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~~Proprietary Information~~
~~Withhold from Public Disclosure~~

Richard J. St. Onge
Director, Nuclear Regulatory Affairs and
Emergency Planning

April 2, 2013

10 CFR 50.4

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

Subject: **Docket No. 50-361**
Response to Request for Additional Information (RAI 11), Revision 1
Regarding Confirmatory Action Letter Response
(TAC No. ME 9727)
San Onofre Nuclear Generating Station, Unit 2

References:

1. Letter from Mr. Elmo E. Collins (USNRC) to Mr. Peter T. Dietrich (SCE), dated March 27, 2012, Confirmatory Action Letter 4-12-001, San Onofre Nuclear Generating Station, Units 2 and 3, Commitments to Address Steam Generator Tube Degradation

2. Letter from Mr. Peter T. Dietrich (SCE) to Mr. Elmo E. Collins (USNRC), dated October 3, 2012, Confirmatory Action Letter – Actions to Address Steam Generator Tube Degradation, San Onofre Nuclear Generating Station, Unit 2

3. Letter from Mr. James R. Hall (USNRC) to Mr. Peter T. Dietrich (SCE), dated December 26, 2012, Request for Additional Information Regarding Response to Confirmatory Action Letter, San Onofre Nuclear Generating Station, Unit 2

4. Letter from Mr. Richard J. St. Onge (SCE) to NRC Document Control Desk, dated January 21, 2013, Response to Request for Additional Information (RAI 11) Regarding Confirmatory Action Letter Response, San Onofre Nuclear Generating Station, Unit 2

Dear Sir or Madam,

On March 27, 2012, the Nuclear Regulatory Commission (NRC) issued a Confirmatory Action Letter (CAL) (Reference 1) to Southern California Edison (SCE) describing actions that the NRC and SCE agreed would be completed to address issues identified in the steam generator tubes of San Onofre Nuclear Generating Station (SONGS) Units 2 and 3. In a letter to the NRC dated October 3, 2012 (Reference 2), SCE reported completion of the Unit 2 CAL actions and included a Return to Service Report (RTSR) that provided details of their completion.

By letter dated December 26, 2012 (Reference 3), the NRC issued Requests for Additional Information (RAIs) regarding the CAL response. SCE provided the response to RAI 11 in a

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letter dated January 21, 2013 (Reference 4). The response to RAI 11 was revised to address questions raised by the NRC during the public meeting on February 27, 2013. Enclosure 2 of this letter provides Revision 1 to the RAI 11 response.

Enclosure 2 of this submittal contains proprietary information. SCE requests that this proprietary enclosure be withheld from public disclosure in accordance with 10 CFR 2.390(a)(4). Enclosure 1 provides a notarized affidavit from Westinghouse, which sets forth the basis on which the information in Enclosure 2 may be withheld from public disclosure by the NRC and addresses with specificity the considerations listed by paragraph (b)(4) of 10 CFR 2.390. Enclosure 3 provides the non-proprietary version of Enclosure 2.

Enclosure 4 provides a list of commitments identified in this submittal. If you have any questions or require additional information, please call me at (949) 368-6240.

Sincerely,

Deborah Lundkeck for

Enclosures:

1. Notarized Affidavit
2. Response to RAI 11, Revision 1 (Proprietary)
3. Response to RAI 11, Revision 1 (Non-Proprietary)
4. List of Commitments

cc: A. T. Howell III, Regional Administrator, NRC Region IV
J. R. Hall, NRC Project Manager, SONGS Units 2 and 3
G. G. Warnick, NRC Senior Resident Inspector, SONGS Units 2 and 3
R. E. Lantz, Branch Chief, Division of Reactor Projects, NRC Region IV

ENCLOSURE 1

Notarized Affidavit

Westinghouse Electric Company
Nuclear Services
1000 Westinghouse Drive
Cranberry Township, Pennsylvania 16066
USA

U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Direct tel: (412) 374-4643
Direct fax: (724) 720-0754
e-mail: greshaja@westinghouse.com
Proj letter: NF-SCE-13-10

CAW-13-3680

April 1, 2013

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: Proprietary Content for, "Follow-on Response to NRC Confirmatory Action Letter RAI #11 for SONGS Unit 2" (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-13-3680 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying affidavit by Southern California Edison.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference CAW-13-3680, and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, Suite 428, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania 16066.

Very truly yours,

Thomas Rodack, Director
Licensing and Engineering Programs

Enclosures

CAW-13-3680

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

Before me, the undersigned authority, personally appeared Thomas Rodack, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

Thomas Rodack, Director
Licensing and Engineering Programs

Sworn to and subscribed before me
this 1st of April 2013

Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Anne M. Stegman, Notary Public
Unity Twp., Westmoreland County
My Commission Expires Aug. 7, 2016
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

(1) I am Director, Licensing and Engineering Programs, in Nuclear Fuel, Westinghouse Electric Company LLC (Westinghouse), 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 rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(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 Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(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 Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse 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 Westinghouse policy and provides the rational basis required.

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 competitive 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

Westinghouse's competitors without license from Westinghouse 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, assurance of quality, or licensing a similar product.

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

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

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

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

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

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

(c) Use by our competitor would put Westinghouse 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 Westinghouse of a competitive advantage.

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

(f) The Westinghouse 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 Section 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 original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is contained in, "Follow-on Response to NRC Confirmatory Action Letter RAI #11 for SONGS Unit 2" (Proprietary), dated April 1, 2013, being transmitted by Southern California Edison letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by SCE to the NRC is that associated with a response to NRC RAI #11with respect to fuel-clad modeling and may be used only for that purpose.

This information is part of that which will enable Westinghouse to:

(a) Support for SONGS Unit 2 enabling SCE to responds to NRC RAIs.

Further this information has substantial commercial value as follows:

(a) Westinghouse can sell support and defense of analyses involving Westinghouse fuel-clad modeling to other licensees, as necessary.

(b) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar calculations 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 purchasing 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 Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted).

ENCLOSURE 3

SOUTHERN CALIFORNIA EDISON

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REGARDING RESPONSE TO CONFIRMATORY ACTION LETTER

DOCKET NO. 50-361

TAC NO. ME 9727

Response to RAI 11, Revision 1

(NON-PROPRIETARY)

RAI 11

Please submit an operational impact assessment for operation at 70% power. The assessment should focus on the cycle safety analysis and establish whether operation at 70% power is within the scope of SCE's safety analysis methodology, and that analyses and evaluations have been performed to conclude operation at 70% power for an extended period of time is safe. The evaluation should also demonstrate that the existing Technical Specifications, including limiting conditions for operation and surveillance requirements, are applicable for extended operation at 70% power.

