Florida Power & Light, 9760 S.W. 344 St. Homestead, FL 33035

FPL

JAN 25 2012
L-2012-040
10 CFR 50.90

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555-0001

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Response to NRC Reactor Systems Branch Request for Additional Information Regarding Extended Power Uprate License Amendment Request No. 205 and Nuclear Fuel Design

Reference:

(1) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-113), "License Amendment Request for Extended Power Uprate (LAR 205)," (TAC Nos. ME4907 and ME4908), Accession No. ML103560169, October 21, 2010.

(2) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2011-561), "Response to NRC Request for Additional Information Regarding Extended Power Uprate License Amendment Request No. 205 and Thermal Conductivity Degradation, Accession No. ML12009A113. December 31, 2011.

(3) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2012-007), "Response to NRC Request for Additional Information Regarding Extended Power Uprate License Amendment Request No. 205 and Thermal Conductivity Degradation," January 13, 2012.

(4) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2012-019), "Response to NRC Request for Additional Information Regarding Extended Power Uprate License Amendment Request No. 205 and Thermal Conductivity Degradation," January 13, 2012.

(5) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2011-414), "Supplemental Response to NRC Mechanical and Civil Engineering Branch Request for Additional Information Regarding Extended Power Uprate License Amendment Request No. 205," Accession No. ML11290A212, October 12, 2011.

By letter L-2010-113 dated October 21, 2010 [Reference 1], Florida Power and Light Company (FPL) requested to amend Renewed Facility Operating Licenses DPR-31 and DPR-41 and revise the Turkey Point Units 3 and 4 (PTN) Technical Specifications (TS). The proposed amendment will increase each unit's licensed core power level from 2300 megawatts thermal (MWt) to 2644 MWt and revise the Renewed Facility Operating Licenses and TS to support operation at this increased core thermal power level. This represents an approximate increase of 15% and is therefore considered an extended power uprate (EPU).

As a result of information presented to the NRC on December 6, 2011, FPL was requested to address the impact of Thermal Conductivity Degradation (TCD) on the PTN EPU safety analyses. FPL provided several responses to the NRC request for information (RAI) via letter L-2011-561 dated December 31, 2011, and letters L-2012-007 and L-2012-019 dated January 13, 2012 [References 2, 3, and 4]. On January 19, 2012 FPL received a follow-up RAI question regarding the associated changes to the Performance and Design (PAD) 4.0 code to explicitly account for TCD (PAD 4.0 TCD). In response to this RAI, FPL proposes a License Condition regarding the use of PAD 4.0 TCD.

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In addition, structural analyses and evaluations were performed to confirm that changes in loads, as a result of the revised reactor vessel (RV) support analyses, to other affected components including RV, RV head, RV internals, and nuclear fuel were acceptable. The results were provided in FPL's response to RAI EMCB-2.4 via letter L-2011-414 on October 12, 2011 [Reference 5]. On January 19, 2012, FPL received a follow-up RAI question regarding the updated Seismic/LOCA analysis impact loads on the Fuel Design System. FPL's responses to both of these RAIs are provided in Attachment 1 to this letter.

This letter contains no new commitments but does contain a new license condition involving the continued use of PAD 4.0 TCD after NRC approval of a revised new generic version of the code explicitly accounting for TCD. The submittal contains no revisions to existing commitments.

The Turkey Point Plant Nuclear Safety Committee (PNSC) has reviewed the proposed license conditions. The proposed license conditions have been evaluated in accordance with 10 CFR 50.91(a)(1), using the criteria in 10 CFR 50.92(c). FPL has determined that the proposed license conditions do not involve a significant hazards consideration. Also, the proposed license conditions do not alter the environmental assessment previously submitted by letter L-2010-113 [Reference 1]. The remainder of this submittal does not alter the significant hazards consideration or environmental assessment previously submitted by letter L-2010-113 [Reference 1].

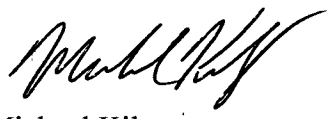
In accordance with 10 CFR 50.91(b)(1), a copy of this letter is being forwarded to the State Designee of Florida.

Should you have any questions regarding this submittal, please contact Mr. Robert J. Tomonto, Licensing Manager, at (305) 246-7327.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on January 25, 2012.

Very truly yours,



Michael Kiley
Site Vice President
Turkey Point Nuclear Plant

Attachment

cc: USNRC Regional Administrator, Region II
USNRC Project Manager, Turkey Point Nuclear Plant
USNRC Resident Inspector, Turkey Point Nuclear Plant
Mr. W. A. Passetti, Florida Department of Health

Turkey Point Units 3 and 4

RESPONSE TO NRC NUCLEAR PERFORMANACE AND CODE REVIEW BRANCH REQUEST FOR ADDITIONAL INFORMATION REGARDING EXTENDED POWER UPRATE LICENSE AMENDMENT REQUEST NO. 205 AND NUCLEAR FUEL DESIGN

ATTACHMENT 1

Response to Request for Additional Information

The following information is provided by Florida Power and Light Company (FPL) in response to the U. S. Nuclear Regulatory Commission's (NRC) Request for Additional Information (RAI). This information was requested to support License Amendment Request (LAR) 205, Extended Power Uprate (EPU), for Turkey Point Nuclear Plant (PTN) Units 3 and 4 that was submitted to the NRC by FPL via letter (L-2010-113) dated October 21, 2010 [Reference 1].

