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June 19, 2009

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

Subject: Duke Energy Carolinas, LLC
William States Lee III Nuclear Station - Docket Nos. 52-018 and 52-019
AP1000 Combined License Application for the
William States Lee III Nuclear Station Units 1 and 2
Response to Request for Additional Information
(RAI No. 2680)
Ltr# WLG2009.06-06

Reference: Letter from Brian Hughes (NRC) to Peter Hastings (Duke Energy), Request for Additional Information Letter No. 069 Related to SRP Section 02.04.03 – Probable Maximum Flood (PMF) on Streams and Rivers for the William States Lee III Units 1 and 2 Combined License Application, dated May 27, 2009

This letter provides the Duke Energy response to the Nuclear Regulatory Commission's request for additional information (RAI) included in the referenced letter.

The response to the NRC information request described in the referenced letter is addressed in a separate enclosure, which also identifies associated changes, when appropriate, that will be made in a future revision of the Final Safety Analysis Report for the Lee Nuclear Station.

If you have any questions or need any additional information, please contact Peter S. Hastings, Nuclear Plant Development Licensing Manager, at 980-373-7820.

Bryan J. Dolan
Vice President
Nuclear Plant Development

D093
NRO

Enclosures:

1) Duke Energy Response to Request for Additional Information Letter 069, RAI 02.04.03-006
2) Duke Energy Response to Request for Additional Information Letter 069, RAI 02.04.03-007
3) Duke Energy Response to Request for Additional Information Letter 069, RAI 02.04.03-008
4) Duke Energy Response to Request for Additional Information Letter 069, RAI 02.04.03-009
5) Duke Energy Response to Request for Additional Information Letter 069, RAI 02.04.03-010

AFFIDAVIT OF BRYAN J. DOLAN

Bryan J. Dolan, being duly sworn, states that he is Vice President, Nuclear Plant Development, Duke Energy Carolinas, LLC, that he is authorized on the part of said Company to sign and file with the U. S. Nuclear Regulatory Commission this supplement to the combined license application for the William States Lee III Nuclear Station and that all the matter and facts set forth herein are true and correct to the best of his knowledge.

Bryan J. Dolan

Subscribed and sworn to me on June 19, 2009

Elaine Falcone
Notary Public

My commission expires: February 27, 2011

SEAL

xc (w/o enclosure):

Loren Plisco, Deputy Regional Administrator, Region II
Stephanie Coffin, Branch Chief, DNRL

xc (w/ enclosure):

Brian Hughes, Senior Project Manager, DNRL

Lee Nuclear Station Response to Request for Additional Information (RAI)

RAI Letter No. 069

NRC Technical Review Branch: Hydrologic Engineering Branch (RHEB)

Reference NRC RAI Number(s): RAI 02.04.03-006

NRC RAI:

In response to the staff's RAI 2.4.3-02, the applicant stated that the maximum water surface elevation estimated in Make-Up Pond B for PMP and coincident wind wave effects, 584.63 ft MSL, is only provided as a sensitivity analysis and does not supersede the design basis flood elevation of 584.3 ft provided in response to staff's RAI 2.4.3-4. The staff disagrees with this statement. The design-basis flood water surface elevation must be based on an appropriate analysis that includes the effects of nonlinear basin response. The applicant should choose the design-basis flood water surface elevation based on an appropriate and conservative method.

Duke Energy Response:

The Duke Energy response to RAI 02.04.03-003 (Reference 1) demonstrates that the maximum hypothetical flooding event from Make-Up Pond B would not have any adverse impacts on the ability of safety-related systems, structures, or components (SSCs) to perform their safety function. The floor elevation for the Unit 1 and Unit 2 Nuclear Islands at the Lee Nuclear Site is located at the 590 ft. msl elevation. Demonstrating that the maximum hypothetical flood height calculated for Make-Up Pond B remains below the 590 ft. msl elevation demonstrates adequate protection from flooding.