RESPONSE – Revision 1

Note: This response includes information requested in RAI 14 associated with the operational impact assessment for operation at 70% power. RAI 14 states: "Provide a summary disposition of the U2C17 calculations relative to the planned reduction in power operation."

SCE has evaluated the extended reduced power operation for its impacts on the Unit 2 Cycle 17 reload core design and safety analysis. The power levels evaluated range from 50% to 100% rated thermal power, which bounds the planned operation at the 70% power level. The assessments were performed in accordance with NRC approved SONGS reload methodology and topical reports referenced in the UFSAR and Technical Specification (TS) 5.7.1.5, and the SONGS Core Reload Analyses and Activities Checklist procedure.

The impacts of extended reduced power operation on Unit 2 Cycle 17 core design and reload analyses, including UFSAR Chapter 15 safety analyses are summarized in Table 1, the impact assessment table. The impact assessment table is organized consistent with the SONGS Core Reload Analyses and Activities Checklist procedure. For each analysis, the Reload Checklist item number is listed in the second column from the left; when applicable, the second column also lists the UFSAR Chapter 15 safety analysis section number. The determination of impact for each analysis is summarized in the right column of the table.

Tables 1 and 2 were revised to provide additional details and clarification to address issues raised during the February 27, 2013 public meeting. Revisions are annotated in the tables by change bars.

Safety Analysis Methodology

The NRC approved safety analysis methods, as described in TS 5.7.1.5, are used to establish the core operating limits specified in the Core Operating Limits Report (COLR) which encompass from Mode 6 up to Mode 1 operation at the rated thermal power. Therefore, operating at the 70% power level is within the scope of SCE safety analysis methodology. No change to the safety analysis methodology is required for extended reduced power operation.

Safety Analysis

The reload and safety analyses determined to be impacted by extended reduced power operation were re-analyzed. The conclusions of the reload analyses, including safety analyses, for extended reduced power operation are as follows: (1) All safety analyses results meet the established acceptance criteria, and (2) The radiological dose consequences for all safety analyses remain bounded by the dose consequences reported in the UFSAR.

Technical Specifications

The existing TS, including limiting conditions for operation (LCO) and surveillance requirements, are applicable for extended operation at 70% power. The impact assessment for TS surveillance requirements is described in the following section.

Impact Assessment for Technical Specification Surveillance Requirements

The TS surveillance requirements were evaluated for the impacts of reduced power operation. The evaluation concluded all TS surveillance requirements under the reactor core design and monitoring program that would have been performed at approximately 82% power or at full power will be performed with the plant operating at approximately 70% power. The evaluation is summarized in Table 2.

Two surveillance procedures related to monitoring Reactor Coolant System (RCS) flow ~~were revised to (1) reduce the minimum power required to perform the surveillances from 85% to 68% power, and to (2) account for the slightly increased RCS flow uncertainty at reduced power operation~~that had been required to be performed only above 85% power were revised to require performance of the surveillances at 70% power. No other surveillances were identified to be impacted by plant operation at 70% power.

Conclusions

Extended reduced power operation at 70% power has been evaluated and determined to be acceptable with respect to Unit 2 Cycle 17 reload core design and safety analysis. Reload analyses needed to support reactor startup and operation at 70% power have been completed. All TS LCO and surveillance requirements under the reactor core design and monitoring program normally performed at or above 70% power will be performed with the plant operating at approximately 70% power. The above evaluations demonstrate that the existing TSs, including limiting conditions for operation and surveillance requirements, are applicable for extended operation at 70% power.

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
1	0.1	Reload Ground Rules (RGR) Review	No change to analysis is required. No change to Rated Thermal Power (RTP). RGR still addresses 0% to 100% RTP operation. RGR addresses the full range of power independent and power dependent operating parameters, including those applicable at reduced power. The RGR Analysis Value defines the maximum or minimum value which must be bounded in the safety analysis. The number is not necessarily equivalent to the value used in an analysis (or Technical Specification) but will be conservative with respect to that value. The RGR Analysis Value includes applicable uncertainties and margins for which the safety analyses must be bounding.
2	1.1.3	Design Models and Depletions	Re-analysis was performed to determine impact, and all results were acceptable. Calculation revised to document depletion at 50% power from Beginning of Cycle (BOC) to End of Cycle (EOC) and comparison to 100% power. The results are expected, since radial power distributions are primarily a function of fuel burnup distribution, burnable poison loading, and control rod configuration. Depletion at reduced power level and corresponding reduced moderator temperature has a negligible impact on core average radial power distributions. Since the radial power distributions changed negligibly at 50% power compared to 100% power, an extended operation at any power level between these two points would also yield insignificant changes to these parameters. The lead fuel assembly (LFA) integrated radial power peaking factors remain below 95% of the core maximum integrated radial power peaking factor at all times in life. The maximum pin burnup remains below the peak pin burnup limit (60,000 MWD/T). ~~As the radial power distributions and distortion factors have been determined to be valid, no downstream analyses are impacted.~~ Impact of extended reduced power operation on generic axial shapes and scram curves is addressed in Item 10 (1-D HERMITE model.)