As a result of information presented to the NRC on December 6, 2011, FPL was requested to address the impact of Thermal Conductivity Degradation (TCD) on the PTN EPU safety analyses. FPL provided several responses to the NRC request for information (RAI) via letter L-2011-561 dated December 31, 2011, and letters L-2012-007 and L-2012-019 dated January 13, 2012 [References 2, 3, and 4]. On January 19, 2012 FPL received a follow-up RAI question regarding the associated changes to the Performance and Design (PAD) 4.0 code to explicitly account for TCD (PAD 4.0 TCD). In response to this RAI, FPL proposes a License Condition regarding the use of PAD 4.0 TCD.

In addition, structural analyses and evaluations were performed to confirm that changes in loads, as a result of the revised reactor vessel (RV) support analyses, to other affected components including RV, RV head, RV internals, and nuclear fuel were acceptable. The results were provided in FPL's response to RAI EMCB-2.4 via letter L-2011-414 on October 12, 2011 [Reference 5]. On January 19, 2012, FPL received a follow-up RAI question regarding the updated Seismic/LOCA analysis impact loads on the Fuel Design System. FPL's responses to both of these RAIs are presented below.

Operating License Changes

License Condition (3.J.1 for Unit 3 and 3.K.1 for Unit 4) is proposed to Renewed Facility Operating Licenses DPR-31 and DPR-41, respectively, consistent with that discussed with the NRC Project Manager (PM) and NRC Nuclear Performance and Code Review Branch (SNPB) technical reviewer:

> "PAD 4.0 TCD has been specifically approved for use for the Turkey Point licensing basis analyses. Upon NRC's approval of a revised generic version of PAD that accounts for Thermal Conductivity Degradation (TCD), FPL will within six months:
>
> 1. Demonstrate that PAD 4.0 TCD remains conservatively bounding in licensing basis analyses when compared to the new generically approved version of PAD w/TCD, or
> 2. Provide a schedule for the re-analysis using the new generically approved version of PAD w/TCD for any of the affected licensing basis analyses."

Basis for the Change: The language in the license conditions will assure that the results of the Turkey Point safety analyses remain conservative and within regulatory limits. Per the license conditions, FPL must implement the new version of PAD in the event that it is more conservative than PAD 4.0 TCD.

See Figures 1 and 2 below for DPR-31 and DPR-41 markups.

NO SIGNIFICANT HAZARDS DETERMINATION

The Commission has provided standards in 10 CFR 50.92(c) for determining whether a significant hazards consideration exists. A proposed amendment to an operating license for a facility involves no significant hazard if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

FPL proposes to add a new license condition (3.J.1 for Unit 3 and 3.K.1 for Unit 4) to DPR-31 and DPR-41, respectively. The proposed license condition will require FPL to, within six months of NRC approval of a revised generic version of the PAD TCD code, either demonstrate that the existing PAD 4.0 TCD analysis remains conservatively bounding when compared to a generically approved version of PAD or provide a schedule to perform re-analysis using the new generically approved version of PAD for any of the affected licensing basis analyses. This will assure that the results of the safety analyses remain conservative and within regulatory limits.

FPL has reviewed this proposed license amendment for Turkey Point Units 3 and 4 and has determined that its adoption would not involve a significant hazards consideration. The bases for this determination are:

The proposed amendment does not involve a significant hazards consideration for the following reasons:

1. **The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.**

   The proposed license conditions will require FPL, within six months of NRC approval of a revised generic version of the PAD TCD code, to either demonstrate that the existing PAD 4.0 TCD analysis remains conservatively bounding when compared to a new generically approved version of PAD or provide a schedule for performance of re-analysis using the new generically approved version of PAD for any of the affected licensing basis analyses. This will assure FPL implementation of the new generically approved version of PAD once it becomes available in the event that the results are more conservative, i.e., restrictive.

   The proposed license conditions have no effect on the probability of an accident previously evaluated as they do not affect the configuration or operation of systems that could initiate an accident previously evaluated. The proposed license conditions have no direct effect on the consequences of an accident previously evaluated as they only assure that the results of the safety analyses remain conservative and within regulatory limits.

   Therefore, the proposed amendments do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.**

   The proposed license conditions will not affect the design or operation of any plant equipment that could initiate or contribute to the initiation of an accident. The proposed license conditions only assure the results of the safety analyses remain conservative and within regulatory limits.

   Therefore, the proposed amendments do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant reduction in the margin of safety.

The proposed license conditions only assure FPL's implementation of the new generically approved version of PAD once it becomes available in the event that the results are more conservative, i.e., restrictive. The proposed license conditions only assure that the results of the safety analyses remain conservative and within regulatory limits. As such, they cannot reduce any margin of safety.

Thus, the proposed amendments do not involve a significant reduction in the margin of safety.

Based on the above discussion, FPL has determined that the proposed license conditions do not involve a significant hazards consideration.

Figure 1 – 3.J.1 for DPR-31

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3. The CREVS compensatory filtration unit, which is being installed by FPL as part of the AST methodology implementation at Turkey Point, will be designed in accordance with the Class I Structures, Systems, and Equipment Design Requirements defined in Appendix 5A of the Turkey Point UFSAR. As such, the compensatory filtration unit will be designed so that the stress limits found in Table 5A-1 of the Turkey Point UFSAR will not be exceeded due to the loadings imposed by a maximum hypothetical earthquake. FPL shall ensure that the design of the compensatory filtration unit satisfies these stress limits prior to the implementation of the proposed AST methodology at Turkey Point.

