (kW/ft) - Appendix K - Nominal	12.82 x 1.02 12.24	13.77 x 1.02 13.20	13.79 x 1.02 13.21
PLHGR (Kw/ft) - Appendix K - Nominal	13.4 x 1.02 12.8	14.4 x 1.02 13.8	14.4 x 1.02 13.8
Worst Case Pellet Exposure for ECCS Evaluation[1] (MWd/MTU)	4000	4000	14,590
LHGR – Exposure Limit Curve Used in the LOCA Analysis (kW/ft vs. MWd/MTU)	13.4/0 13.4/16,000 8.0/63,500 5.0/70,000	14.4/0 14.4/14,590 9.0/60,000	14.4/0 14.4/14,590 9.0/60,000
Initial Operating MCPR – LOCA Analysis Limit - Appendix K - Nominal	1.27 1.27/1.02 1.27+0.02	1.17 1.17/1.02 1.17+.02	1.17 1.17/1.02 1.17+.02
Axial Peaking Factor	1.8	1.4	1.4
Number of Fuel Rods per Bundle (full or part-length)	92	60	62

[1] Represents the limiting operating condition that results in the maximum calculated PCT at anytime during the bundle life.

TABLE 4. COMPARISON OF SAFER/GESTR RESULTS BASED ON ORIGINAL AND RELAXED ECCS ANALYTICAL VALUES

Analysis Basis	SAFER/GESTR Base Case PCT	Original Design Basis[1] PCT
Nominal	998	880
Appendix K	1547	1176

TABLE 5. SAFER/GESTR-LOCA LICENSING RESULTS

Fuel Type	GE8	GE10	GE14	Licensing Acceptance Criteria
1. Peak Cladding Temperature (°F) Licensing Basis	<1450	<1430	<1550	≤2200
2. Estimated Upper Bound PCT (°F) (95% Probability)	<1440	<1410	<1450	≤1600
3. Maximum Local Oxidation (%)	<1.0	<1.0	<1.0	≤17
4. Core-Wide Metal-Water Reaction Fraction (%)	<0.1	<0.1	<0.1	≤1.0
5. Coolable Geometry	See 1 and 3 above	See 1 and 3 above	See 1 and 3 above	See 1 and 3 above
6. Long Term Cooling	Reflood to above TAF[2] or Reflood to top of jet pumps with one core spray available	Reflood to above TAF or Reflood to top of jet pumps with one core spray available	Reflood to above TAF or Reflood to top of jet pumps with one core spray available	Core temperature acceptably low and long-term decay heat removed

[1] Original Design Basis analyses used the analytical parameters that were used for the original plant design and license.
[2] TAF – top of active fuel