In Reference 1, the maximum hypothetical flood elevation for Make-Up Pond B was identified as 584.63 ft. msl. This flood height was comprised of three component parts: 1) the Probable Maximum Flood (PMF), 2) the calculated effects from wind-driven waves, and 3) the impact from assuming a nonlinear basin response at high rainfall rates. The individual component parts had the following contribution: 583.85 ft. msl + 0.38 ft. + 0.40 ft. = 584.63 ft. msl. This result demonstrated that there was over 5 ft. of margin between the calculated flood elevation and the point where safety-related SSCs could be impacted. This conclusion demonstrates reasonable assurance that the plant, as proposed, has adequate protection from the worst-case external plant flood originating from Make-Up Pond B.

The NRC staff identified that the effect from wind-driven waves was determined prior to the consideration of nonlinearity effects. The staff theorized that the impact from wind-driven waves (0.38 ft.) could be higher due to a slightly longer fetch resulting from a slightly higher stillwater flood elevation considering nonlinearity (0.40 ft.). Duke Energy re-analyzed the flooding scenario for Make-Up Pond B calculating the effects of wind-driven waves from a stillwater elevation that included nonlinearity.

As discussed in the response to RAI 02.04.03-003 (Reference 1), nonlinear basin response for the Make-Up Pond B watershed was accounted for by increasing the peak of the associated derived unit hydrograph by 20 percent and reducing the time base by one-third.

Based on the above re-analysis, the revised flood height for Make-Up Pond B is 584.59 ft. msl (rounded to 584.6 ft. msl). This result is the product of the same three component parts

described above, but combined in a revised order: 1) the PMF, 2) the impact from assuming a nonlinear basin response at high rainfall rates, and 3) the calculated effects from wind-driven waves from a flood height that is the combination of components 1 and 2. The individual component parts had the following contribution: 583.85 ft. msl + 0.40 ft. + 0.34 ft. = 584.59 ft. msl. The only changes in the analysis were associated with the calculation of wind-driven waves. This component was influenced by three factors: 1) a minor increase in fetch length due to the use of a higher surface water elevation of 584.25 ft. msl, which would tend to increase the wind-driven wave contribution; 2) a minor increase in slope associated with the higher water surface elevation of 584.25 ft. msl, which would tend to increase the wind-driven wave contribution; and 3) the correction of minor computational errors, which over-predicted wave run-up height in the original analysis. The result of the re-analysis demonstrates that there is over 5 ft. of margin between the calculated flood elevation and the point where safety-related SSCs could be impacted. This conclusion demonstrates reasonable assurance that the plant, as proposed, has adequate protection from the worst-case external plant flood originating from Make-Up Pond B.

FSAR mark-ups are provided to incorporate the changes presented above regarding nonlinearity, wind-driven waves, and resulting changes in the flood evaluation. Duke Energy has provided additional mark-ups to FSAR Subsection 2.4.3 that are unrelated to the staff's question, but are included to better identify the limiting condition for each analysis. These proposed changes to the FSAR will be incorporated into a future revision of the Final Safety Analysis Report.

Reference:

1. Bryan J. Dolan to Document Control Desk, U.S. Nuclear Regulatory Commission, Partial Response to Request for Additional Information (RAI Nos. 820, 821, 822, 823, 824, and 825) Ltr# WLG2008.10-14, dated October 27, 2008 (ML083040525).

Associated Revision to the Lee Nuclear Station Final Safety Analysis Report:

FSAR Subsection 2.4.1.2.2.6

FSAR Subsection 2.4.2.2

FSAR Subsection 2.4.3.1

FSAR Subsection 2.4.3.3

FSAR Subsection 2.4.3.4

FSAR Subsection 2.4.3.5

FSAR Subsection 2.4.3.6

FSAR Subsection 2.4.14

FSAR Table 2.0-201

FSAR Figure 2.4.3-227

FSAR Figure 2.4.3-230

FSAR Figure 2.4.3-231

FSAR Figure 2.4.3-234

FSAR Figure 2.4.3-235 (New)

FSAR Figure 2.4.3-236 (New)