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
3	1.1.4	Design Parameters and F_R Versus Power	No change to analysis is required. Radial power distributions and generic axial shapes remain applicable. Individual Control Element Assembly (CEA) worth, CEA bank worth, scram worth, peaking factors, distortion factors that are strongly dependent on the radial power distribution remain applicable. Extended reduced power operation results in less Pu-239 inventory. As such, generic bounding parameters (i.e., Fuel Temperature Coefficient (FTC), Moderator Temperature Coefficient (MTC), kinetics parameters) remain applicable. Critical Boron Concentrations (CBC) at Beginning of Cycle (BOC) are not affected. CBC at End of Cycle (EOC) is similar. Therefore, bounding boron concentration requirements and Inverse Boron Worths (IBW) are not impacted. Representative design parameter and Fr values for Reload Analysis Report (RAR) are not impacted.
4	1.1.5	Physics Input to LOCA, TORC, and FATES Analysis (including Pin Census)	No change to analysis is required for the physics inputs to LOCA analysis and TORC code analysis. BOC, limiting boron concentration, reactivity are not affected. Radial power distribution and peaking data remain applicable. Generic LOCA and TORC input parameters remain applicable. Re-analysis was performed for the physics input to Fuel Performance Analysis (FATES) code analysis. Radial fall-off curves, Fr, and fast flux data were regenerated for reduced power operation. Generic axial shapes remain applicable. The impact of the revised input on FATES is addressed in Item 19.
5	1.1.6	Physics Input to Fuel Mechanical Design	Re-analysis was performed to determine impact, and all results were acceptable. Calculation revised to provide power history data for AREVA Lead Fuel Assembly (LFA) mechanical design analysis. Also updated maximum core residence time for Westinghouse analysis. Other generic parameters for Westinghouse mechanical design analysis remain applicable due to similar radial power distribution.
6	1.1.7	Physics Input to ASGT	No change to analysis is required. Physics Input to Asymmetric Steam Generator Transient (ASGT) is performed at EOC with most negative Technical Specification MTC. Calculations performed at multiple power levels (90%, 70%, 50%, and 20%). Due to similar power distributions, results remain applicable.
7	1.1.8	Physics Input to Post-Trip Steam Line Break Analysis	No change to analysis is required. Analysis performed at EOC. Radial power distributions (at the same power level and burnup) are essentially identical. The MTC is tuned to the most negative Tech Spec value (-3.7E-4 $\Delta k/k/^{\circ}F$). Cooling down adds reactivity. More reactivity is added cooling from 100% power (higher T-fuel and T-mod) than reduced power to lower temperatures (e.g., 545°F, 300°F, 200°F, 68°F)

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
8	1.1.9	Physics Input to CEA Ejection Analysis	No change to analysis is required. Physics data in this analysis were generated at multiple power levels and the reduced power operating range is covered. Since the reduced power operation results in power distributions essentially identical to those from 100% power operation, the data generated from the original analysis are applicable to reduced power operation.
9	1.1.10	Physics Input to CEA Withdrawal	No change to analysis is required. Calculations performed at multiple power levels. Radial power distributions (at the same power level and burnup) are essential identical. CEA worth remains applicable since it is strongly dependent on power distribution. Limiting axial power shapes from axial shape index (ASI) search remain applicable.
10	1.1.11	1-D HERMITE Model	Re-analysis was performed to determine impact, and all results were acceptable. Analysis is revised to establish applicability of the generic axial shapes used in the design analyses and applicability of the SCRAM curves used in the design analyses. Analysis also shows that depletion at reduced power leads to essentially the same limiting shapes from ASI search as those selected for the analyses of the design depletions.
11	1.1.12	Physics Input to Steam Line Break Return-to-Power ~~for Cycle N-1 Configuration~~	No change to analysis is required. This EOC event begins at 0% power. Radial power distributions (at the same power level and burnup) are essentially identical.
12	1.1.13	F_R Versus Temperature for Cooldown Events	No change to analysis is required. Bounding distortion factors were determined based on multiple CEA configurations, temperature ranges at BOC and EOC. Radial power distributions (at the same power level and burnup) are essentially identical.
13	1.1.14	Boron Requirement for SITs and BAMU Tanks	No change to analysis is required. The case run for this calculation is performed at hot zero power (HZP). The Xenon starting condition is Hot Full Power (HFP) which is conservative.
14	1.1.15	LOCA and Non-LOCA Source Term	No change to analysis is required. This analysis tests the Cycle 17 conditions of interest against the parameters required for applicability of the LOCA and Alternative Source Term (AST) source terms. The power level is used as a maximum not to be exceeded. Running Cycle 17 at reduced power results in less "short half-life" nuclides. Increase in "long half-life" nuclides due to extended calendar time is bounded by the lower production from extended reduced power.

Table 1 – Revision 1 SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses			
ITEM #	**CHECKLIST ITEM (UFSAR SECTION)**	**DESCRIPTION**	**SUMMARY OF IMPACT ASSESSMENT**
15	1.1.16	Tritium Production	No change to analysis is required. Reduced power results in a decrease in tritium production. The analysis at 100% power is conservative.
16	1.1.17	STAR Physics Verification	No change to analysis is required. This analysis uses BOC (HZP) conditions (Mode 3) for an assessment for S2C17 inclusion in the Startup Test Activity Reduction (STAR) program.
17	1.1.18	Digital Setpoints Physics Data	No change to analysis is required. The case sets encompass LCO and Limiting Safety System Settings (LSSS) ASI ranges. Power level does not impact axial shapes significantly, so reduced powers are covered by the case set.
18	1.1.19	Physics RAR Inputs	Re-analysis was performed to determine impact, and all results were acceptable. RAR has been updated to reflect actual Cycle 16 EOC burnup and Cycle 17 reduced power operation.

Table 1 – Revision 1 SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses			
ITEM #	**CHECKLIST ITEM (UFSAR SECTION)**	**DESCRIPTION**	**SUMMARY OF IMPACT ASSESSMENT**
19	1.2.1	Fuel Performance Analysis (FATES)	Re-analysis was performed to determine impact, and all results were acceptable. Reduced power results in fuel performance data that is not bounded when compared to the Generic Fuel Performance data generated for ZIRLO™ in Cycle 14 (data used in LOCA Analysis). A revision to the Fuel Performance and Setpoints Analyses was performed to determine the appropriate penalty factors such that the Generic Fuel Performance data remained bounding. Operation at reduced power impacts several of the fuel modeling parameters and mechanisms within the FATES fuel performance code. [ ]. Fuel Performance results are utilized in the ECCS LOCA Analysis (item #71). [ ]. The Fuel Performance results are also used in the CEA Ejection Analysis (item #44). New data were transmitted and addressed in that analysis.
20	1.2.2	T-H Input Summary	No change to analysis is required. Calculation is a collection of input data that are not impacted by reduced power.