I. Extended Power Uprate Modifications

1. Prior to completion of the Cycle 26 refueling outage for Unit 3, the licensee shall provide confirmation to the NRC staff that the design and structural integrity evaluations associated with the modifications related to the spent fuel pool supplemental heat exchangers are complete, and that the results demonstrate compliance with appropriate UFSAR and code requirements. As part of the confirmation, the licensee shall provide a summary of the structural qualification results of the piping, pipe supports, supplemental heat exchanger supports, and the inter-tie connection with the existing heat exchanger for the appropriate load combinations along with the margins.

J. PAD TCD Safety Analyses

1. PAD 4.0 TCD has been specifically approved for use for the Turkey Point licensing basis analyses. Upon NRC's approval of a revised generic version of PAD that accounts for Thermal Conductivity Degradation (TCD), FPL will within six months:
   a. Demonstrate that PAD 4.0 TCD remains conservatively bounding in licensing basis analyses when compared to the new generically approved version of PAD w/TCD, or
   b. Provide a schedule for the re-analysis using the new generically approved version of PAD w/TCD for any of the affected licensing basis analyses.

4. This renewed license is effective as of the date of issuance, and shall expire at midnight July 19, 2032.

FOR THE NUCLEAR REGULATORY COMMISSION

Signed by
Samuel J. Collins, Director
Office of Nuclear Reactor Regulation

Attachments:
Appendix A – Technical Specifications for Unit 3
Appendix B – Environmental Protection Plan

Date of Issuance: June 6, 2002

Renewed License No. DPR-31
Revised by letter dated _____

Figure 2 – 3.K.1 for DPR-41

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K. PAD TCD Safety Analyses

1. PAD 4.0 TCD has been specifically approved for use for the Turkey Point licensing basis analyses. Upon NRC's approval of a revised generic version of PAD that accounts for Thermal Conductivity Degradation (TCD), FPL will within six months:
   a. Demonstrate that PAD 4.0 TCD remains conservatively bounding in licensing basis analyses when compared to the new generically approved version of PAD w/TCD, or
   b. Provide a schedule for the re-analysis using the new generically approved version of PAD w/TCD for any of the affected licensing basis analyses.

4. This renewed license is effective as of the date of issuance, and shall expire at midnight April 10, 2033.

FOR THE NUCLEAR REGULATORY COMMISSION

Signed by
Samuel J. Collins, Director
Office of Nuclear Reactor Regulation

Attachments:
Appendix A – Technical Specifications for Unit 4
Appendix B – Environmental Protection Plan

Date of Issuance: June 6, 2002

Updated Seismic/LOCA Analysis Information Following the NRC Audit, January 19, 2012

The fuel Seismic/LOCA analysis was regenerated with revised core plate motions to account for the change in Reactor Vessel stiffness values. The Seismic/LOCA Licensing Report (LR) Section 2.8.1.2.3 was reviewed for any necessary changes. This review concluded that the description of crushed grid locations requires updating in LR Sections 2.8.1.2.3.1 and 2.8.1.2.3.5. The revised descriptions of grid crush locations are provided below.

LR Section 2.8.1.2.3.1

New core plate motions were developed for Turkey Point Units 3 and 4 and, subsequently, an updated fuel Seismic/LOCA analysis was performed. The updated analysis shows that all Seismic/LOCA fuel criteria are met for the EPU conditions, for a homogeneous core of Westinghouse 15x15 Upgrade design fuel, and for mixed cores with Westinghouse 15x15 DRFA and Upgrade design fuel. However, the updated analysis presents some analysis details that are different than those that are documented in Turkey Point LR Section 2.8.1.2.3 [Reference 1]; specifically, the locations of fuel assemblies containing predicted crushed grids. The updated analysis results show that the maximum impact force of 15x15 Upgrade fuel assemblies in the homogenous core and 15x15 DRFA and Upgrade fuel assemblies in mixed cores are below the allowable grid crush limit except for a few assemblies in the three-fuel-assembly and seven-fuel-assembly rows.

The allowable grid strengths are established at the 95-percent confidence level on the true mean from the distribution of experimentally determined grid crush data at operating temperature. The grid elevation off-set between the Upgrade fuel and DRFA fuel were included in the Seismic/LOCA analysis. The off-set grid deformation strengths were tested at operating temperature and the tested results were applied to the mixed transition core analyses.

Since the DRFA fuel has no IFM grid while the Upgrade fuel does have IFM grids, the gaps between the two types of fuel (or fuel rod to IFM) is much larger than the gap at mid grid locations. Since the grid span length between the mid grid and IFM is relatively short (10 inches) and the fuel assembly is relatively stiff, the impact forces will be transferred between the mid grids rather than through fuel rod to IFM contact.

Based on the results of the combined Seismic and LOCA loads, the crushed grids are only located in fuel assemblies at the core periphery, in non RCCA locations, except the case discussed in 2.8.1.2.3.5. Updated analysis indicates that the core coolable geometry requirements are met. Therefore, both the DRFA and Upgrade fuel designs are structurally acceptable for the EPU.

LR Section 2.8.1.2.3.5

The maximum seismic and LOCA load results for fuel assemblies in both the homogenous 15x15 Upgrade fuel assembly core and the 15x15 DRFA & Upgrade fuel assembly transition mixed cores occur in the Z-direction during Seismic/LOCA Accumulator line (ACC) loading. The impact forces of Seismic and LOCA were combined by SRSS (square root of the sum of the square) method. The maximum structural grid loads for the fuel assemblies occur in the peripheral assemblies in the three and seven fuel assembly rows.