FSAR Figure 2.4.3-237 (New)

FSAR Figure 2.4.3-238 (New)

FSAR List of Figures

Attachments:

1) Mark-up of FSAR Subsection 2.4.1.2.2.6
2) Mark-up of FSAR Subsection 2.4.2.2
3) Mark-up of FSAR Subsection 2.4.3.1
4) Mark-up of FSAR Subsection 2.4.3.3
5) Mark-up of FSAR Subsection 2.4.3.4
6) Mark-up of FSAR Subsection 2.4.3.5
7) Mark-up of FSAR Subsection 2.4.3.6
8) Mark-up of FSAR Subsection 2.4.14
9) Mark-up of FSAR Table 2.0-201
10) Revised FSAR Figure 2.4.3-227
11) Revised FSAR Figure 2.4.3-230
12) Revised FSAR Figure 2.4.3-231
13) Revised FSAR Figure 2.4.3-234
14) New FSAR Figure 2.4.3-235
15) New FSAR Figure 2.4.3-236
16) New FSAR Figure 2.4.3-237
17) New FSAR Figure 2.4.3-238
18) Revised FSAR List of Figures

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 1 to RAI 02.04.03-006

Mark-up of FSAR Subsection 2.4.1.2.2.6

COLA Part 2, FSAR, Chapter 2, Subsection 2.4.1.2.2.6, last paragraph under the heading "Make-Up Pond B," is revised as follows:

The maximum flood level at the Lee Nuclear Station is elevation 584.~~36~~ ft. msl. This elevation would result from a Probable Maximum Flood (PMF) event on Make-Up Pond B watershed with the added effects of coincident wind wave activity as described in Subsection 2.4.3. The Lee Nuclear Station safety-related structures have a grade elevation of 590 ft. msl~~, providing over 5 ft. of freeboard from the worst potential flood considerations~~.

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 2 to RAI 02.04.03-006

Mark-up of FSAR Subsection 2.4.2.2

COLA Part 2, FSAR, Chapter 2, Subsection 2.4.2.2, last paragraph, is revised as follows:

The maximum flood level at the Lee Nuclear Station is elevation 584.~~3~~6 ft. msl. This elevation would result from a PMF event on Make-Up Pond B watershed with the added effects of coincident wind wave activity as described in Subsection 2.4.3. The Lee Nuclear Station safety-related plant elevation is 590 ft.~~, providing over 5 ft. of freeboard under the worst potential flood considerations~~ msl. The maximum flood level is identified as a site characteristic in Table 2.0-201.

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 3 to RAI 02.04.03-006

Mark-up of FSAR Subsection 2.4.3.1

COLA Part 2, FSAR, Chapter 2, Subsection 2.4.3.1, second paragraph under the heading "McKowns Creek/Make-Up Pond B," is revised as follows:

Several time distributions were examined for both modeled events. For each storm, a two-thirds peaking storm event was found to provide the greatest runoff. However, an end peaking storm event was found to provide the controlling water surface elevation as discussed in Subsection 2.4.3.5. Hyetographs are provided in Figure 2.4.3-204 and Figure 2.4.3-205~~.~~ for the two-thirds peaking storm events. Hyetographs are provided in Figure 2.4.3-235 and Figure 2.4.3-236 for the end peaking storm events.

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 4 to RAI 02.04.03-006

Mark-up of FSAR Subsection 2.4.3.3

COLA Part 2, FSAR, Chapter 2, Subsection 2.4.3.3, first four paragraphs under the heading "McKowns Creek/Make-Up Pond B," is revised as follows:

For McKowns Creek and Make-Up Pond B, HEC-HMS modeling software was used for rainfall runoff and storage routing calculations. The watershed is shown in Figure 2.4.3-201. Methods adopted to account for nonlinear basin response at high rainfall rates include ~~the use of wet antecedent moisture conditions and no precipitation losses, as discussed below~~ increasing the peak of the unit hydrograph by 20 percent and reducing the time base by one-third. Topographic characteristics of the site and watershed are described in Subsection 2.4.1.2.1.