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
21	1.2.4	T-H Limiting Assembly and CETOP Benchmarking Analysis	No change to analysis is required. Power is not an input. Calculation is a benchmark of CETOP to TORC computer codes at reference departure from nucleate boiling (DNBR) points rather than a benchmark at a given power. This benchmark is mainly driven by power distributions from physics. Physics Models & Depletions has validated the power distributions used in the original calculation.
22	1.2.5	Mechanical Design Analysis (Fuel Vendor)	Re-analysis was performed to determine impact, and all results were acceptable. Westinghouse performed calculations to determine the impact of reduced power on the fuel mechanical design. AREVA performed calculations to determine the impact of reduced power on the Lead Fuel Assembly fuel mechanical design.
23	1.2.6	Power Operating Limit Partial Derivative Verification	No change to analysis is required. The calculation is driven by a large family of axial shapes, which are not impacted by the power reduction.
24	1.2.7	Setpoints Input Summary	Re-analysis was performed to determine impact, and all results were acceptable. Calculation has been revised to address the increased reactor coolant system (RCS) flow uncertainty at reduced power.
25	1.2.8	RCS Flow Uncertainties	Re-analysis was performed to determine impact, and all results were acceptable. Has been reanalyzed. RCS flow uncertainty increases due to reduced delta-temperature and increased secondary calorimetric power uncertainty. More details of this analysis are provided in the RAI 12 Response.
26	1.2.9	Fuel Mechanical Design Verification	No change to analysis is required. The objective of the fuel mechanical design verification calculation is to document the design of the fuel based on the fuel vendor Bill of Materials, Design Drawings and the design and material specifications transmitted from the fuel vendor. Reduced power operation has no impact on this analysis.
27	1.2.11	Secondary Calorimetric Power Uncertainty	No change to analysis is required. Intermediate powers were explicitly analyzed in the original calculation.

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
28	1.2.12	Delta-T/Turbine Power Uncertainties	No change to analysis is required. The analysis uses a reference power error of 1.3% at full power. The increase in reference power (i.e., secondary calorimetric power) associated with performing delta-t/turbine power calibrations at reduced power would increase the uncertainties. The bounding results include ~0.50% of conservatism; therefore, the analysis of record (AOR) remains bounding. Intermediate powers were explicitly analyzed in the original calculation.
29	1.2.13	Cycle Independent Data and Setpoints Assumptions List (CIDSAL)	No change to analysis is required. CIDSAL provides cycle independent values to use or to be verified in downstream analyses. Reduced power operation does not impact the requirements for downstream analysis verification. None of the calculations explicitly performed in the analysis section are dependent upon nominal plant operating conditions or the power shapes/distributions at reduced power operation.
30	1.2.16	Core Protection Calculator (CPC) Calibration Allowances	No change to analysis is required. Intermediate powers were explicitly analyzed in the original calculation. Due to less decalibration, full power bounds lower power levels.
31	1.2.17	Fuel Duty Index	No change to analysis is required. Full power bounds lower power levels.
32	1.2.18	T-H MSCU Verification	No change to analysis is required. Power is not an input. Calculation is a verification of response surface at reference DNBR points rather than a benchmark at a given power.
33	1.2.19	CEA STAR Verification	No change to analysis is required. Radial power distributions (at the same power level and burnup) are essentially identical. At reduced power the plan is to continue to operate with all rods out. The duration and depth of lead bank CEA insertion beyond the typical all-rods-out position is monitored per the core follow procedure with notification/action to review the conservative CEA life analysis when insertion exceeds an insertion assumption within the analysis.
34	1.3.1	Summary of Transients	Re-analysis was performed to determine impact, and all results were acceptable. Calculation was revised to perform an evaluation of all Updated Final Safety Analysis Report (UFSAR) Chapter 15 events for extended reduced power operation. Individual events are addressed in subsequent entries to this table.
35	1.3.2	CENTS Cycle Update and Action Modules	No change to analysis is required. Calculation and associated computer files already accommodate power levels from 0 to 100 percent.

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
36	1.3.3 (15.10.1.3.1.1)	Main Steam Line Break (MSLB) Pre-Trip	No change to analysis is required. Pre-trip SLB is analyzed @100% power (with uncertainty). The generic physics inputs remain unchanged. Since the VOPT is generated on the rate of change in power setpoint (DELSPV), the actual trip occurs at the same power rise, independent of the starting power level. As this is a Required Over Power Margin (ROPM) event, the actual initial power level chosen is not significant to the event.
37	1.3.4 (15.10.1.3.1.2)	Main Steam Line Break (MSLB) Post-Trip	No change to analysis is required. This event is limiting at hot zero power (HZP). HZP cases show greatest return to power since there is minimum initial stored energy, decay heat and scram worth at HZP conditions. There is no impact to the HZP cases since HZP physics inputs and initial conditions do not change. A reactivity balance for reduced power showed that net reactivity change remained negative. HZP cases result in greatest return to criticality since initial stored NSSS energy, decay heat, and scram worth are minimized while steam generator pressure and mass are at maximum. This minimizes RCS mass and maximizes cooldown potential. Consequently, the HZP MSLB event bounds MSLB initiated from power conditions. Operation at intermediate power levels does not alter these key parameters that make HZP limiting.
38	1.3.5 (15.10.4.1.4)	Chemical Volume Control System (CVCS) Malfunction - Boron Dilution	No change to analysis is required. This is a BOC event that is not analyzed in Mode 1. The reactivity addition due to a boron dilution event is less adverse than the CEA Withdrawal event at Power and therefore Mode 1 and the higher power portion of Mode 2 are not explicitly addressed.
39	1.3.6 (15.10.4.1.1)	CEA Bank Withdrawal from Subcritical (CEAW @ SC)	No change to analysis is required. Event is evaluated at subcritical conditions. Note that this event is being re-evaluated to address the extended shut down.
40	1.3.6 (15.10.4.1.1)	CEA Bank Withdrawal at Low Power (CEAW @ HZP)	No change to analysis is required. Event is evaluated at hot zero power conditions.
41	1.3.6 (15.10.4.1.2)	CEA Bank Withdrawal at Power (CEAW @ Power, 50% & 100%)	No change to analysis is required. CEAW at reduced power is enveloped by CEAW @ 50% Power and CEAW @ 100% Power; and the results are acceptable.
42	1.3.8 (15.10.1.1.3)	Increased Main Steam Flow (IMSF)	No change to analysis is required. The system response is the same as IMSF+SF.