Figures 3 and 4 show a core map for Units 3 and 4, respectively, indicating the fuel assembly locations for which the analysis results show grid deformation for the homogenous 15x15 Upgrade fuel assembly core. In this case, the results found that the impact force on the fuel assemblies in all RCCA core locations were below the allowable grid crush limit.

In general, fresh fuel is not loaded at the periphery of the reactor for economic reasons. For transition mixed cores with Westinghouse 15x15 DRFA & Upgrade design fuel, based on the updated analysis, deformed grids only occur at periphery locations of the reactor when Upgrade fuel assemblies are located at the core periphery locations.

Figure 5 shows a core map for a transition mixed core with DRFA fuel assemblies in all core periphery locations. The results of the analysis for this case found that the impact force on all fuel assemblies were below the allowable grid crush limit.

Figure 6 shows a core map indicating the fuel assembly locations for which the analysis results show grid deformations for a transition mixed core with 15x15 Upgrade fuel assemblies in all core periphery locations. In this case, the results found that the impact force on the fuel assemblies in all RCCA core locations were below the allowable grid crush limit.

Figure 7 shows a core map indicating the fuel assembly locations for which the analysis results show grid deformation for a transition mixed core with 15x15 Upgrade fuel assemblies in all core periphery locations except core locations F-2, F-14, H-1, H-15, K-2, and K-14 which have DFRA fuel assemblies. In this case, the results show grid deformation in the fuel assemblies in RCCA core locations F-2 and F-14.

Figure 8 shows a core map indicating the fuel assembly locations for which the analysis results show grid deformation for a transition mixed core with 15x15 DRFA fuel assemblies in all core periphery locations except core locations F-2, F-14, H-1, H-15, K-2, and K-14 which have Upgrade fuel assemblies. In this case, the results found that the impact force on the fuel assemblies in RCCA core locations F-2 and F-14 were below the allowable grid crush limit.

The Seismic/LOCA results also show that the maximum impact forces of both 15x15 DRFA and Upgrade fuel assemblies in the mixed core seven fuel assembly rows are below the allowable crush limits when a DRFA fuel assembly is placed in core locations E-2, E-14, F-2 and F-14.

The stress analysis results demonstrate that sufficient margin to fragmentation exists for the fuel rods of both 15x15 Upgrade and DRFA fuel types. In addition the stress analysis shows that thimble tubes meet the stress limits for Condition III & IV accidents. The updated analysis concluded that a coolable geometry is maintained.

An unlikely loading pattern condition was analyzed where the Upgrade fuel assemblies are placed in core locations E-2 and E-14 and DRFA fuel assemblies are placed in RCCA core locations F-2 and F-14. This was the only condition when grid crush was predicted to occur in fuel assemblies under an RCCA. To ensure grid crush in RCCA locations does not occur, an RSAC limitation is being maintained to assure that for 15x15 DRFA & Upgrade fuel assembly transition mixed cores, only DRFA fuel is loaded in core locations E-2 and E-14 when DRFA fuel is loaded in RCCA core locations F-2 and F-14.