The Soil Conservation Service (SCS) unit hydrograph method was used as a basis for a modified unit hydrograph to transform rainfall to runoff. Equivalent SCS unit hydrographs for the 72-hr. storm event and the 6-hr. storm event were first determined using the process of deconvolution, i.e., the known resulting flow hydrograph into Make-Up Pond B using the SCS unit hydrograph was used to back calculate an equivalent of the SCS unit hydrograph for the Make-Up Pond B watershed. The equivalent SCS unit hydrograph was then modified by increasing the peak of the unit hydrograph by 20 percent and reducing the time base by one-third. The remaining ordinates of the modified unit hydrograph were adjusted to maintain a smooth unit hydrograph with the standard characteristic of 1 in. of runoff. The 72-hr. storm event initial SCS unit hydrograph and modified unit hydrograph to account for the effects of nonlinear basin response are provided in Figure 2.4.3-237. The 6-hr. storm event initial SCS unit hydrograph and modified unit hydrograph to account for the effects of nonlinear basin response are provided in Figure 2.4.3-238.

The drainage area, length of watercourse, and average slope of the watershed were determined from aerial topography created for the area. The lag time was determined using the standard SCS curve number regression equation:

$T_{lag} = (L^{0.8} * (S+1)^{0.7}) / (1900 * Y^{0.5})$

where

T_{lag}	=	~~time~~ lag time (hr.)
L	=	hydraulic length of the watershed (ft.)
S	=	maximum potential storage of the watershed (in.); where S = 1000/CN-10 and CN = average curve number for the watershed
Y	=	average watershed land slope (percent)

The resulting characteristic parameters for the watershed are as follows:

Drainage Area

(sq. mi.)	L (ft.)	CN	S (in.)	Y (%)	T_{lag} (hr.)
2.55	10,320	87	1.49	1.60	1.28

The curve number is used to determine the ~~time~~ lag time only. During rainfall routing, the model does not use the curve number loss method, under the conservative assumption that precipitation losses do not occur. The curve number was developed using the NRCS Web Soil Survey (Reference 278) to determine the soil types in the watershed. About 95 percent of the soil belongs to Hydrologic Soil Group B, and the remaining 5 percent to Hydrologic Soil Group C. The land use is predominately wooded. Make-Up Pond B is modeled as impervious cover. Wet antecedent moisture conditions (AMC III) were also assumed.

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 5 to RAI 02.04.03-006

Mark-up of FSAR Subsection 2.4.3.4

COLA Part 2, FSAR, Chapter 2, Subsection 2.4.3.4, paragraph under the heading "McKowns Creek/Make-Up Pond B," is revised as follows:

Applying the precipitation, described in Subsection 2.4.3.1, with no precipitation losses, described in Subsection 2.4.3.2, to the runoff model, described in Subsection 2.4.3.3, the McKowns Creek and Make-Up Pond B peak PMF runoff was determined to be ~~19,257~~21,831 cfs resulting from the 6-hr. two-thirds peaking storm event. The routed peak discharge is ~~7411~~7956 cfs. However, the 6-hr. end peaking storm event resulting in a peak PMF runoff of 19,982 cfs resulted in a greater routed peak discharge of 8023 cfs. Furthermore, the 72-hr. end peaking storm event resulting in a peak PMF runoff of 16,926 cfs and a routed discharge of 8303 cfs provided the controlling water surface elevation. The resulting flow hydrograph for the 72-hr. end peaking storm event is shown in Figure 2.4.3-227. Temporal distribution of the PMP is discussed in Subsection 2.4.3.1. Because the watershed is small, the position of the PMP is considered point rainfall affecting the entire watershed equally. There are no upstream structures. No credit is taken for the lowering of flood levels at the site due to downstream dam failure.