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
43	1.3.8 (15.10.1.2.3)	IMSF with Single Failure (SF)	No change to analysis is required. IMSF+SF (fast & slow) analyzed @100% power. The generic physics inputs remain unchanged. The fast case credits the VOPT which is generated on the rate of change in power (DELSPV) setpoint, as such the actual trip occurs at the same power rise, independent of the starting power level. Since the fast case is a Required Over Power Margin (ROPM) event, the actual initial power level chosen is not significant to the event. The limiting event is the slow trip, which is initiated from a Power Operating Limit. As such, the actual initial power level chosen is not significant to the event.
44	1.3.9 (15.10.4.3.2)	CEA Ejection	Re-analysis was performed to determine impact, and all results were acceptable. The event is normally analyzed at multiple power levels. It was reanalyzed to address reduced power data from the fuel performance analysis. The CEA Ejection event is normally analyzed at multiple power levels according to the power dependent insertion limits (PDIL) using fuel performance data based on 100% power operation. As discussed in Item 19, [ ] used in the CEA Ejection analysis was determined with a conservative approach, the event was re-analyzed to address the impact on fuel performance from reduced power operation. The fuel performance analysis (Item 19) generated additional fuel performance data based on reduced power operation at 70% and at 50%. The CEA Ejection cases were re-analyzed using the fuel performance data based on 70% power operation, as well as those based on 50% power operation. The re-analysis showed [ ]. The re-analysis bounds the planned reduced power operation for Unit 2 and all results meet the acceptance criteria.
45	1.3.10 (15.10.3.3.1)	Reactor Coolant Pump Shaft Seizure	No change to analysis is required. Bounded by Reactor Coolant Pump Sheared Shaft (RCPSS).

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
46	1.3.10 (15.10.3.3.2)	Reactor Coolant Pump Sheared Shaft (RCPSS)	No change to analysis is required. This is a margin/ fuel failure calculation event. The thermal margin loss for this event is initiated by the loss of flow from one pump (either seized rotor or sheared shaft). The reduction of thermal margin due to the loss of flow from one pump is not a function of the initial power (i.e., is constant at any power level). In addition, at reduced power, the initial thermal margin is larger than at the 100% power condition. Therefore, the analysis at full power is bounding.
47	1.3.11 (15.10.2.1.3)	Loss of Condenser Vacuum (LOCV)	No change to analysis is required. Bounded by LOCV+SF
48	1.3.11 (15.10.2.2.3)	LOCV with Single Failure	No change to analysis is required. This event is driven by plant response and not by detailed core physics. There are two criteria (peak RCS pressure and peak secondary pressure). At lower powers, there is less internal energy in the reactor core, which translates into a slower RCS pressure transient that is more rapidly mitigated by main steam safety valves (MSSVs). The peak secondary pressure event is evaluated at multiple power levels to establish the allowed power level as a function of the number of gagged MSSVs (Tech Spec 3.7.1).
49	1.3.12 (15.10.6.3.2)	Steam Generator Tube Rupture (SGTR)	No change to analysis is required. The SGTR is a slow event and not sensitive to initial power. Furthermore, at lower powers there is a higher secondary pressure that translates to lower primary-to-secondary rupture flow (i.e., lower activity release).
50	1.3.13 (15.10.1.1.4)	Inadvertent Opening of a Steam Generator Safety or an Atmospheric Dump Valve (IOSGADV)	No change to analysis is required. See IOSGADV+SF
51	1.3.14 (15.10.1.2.4)	IOSGADV with Single Failure	No change to analysis is required. The IOSGADV+SF is analyzed at a power level of 1 MWt.
52	1.3.15 (15.10.9.1.1)	Asymmetric Steam Generator Transient (ASGT)	No change to analysis is required. The ASGT event was analyzed in the AOR at multiple power levels (90%, 70%, 50%, and 20%).
53	1.3.16 (15.10.1.1.1)	Decrease in Feedwater Temp (DFWT)	No change to analysis is required. Since feedwater heating is reduced at reduced power, the potential loss in feedwater heating is also reduced. Impact at reduced power is also mitigated by increased mass in RCS and Steam Generators (SGs) and increased recirculation in SGs at lower power.

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
54	1.3.17 (15.10.1.2.1)	DFWT with Single Failure	No change to analysis is required. Since feedwater heating is reduced at reduced power, the potential loss in feedwater heating is also reduced. Impact at reduced power is also mitigated by increased mass in RCS and Steam Generators and increased recirculation in SGs at lower power.
55	1.3.18 (15.10.1.1.2)	Increase in Feedwater Flow (IFF)	No change to analysis is required. Primary to secondary heat transfer is dominated by heat of vaporization (Hfg) which is considerably greater than steam generator enthalpy rise resulting from sensible heat. Consequently, cool downs resulting from Increases in Feedwater Flow events are limited by Increases in Main Steam Flow events. Further, Increases in Steam Flow events occur more rapidly as changes in Feed Water are mitigated by the liquid mass and recirculation flow in the steam generators. Further factors that mitigate Increasing Feedwater Flow events at reduced power include greater RCS / SG mass, increased recirculation flow in the steam generators, greater steam generator pressure and earlier reactor trip from increased feedwater flow - steam flow mismatch.
56	1.3.18 (15.10.1.2.2)	IFF with Single Failure	No change to analysis is required. The most adverse single failure postulated for IFF is the opening of all Steam Bypass Control System (SBCS) valves. Because the Increase in Main Steam Flow (IMSF) event postulates the opening of all SBCS valves and assumes that Main Feedwater flow increases to match steam flow, the IFF with Single Failure is the essentially the same event as the IMSF event. Therefore, conclusions regarding IMSF are applicable to IFF with Single Failure.
57	1.3.19 (15.10.2.1.1)	Loss of External Load (LOL)	No change to analysis is required. The system response to the Loss of External Load, Turbine Trip, and the Loss of Condenser Vacuum are essentially the same. Therefore, the relationship between the events will remain the same at reduced power. As such these events remain bounded by LOCV.
58	1.3.19 (15.10.2.2.1)	LOL with Single Failure	No change to analysis is required. The system response to the Loss of External Load with single failure, Turbine Trip with single failure, and the Loss of Condenser Vacuum with single failure are essentially the same. Therefore, the relationship between the events will remain the same at reduced power. As such these events remain bounded by LOCV+SF.
59	1.3.19 (15.10.2.1.2)	Turbine Trip (TT)	No change to analysis is required. The system response to the Loss of External Load, Turbine Trip, and the Loss of Condenser Vacuum are essentially the same. Therefore, the relationship between the events will remain the same at reduced power. As such these events remain bounded by LOCV.