Figure 3 – Turkey Point 3

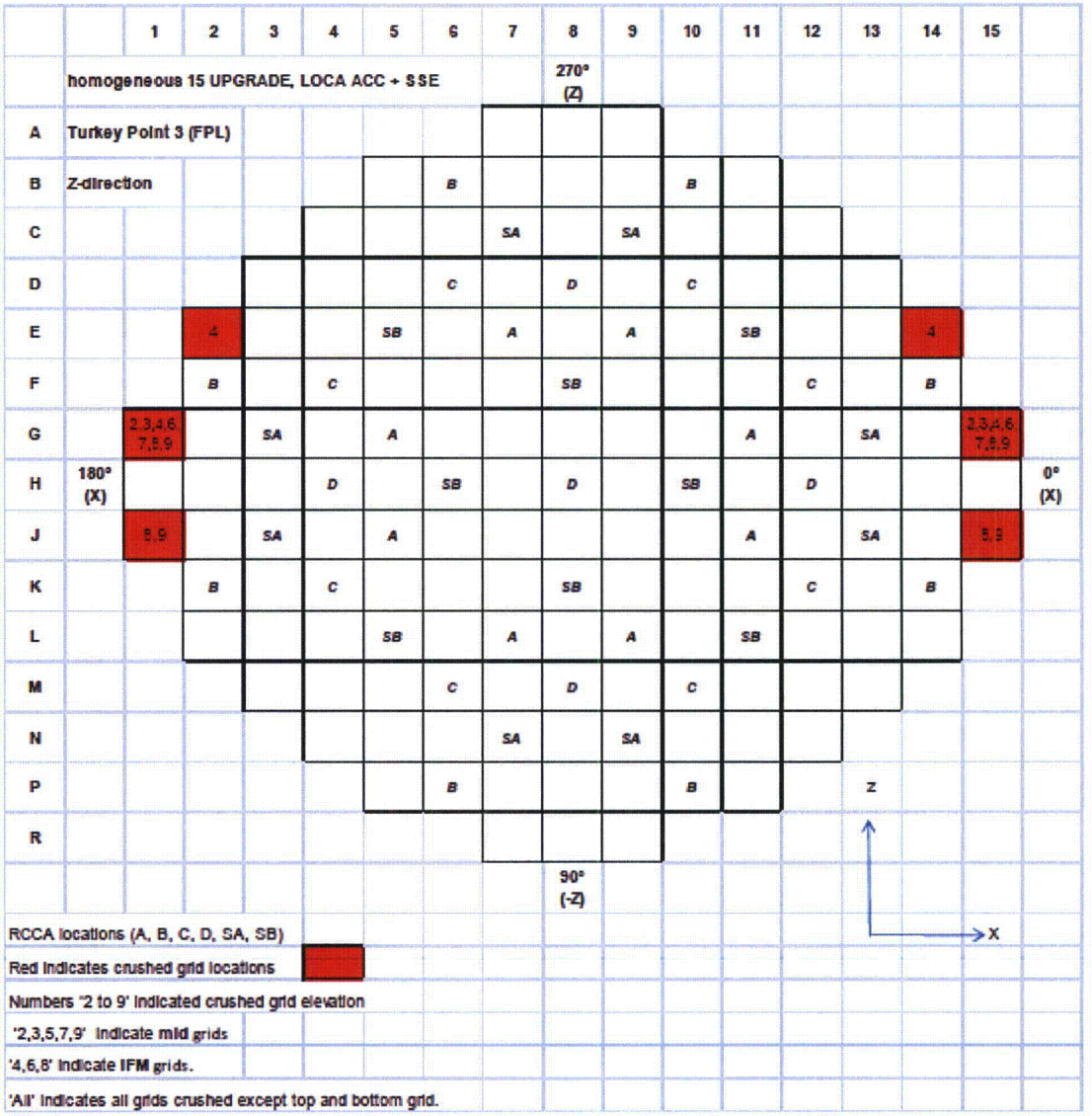

Figure 4 – Turkey Point 4

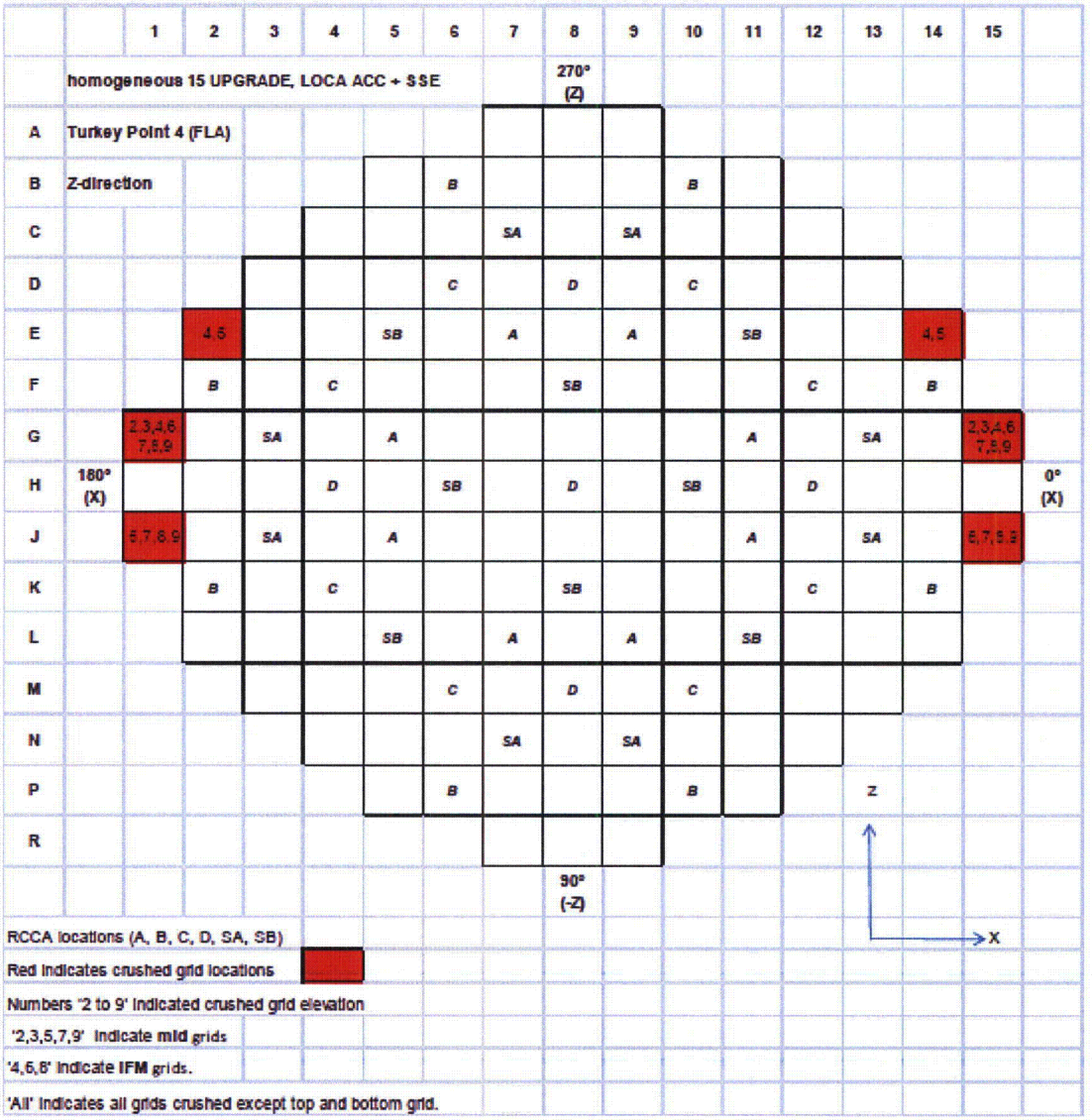

Figure 5

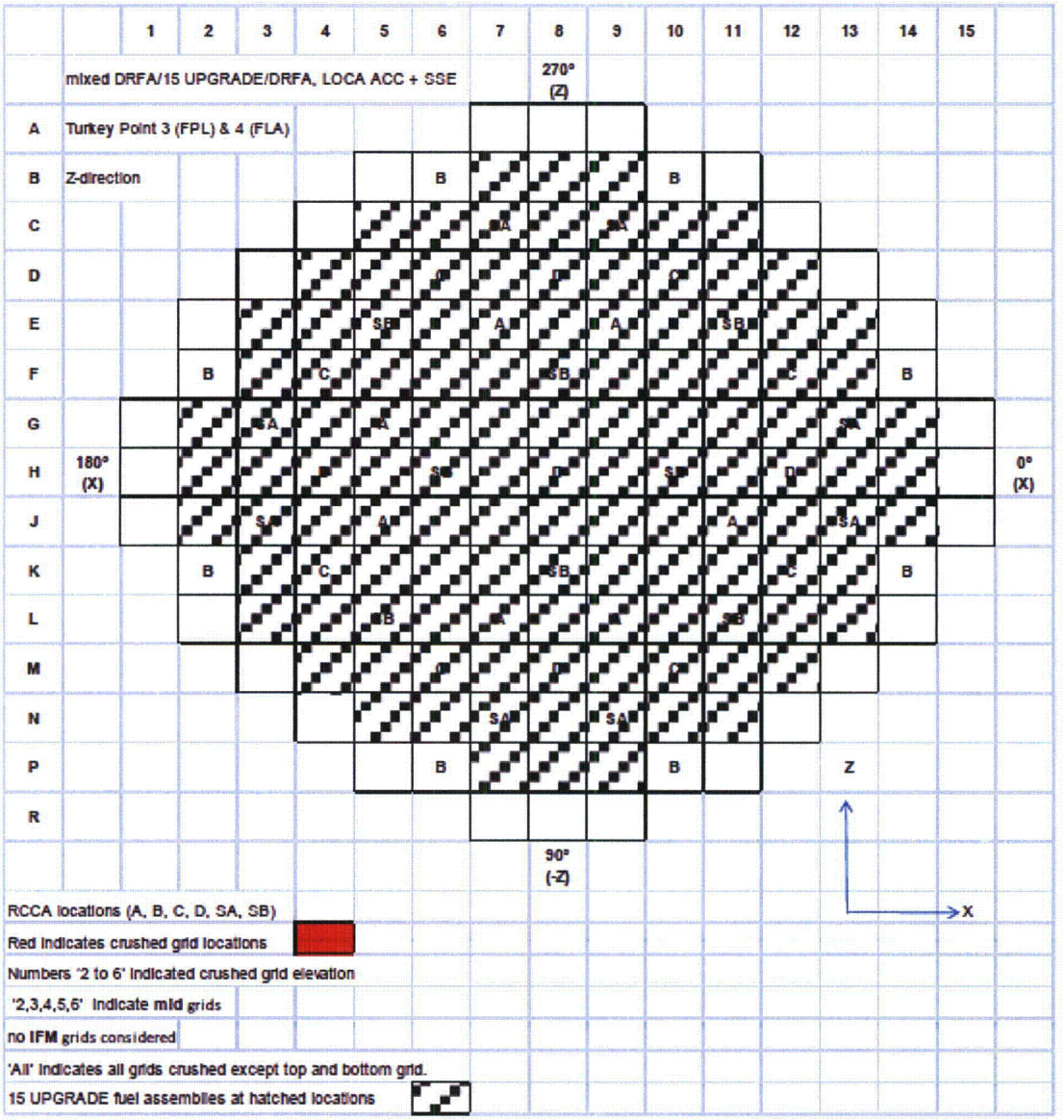
mixed DRFA/15 UPGRADE/DRFA, LOCA ACC + SSE
Turkey Point 3 (FPL) & 4 (FLA)
Z-direction
270° (Z)
180° (X)
0° (X)
90° (-Z)
Z
X
RCCA locations (A, B, C, D, SA, SB)
Red indicates crushed grid locations
Numbers '2 to 6' indicated crushed grid elevation
'2,3,4,5,6' indicate mid grids
no IFM grids considered
'All' indicates all grids crushed except top and bottom grid.
15 UPGRADE fuel assemblies at hatched locations