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 6 to RAI 02.04.03-006

Mark-up of FSAR Subsection 2.4.3.5

COLA Part 2, FSAR, Chapter 2, Subsection 2.4.3.5, first paragraph under the heading "McKowns Creek/Make-Up Pond B," is revised as follows:

Subsection 2.4.3.6 addresses coincident wind wave activity for Make-Up Pond B. The maximum water surface elevation of Make-Up Pond B, resulting from the 6-hr. end peaking storm event modeled with a 5-min. time step, was found to be 583.~~68~~94 ft. The elevation hydrograph is provided in Figure 2.4.3-230. The maximum water surface elevation of Make-Up Pond B resulting from the 72-hr. end peaking storm event modeled with a 1-hr. time step was found to be 58~~3.85~~4.25 ft. Although the greatest runoff for the 72-hr. storm results from a two-thirds peaking event, the highest water surface elevation results from the routed flow~~, 7809 cfs,~~ of an end peaking event. The ~~inflow, outflow and~~ elevation hydrograph~~s are~~is provided in Figure 2.4.3-231. Subsection 2.4.3.3 describes the models used to translate the PMP discharge to the elevation hydrographs.

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 7 to RAI 02.04.03-006

Mark-up of FSAR Subsection 2.4.3.6

COLA Part 2, FSAR, Chapter 2, Subsection 2.4.3.6, paragraphs under the heading "McKowns Creek/Make-Up Pond B," is revised as follows:

Wind wave activity on Make-Up Pond B is evaluated coincident with the maximum water surface elevation of the PMF as discussed in Subsection 2.4.3.5. The determined critical fetch length of 1.4~~7~~8 mi. is shown in Figure 2.4.3-234. The 2-year annual extreme mile wind speed is adjusted based on the factors of fetch length, level overland or over water, critical duration, and stability. The critical duration is approximately 36 min. The adjusted wind speed is 50.22 mph.

Significant wave height (average height of the maximum ~~33-1/3 percent~~one-third of waves) is estimated to be 2.07 ft., crest to trough. The maximum wave height (average height of the maximum 1 percent of waves) is estimated to be 3.44 ft., crest to trough. The corresponding wave period is ~~1.8~~2.2 sec.

The 0.6~~5~~6 percent slopes along the banks of Make-Up Pond B adjacent to the site are used to determine the wave setup and runup. The maximum runup, including wave setup, is estimated to be 0.3~~0~~26 ft. The maximum wind setup is estimated to be 0.08 ft. Therefore, the total wind wave activity is estimated to be 0.3~~8~~4 ft. The PMF and the coincident wind wave activity results in a flood elevation of 584.~~3~~6 ft. msl. The Lee Nuclear Station safety-related plant elevation is 590 ft. msl and is unaffected by flood conditions and coincident wind wave activity.

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 8 to RAI 02.04.03-006

Mark-up of FSAR Subsection 2.4.14

COLA Part 2, FSAR, Chapter 2, Subsection 2.4.14, first paragraph, is revised as follows:

The maximum flood level at the Lee Nuclear Station is elevation 584.~~3~~6 ft. msl. This elevation would result from a Probable Maximum Flood (PMF) event on the Make-Up Pond B watershed with the added effects of coincident wind wave activity as described in Subsection 2.4.3.6. The Lee Nuclear Station safety-related structures have a plant elevation of 590 ft.~~, providing over 6 ft. of freeboard under the worst potential flood considerations~~ msl. Also, Subsection 2.4.12.5 describes plant elevation relative to the maximum anticipated groundwater level. The hydrostatic loading is not expected to exceed design criteria.