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
60	1.3.19 (15.10.2.2.2)	TT with Single Failure	No change to analysis is required. The system response to the Loss of External Load with single failure, Turbine Trip with single failure, and the Loss of Condenser Vacuum with single failure are essentially the same. Therefore, the relationship between the events will remain the same at reduced power. As such these events remain bounded by LOCV+SF.
61	1.3.20 (15.10.2.1.4)	Loss of Normal AC Power (LONAC)	No change to analysis is required. See LONAC+SF
62	1.3.20 (15.10.2.2.4)	LONAC with Single Failure	No change to analysis is required. Operation at lower power level is less challenging with respect to maintaining an adequate heat sink.
63	1.3.21 (15.10.2.2.5)	Loss of Normal Feedwater (LONF or LOFW)	No change to analysis is required. See LOFW+SF
64	1.3.21 (15.10.2.3.2)	LOFW with Single Failure	No change to analysis is required. Operation at lower power level is less challenging with respect to maintaining an adequate heat sink.
65	1.3.22 (15.10.2.3.1)	Feedwater System Pipe Breaks (FSPB or FWLB)	No change to analysis is required. Peak primary and secondary pressure events were analyzed at the least negative MTC value and main feedwater enthalpy corresponding to full power. The slightly higher MTC corresponding to reduced power is offset by the lower main feedwater enthalpy at reduced power. Operation at lower power level is less challenging with respect to maintaining an adequate heat sink. The energy in the plant is less at reduced power relative to full power, and therefore pressurizer overfill is bounded by the full power response.
66	1.3.23 (15.10.5.1.1)	CVCS Malfunction	No change to analysis is required. See CVCS Malfunction+SF.
67	1.3.23 (15.10.5.2.1)	CVCS Malfunction with Single Failure	No change to analysis is required. The energy in the plant is less at reduced power relative to full power, and therefore pressurizer overfill is bounded by the full power response. Operation at lower power level is less challenging with respect to maintaining an adequate heat sink.
68	1.3.24	Pressurizer Spray Malfunction	No change to analysis is required. See Core Protection Calculator (CPC) Dynamic Filter Analysis.
69	1.3.25 (15.10.4.1.5)	Reactor Coolant Pump (RCP) - Start Up of an Inactive Loop	No change to analysis is required. Modes 1 and 2 were not analyzed because operation in these Modes is only allowed with all 4 RCPs running.

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
70	1.3.27 (15.10.4.3.2)	CEA Ejection (peak pressure analysis)	No change to analysis is required. The event is limiting at hot zero power (HZP).
71	1.4 (15.10.6.3.3)	Emergency Core Cooling System (ECCS) Analyses including LBLOCA, SBLOCA and LTC	Re-analysis was performed to determine impact, and all results were acceptable. Impact assessment addressed in analyses performed by Fuel Vendors. Details are provided in the response to RAI 13.
72	(15.10.5.1.2)	Inadvertent Operation of ECCS at Power (IOECCS)	No change to analysis is required. The system response to the IOECCS and CVCS malfunction events are essentially the same. Therefore, the relationship between the events will remain the same at reduced power. As such this event continues to be bounded by CVCS malfunction event.
73	(15.10.5.2.2)	IOECCS with Single Failure	No change to analysis is required. The system response to the IOECCS with single failure and CVCS malfunction with single failure events are essentially the same. Therefore, the relationship between the events will remain the same at reduced power. As such this event continues to be bounded by CVCS malfunction event with single failure.
74	(15.10.6.3.1)	Primary Sample or Instrument Line Break (PSILB)	No change to analysis is required. Mass releases are driven by energy in the primary system which is highest following operation at HFP. The event does not fail fuel, and there is no ROPM requirement.
75	(15.10.6.3.4)	Inadvertent Opening of a PSV (IOPSV)	No change to analysis is required. The IOPSV event is bounded by small break LOCA.
76	1.5.1	Applicability Evaluation of Source Terms in Dose Analyses	No change to analysis is required. There is no change to core activity inventory source term.
77	1.5.2	Cycle Specific Dose Analysis	No change to analysis is required. No Cycle 17 event-specific dose analysis was performed, therefore no impact for reduced power.

Table 1 – Revision 1 SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses			
ITEM #	**CHECKLIST ITEM (UFSAR SECTION)**	**DESCRIPTION**	**SUMMARY OF IMPACT ASSESSMENT**
78	1.5.4	Applicability Evaluation of Dose Analyses	Re-analysis was performed to determine impact, and all results were acceptable. Revised to document that the currently modeled radial peaking factors are conservatively greater than the increased radial peaking factors at reduced power. The transient analyses and mass release analyses are evaluated at the current 8% steam generator (SG) tube plugging limit. The dose calculation uses mass release data per the transient analyses and their assumed 8% SG tube plugging models. The calculation is revised with discretionary conservatism to model 20% SG tube plugging in the calculation of the RCS dilution volume and mass considered for non-LOCA events which have clad damage. Evaluated RCS dilution mass at RCS temperatures for both 50% and 100% power, which envelopes powers between 50% and 100%. The mass release calculations are evaluated for a core inlet temperature (Tcold) of 560F, which maximizes core average temperature (Tave). Currently modeled mass release values in the Summary of Transients (SOT) correspond to full power operation. The SOT did not identify an increase in the amount of steam released from the secondary side because it remains more limiting compared to operation at lower power level due to lower sensible heat in the RCS and lower post trip decay heat. Technical Specification Action Statement Figure 3.4.16-1 allows for larger short term elevated primary coolant dose equivalent iodine-131 (I-131) activity for plant operation at 70% Rated Thermal Power (RTP). For UFSAR chapter 15 radiological safety analyses that model a pre-existing iodine spike, the SONGS licensing basis is an initial primary coolant concentration of 60 µCi/gm dose equivalent I-131 at 100% RTP. SCE commits to administratively control the RCS dose equivalent I-131 specific activity described in TS LCO 3.4.16 Action A1 to no more than 60 µCi/gm (see Enclosure 4). No changes to these analyses are required for reduced power operation.