Figure 6

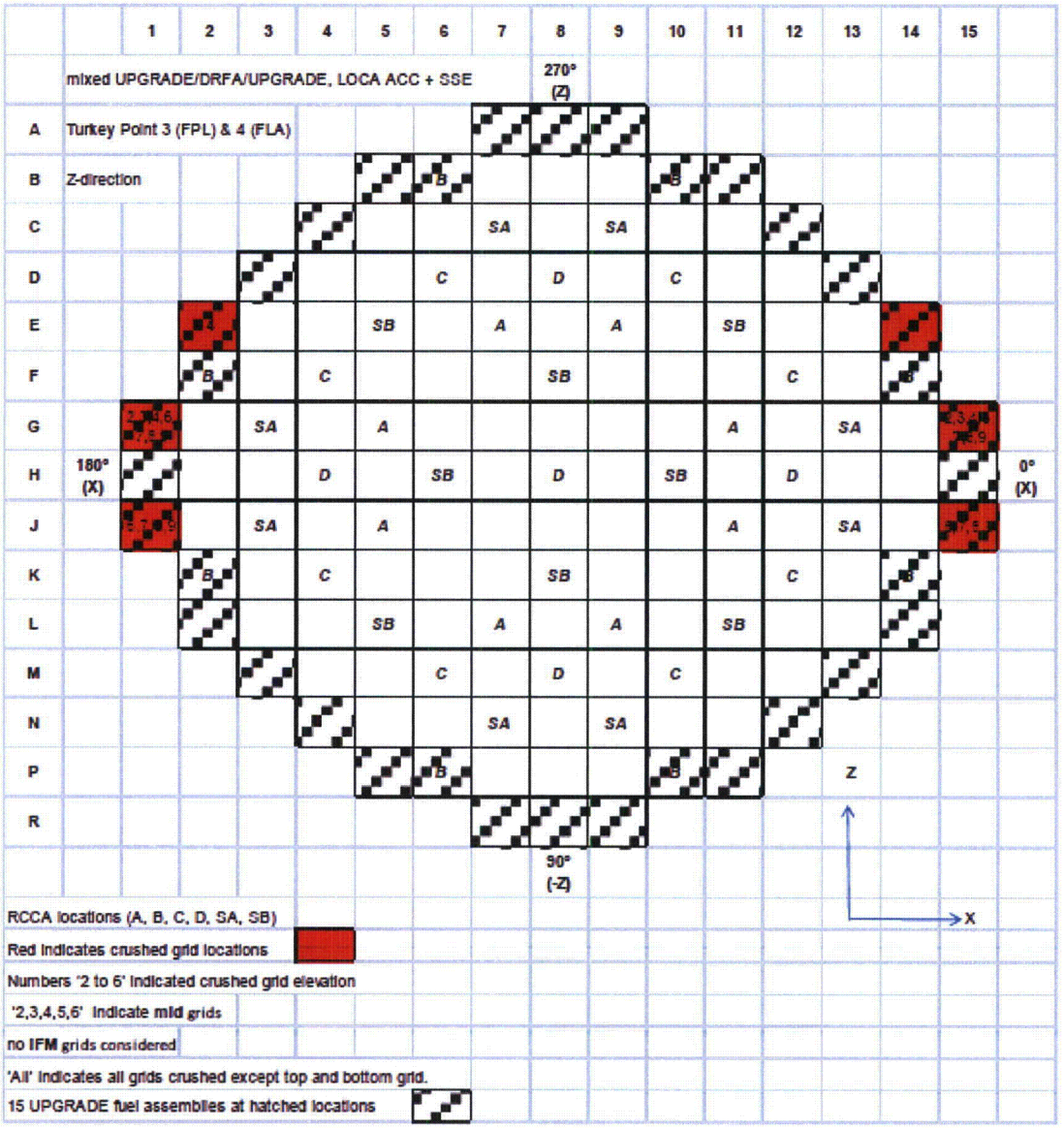
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Figure 7