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
79	n/a	Fuel Corrosion and Oxide Thickness (BOA Code) analysis	No change to analysis is required. The Westinghouse BOA code analysis for cycles 15, 16 and 17 was performed as part of the Zinc Injection project. This calculation compared predicted values for corrosion and oxide thickness, Fuel Duty Index and crud dryout to the Westinghouse Chemistry Guideline limits. Maximum values of Fuel Duty Index and Crud Dryout are driven by fresh fuel operating at high power. Operation at reduced power would be bounded by the 100% power cases run in the analysis of record (AOR). Maximum values of corrosion and oxide thickness are driven by both power level and effective full power days (EFPD). The AOR assumed a core operating strategy which would maximize corrosion and oxide; running fuel for three full cycles, a total of 1830 EFPD. Table 2-1 of the AOR showed that the maximum predicted oxide thickness for U2C17 is 28.4 microns, well below the 100 micron limit. Operation at reduced power for longer time would not significantly change the fuel rod corrosion rate, and there is substantial margin to the 100 micron limit.
80	n/a	AREVA Lead Fuel Assembly (LFA) compatibility	Re-evaluation was performed to determine impact, and all results were acceptable. Compatibility was verified by AREVA as documented in revised U2C17 Reload Analysis Report (RAR).
81	n/a	WEC Lead Fuel Assembly (LFA) compatibility	Re-evaluation was performed to determine impact, and all results were acceptable. Compatibility was verified by Westinghouse as documented in revised U2C17 RAR.
82	n/a	AREVA and WEC Chemistry concurrence	Re-evaluation was performed to determine impact, and all results were acceptable. Concurrence for reduced power operation was performed by Westinghouse and AREVA as documented in revised U2C17 RAR.
83	1.6.1	Reload Analysis Report (RAR)	Re-analysis was performed to determine impact, and all results were acceptable. Revised to address extended operation at reduced power.
84	1.6.2	Engineering Change Package (ECP) and 10CFR50.59 Review	Re-evaluation was performed to determine impact, and all results were acceptable. 10CFR50.59: New 10CFR50.59 review issued to address the extended operation at reduced power. ECP: Affected Section Change (ASC) issued to address the extended operation at reduced power.

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
85	2.1.2	Physics Input to FLCEA Drop Analysis and PFDTME Verification	No change to analysis is required. Power distributions at the same power level and burnup are essentially identical. Analysis performed at multiple power levels.
86	2.1.3	Physics Input to PLCEA Drop Analysis	No change to analysis is required. Power distributions at the same power level and burnup are essentially identical. Analysis performed at multiple power levels.
87	2.1.5	Physics Input to CEA Deviation Within CPC Deadband	No change to analysis is required. Power distributions at the same power level and burnup are essentially identical. Analysis performed at multiple power levels.
88	2.1.9	Refueling Boron Concentration	No change to analysis is required. Analyzed at BOC, Mode 6.
89	2.1.10	CIDSAL Physics Verification	No change to analysis is required. Radial power distributions (at the same power level and burnup) are essentially identical. T-inlet program remain unchanged.
90	2.2.1 (15.10.4.1.3)	CEA Misoperation - Deviation within Dead Band (DWDB)	No change to analysis is required. Power distributions at the same power level and burnup are essentially identical. Analysis performed at multiple power levels.
91	2.2.2 (15.10.4.1.3)	CEA Misoperation - PLR Drop - Power ≤ 50%	No change to analysis is required. Power distributions at the same power level and burnup are essentially identical. Event scenario is defined at ≤ 50% Power. Scenarios at >50% power are discussed in "CEA Misoperation - Single Part Length CEA Drop (PLR Drop) - Power > 50%."
92	2.2.3 (15.10.4.1.3)	CEA Misoperation - Single Full Length CEA Drop (FLCEA Drop)	No change to analysis is required. Power distributions at the same power level and burnup are essentially identical. Analyzed at multiple power levels.
93	2.2.3 (15.10.4.1.3)	CEA Misoperation - Single Part Length CEA Drop (PLCEA Drop) - Power > 50%	No change to analysis is required. Power distributions at the same power level and burnup are essentially identical. Analyzed at multiple power levels.
94	2.2.3 (15.10.4.1.3)	CEA Misoperation - Sub Group CEA Drop	No change to analysis is required. Power distributions at the same power level and burnup are essentially identical. Analyzed at multiple power levels.
95	2.2.4	AOPM Analysis	No change to analysis is required. Power distributions at the same power level and burnup are essentially identical. Analyzed at multiple power levels.
96	2.2.5	Transient Thermal Margin Summary	No change to analysis is required. Analyzed at multiple power levels.

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
97	2.2.6 (15.10.3.1.1)	Partial Loss of RCS Flow (PLOF)	No change to analysis is required. Bounded by TLOF.
98	2.2.6 (15.10.3.2.2)	PLOF with Single Failure	No change to analysis is required. Bounded by RCPSS.
99	2.2.6 (15.10.3.2.1)	Total Loss of Forced Reactor Coolant Flow (TLOF)	No change to analysis is required. The total loss of coolant flow event was analyzed for a bounding scenario at 100% power and a MTC of +0.5×10-4 Δρ/°F. This scenario bounds all powers from 0 to 100%.
100	2.2.6 (15.10.3.3.3)	TLOF with Single Failure	No change to analysis is required. Bounded by RCPSS.
101	2.2.7	CPC Dynamic Filter Analysis (including the Pressurizer Spray Malfunction)	No change to analysis is required. The bounding events considered include CEA Withdrawal, Excess Load events, etc. As the system response time for these events has not changed, the dynamic filter analysis remains conservative.
102	2.3.4	MSOUA Database and Files	No change to analysis is required. The impact of RCS flow uncertainty changes has been captured in MSOUA Post-Processor.
103	2.3.5	CPC Reload Data Block (RDB) Update	No change to analysis is required. Reduced power has been implemented through CPC Type 2 addressable constants, and not CPC RDB.
104	2.3.6	MSOUA Post Processor	Re-analysis was performed to determine impact, and all results were acceptable. Calculation has been revised for RCS flow uncertainty and the change in UNCERT from the FATES fuel performance analysis. The COLSS and CPC Departure from Nucleate Boiling-Ratio (DNBR) penalties increased by approximately 2% due to the RCS flow uncertainty increase (see Item 25) and another 3% increase for licensee's discretionary conservatism; bringing the total DNBR penalty increase to approximately 5%. The 70% RTP based COLSS Linear Heat Rate (LHR) penalty increased by approximately 8% due to an increase in the fuel performance uncertainty factor from the revised fuel performance analyses (see Item 19). Discretionary conservatism of 3% was added to the COLSS LHR penalty for a total COLSS LHR penalty increase of approximately 11%. The CPC Linear Power Density (LPD) penalty increased by 3% due to the addition of 3% discretionary conservatism. These COLSS and CPC overall uncertainty analysis based penalty increases are acceptable because adequate core DNBR and Local/Linear Power margins exist.

Table 1 – Revision 1
SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses

ITEM #	CHECKLIST ITEM (UFSAR SECTION)	DESCRIPTION	SUMMARY OF IMPACT ASSESSMENT
105	2.3.7	Core Operating Limits Supervisory System (COLSS) & CPC Operating Margin Assessment	No change to analysis is required. Calculation is a prediction of operating margin at full power. Reduced power increases operating margin.
106	2.3.8	COLSS Database	No change to analysis is required. No changes are being made to the manner in which COLSS functions or responds. Therefore the cycle independent constants do not require change. The installed Primary ΔT power Block I constants were verified to be bounding. The cycle specific constants that are impacted by reduced power operation have been addressed in the COLSS As-built Database and Test Cases calculation.
107	3.1.1	Full Core Load Map	No change to analysis is required. Fuel management not changed.
108	3.1.3	As-Built Models and Depletions	Re-analysis was performed to determine impact, and all results were acceptable. Calculation was revised to address extended reduced power operation and to verify Lead Fuel Assembly (LFA) compatibility operational requirements.
109	3.1.4	CECOR Coefficients	Impacted, and all results were acceptable. Calculation was revised to address extended reduced power operation.
110	3.1.5	As-Built Mini Depletion	Re-analysis was performed to determine impact, and all results were acceptable. Calculation revised to address extended reduced power operation and to verify LFA compatibility operational requirements.
111	3.1.6	Decay Heat	No change to analysis is required. Decay heat was evaluated at end of Cycle 16 condition. The calculation specifically addresses outage times past 99 days.
112	3.1.7	Simulator Data	Re-analysis was performed to determine impact, and all results were acceptable. Calculation revised to address extended reduced power operation.
113	3.1.8	Special Nuclear Material Database Update	No change to analysis is required. The change to Cycle 17 operating power will have no effect on prior cycle spent fuel and its characteristics.
114	3.1.9	Plant Physics Data Book	Re-analysis was performed to determine impact, and all results were acceptable. Data Book has been revised to address extended reduced power operation.

Table 1 – Revision 1 SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Reload and UFSAR Chapter 15 Safety Analyses			
ITEM #	**CHECKLIST ITEM (UFSAR SECTION)**	**DESCRIPTION**	**SUMMARY OF IMPACT ASSESSMENT**
115	3.1.10	Startup Physics Test Predictions	Re-analysis was performed to determine impact, and all results were acceptable. Calculation has been revised to address changes to startup testing power plateaus.
116	3.2.1	COLSS As-built Database and Test Cases	Re-analysis was performed to determine impact, and all results were acceptable. Calculation has been revised to address extended reduced power operation impact on the cycle specific COLSS reload constants for DNBR & Linear Heat Rate (LHR) penalties.
117	3.2.2	CEFAST Database Analysis	Re-analysis was performed to determine impact, and all results were acceptable. Calculation has been revised to address extended reduced power operation impact on the cycle specific CPC reload constants for DNBR & Local Power Density (LPD) penalties.

Table 2 – Revision 1

SONGS Unit 2 Cycle 17 Reduced Power Operation – Summary of Impact Assessment of Core Design and Monitoring Technical Specification Surveillance Requirements

Surv #	Surveillance Topic	Power Applicability and Surveillance Frequency	Summary of Impact Assessment for Performing at 68-70% Power
3.1.3.1	Reactivity Balance	Every 31 EFPD	Steady state power (not full power) is required
3.1.4.1	MTC within positive limit	Prior to Mode 1	Performed at Hot Zero Power and projected to BOC 70% conditions
3.1.4.2	MTC within negative limit	Within 14 EFPD of peak Boron @ RTP	Peak boron occurs at BOC, – performed at Hot Zero Power and projected to HFP EOC conditions
3.1.4.2	MTC within negative limit	Within ± 30 EFPD of 2/3 of expected core burnup	Steady state power (not full power) is required; projected to HFP EOC conditions
3.2.2.1	CPC & COLSS Fxy > measured Fxy (CECOR)	Between 40% - 85% (i.e., prior to exceeding 85%)	68%-70% is within the power range required for surveillance
3.2.2.1	CPC & COLSS Fxy > Measured Fxy (CECOR)	Every 31 EFPD	Steady state power (not full power) is required
3.2.3.3	CPC Azimuthal Tilt > Measured Tilt (CECOR)	Every 31 EFPD	Steady state power (not full power) is required
3.3.1.2	RCS Flow in CPCs < Measured RCS Flow	Every 12 hours (not required until 12 hours after power > 85% RTP)	Procedure changed to perform surveillance at ~~≥ 68~~70% power
3.3.1.5	RCS Flow by calorimetric	Every 31 days (not required until 12 hours after power > 85% RTP)	Procedure changed to perform surveillance with additional margin at ≥ ~~68~~70% power.~~, and to require additional margin when surveillance is performed during extended operation at < 95% power~~
3.3.1.11	CPC Shape Annealing Matrix (SAM) Verification	Prior to exceeding 85%	A minimum ASI change, rather than a specific power level, is required
N/A	Startup Test Activity Reduction Program Reactivity Balance HZP - HFP	Normally performed after reaching full power	Results are already adjusted from actual test conditions to RTP conditions as a part of the test method

ENCLOSURE 4

List of Commitments

Enclosure 4
List of Commitments

This table identifies an action discussed in this letter that Southern California Edison commits to perform. Any other actions discussed in this submittal are described for the NRC's information and are not commitments.

Commitment	One-Time Only	Sustainable	Due Date
Administratively control the RCS dose equivalent I-131 specific activity described in Technical Specification LCO 3.4.16 Action A1 to no more than 60 µCi/gm.	X		Prior to Unit 2 Cycle 17 Mode 2 operation