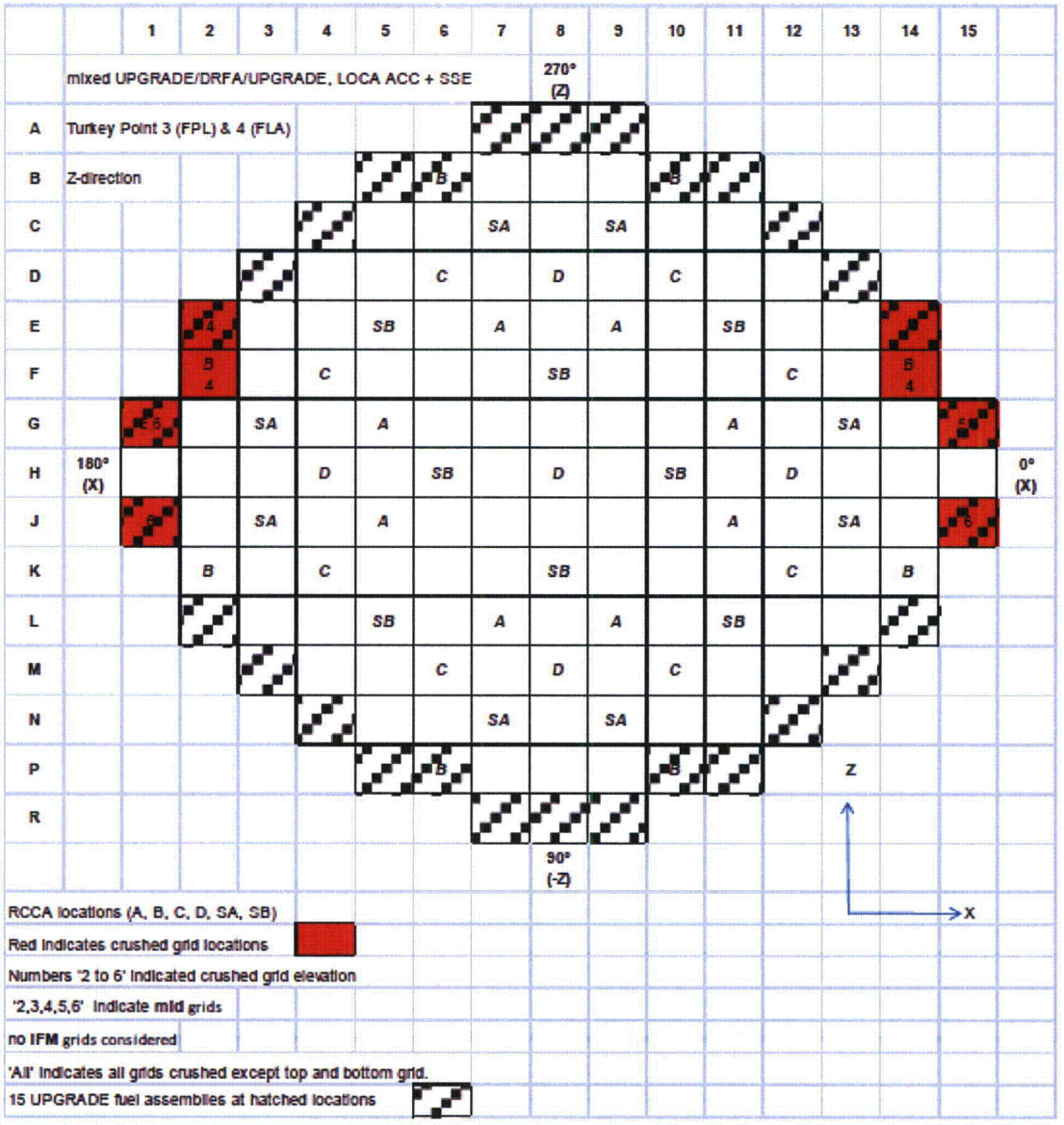
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
mixed UPGRADE/DRFA/UPGRADE, LOCA ACC + SSE
270° (Z)
A Turkey Point 3 (FPL) & 4 (FLA)
B Z-direction
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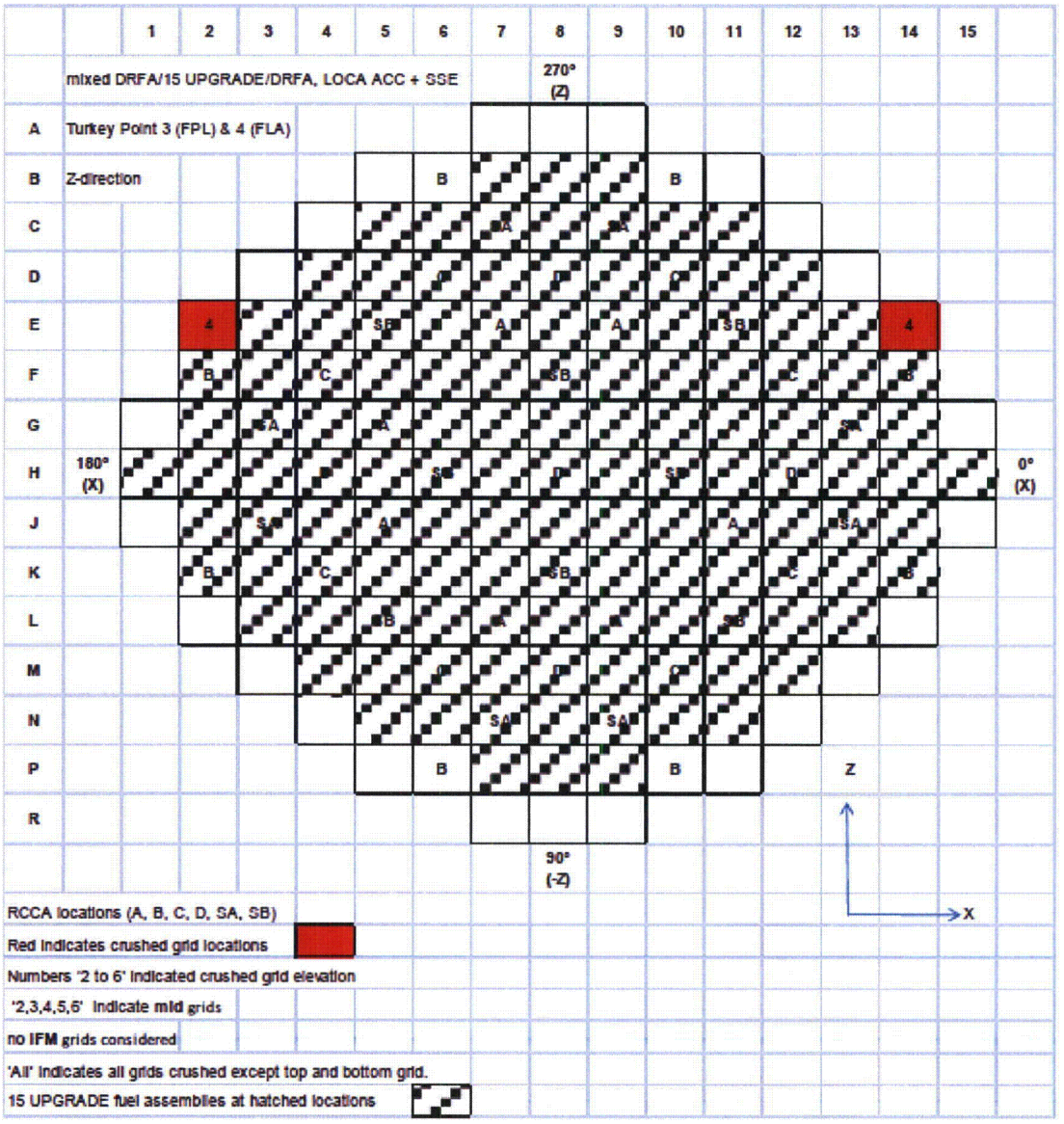
Figure 8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