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 9 to RAI 02.04.03-006

Mark-up of FSAR Table 2.0-201

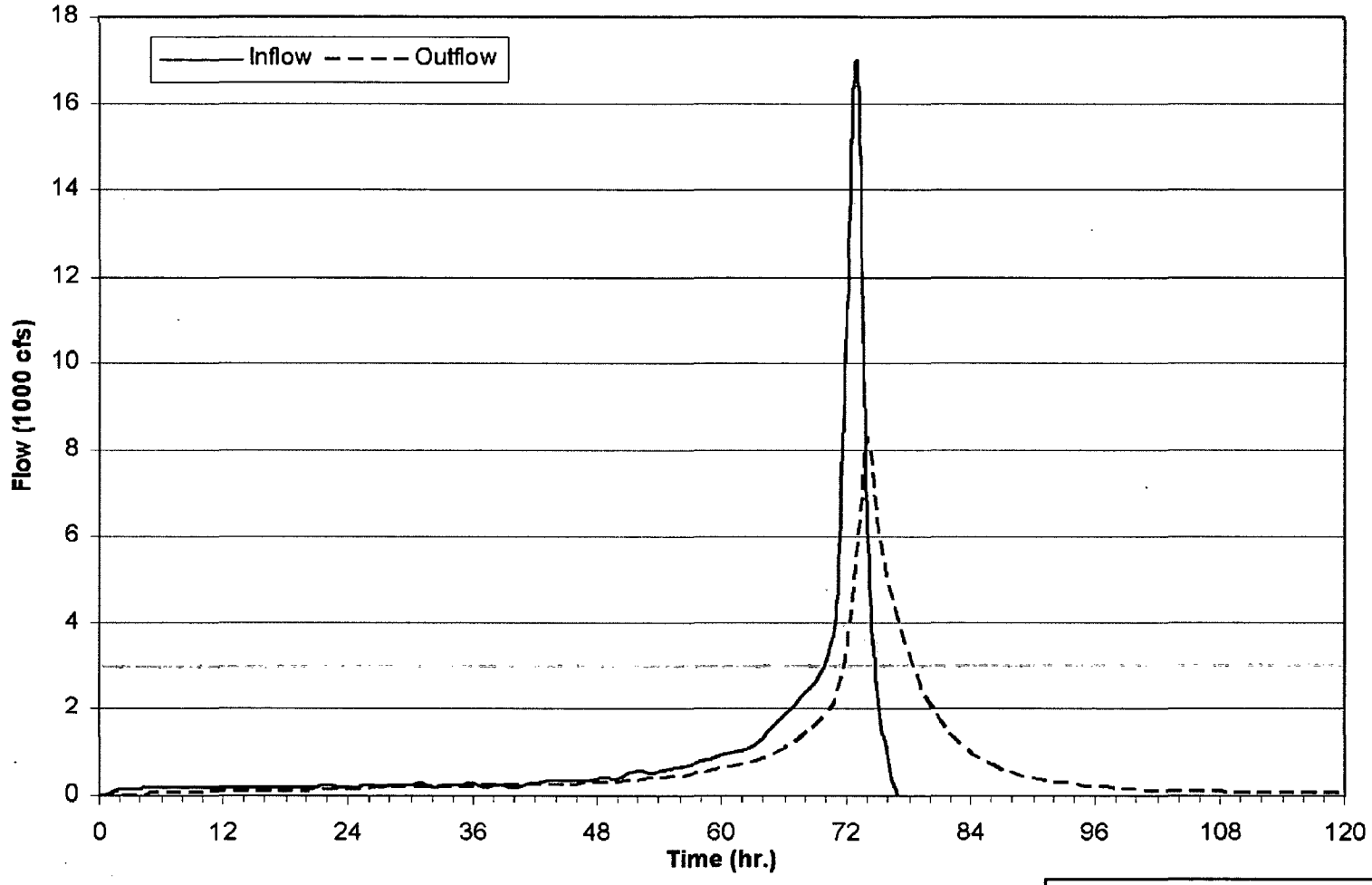
COLA Part 2, FSAR, Chapter 2, Table 2.0-201 (Sheet 5 of 7), entry for "Flood Level," is revised as follows:

	AP 1000 DCD Site Parameters	WLS Site Characteristic	WLS FSAR Reference	WLS Within Site Parameter
Flood Level	Less than plant elevation 100' (WLS Elevation 590' msl)	584.36' msl	Subsection 2.4.3.6	Yes

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 10 to RAI 02.04.03-006

Revised FSAR Figure 2.4.3-227



WLS COL 2.4-2

WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

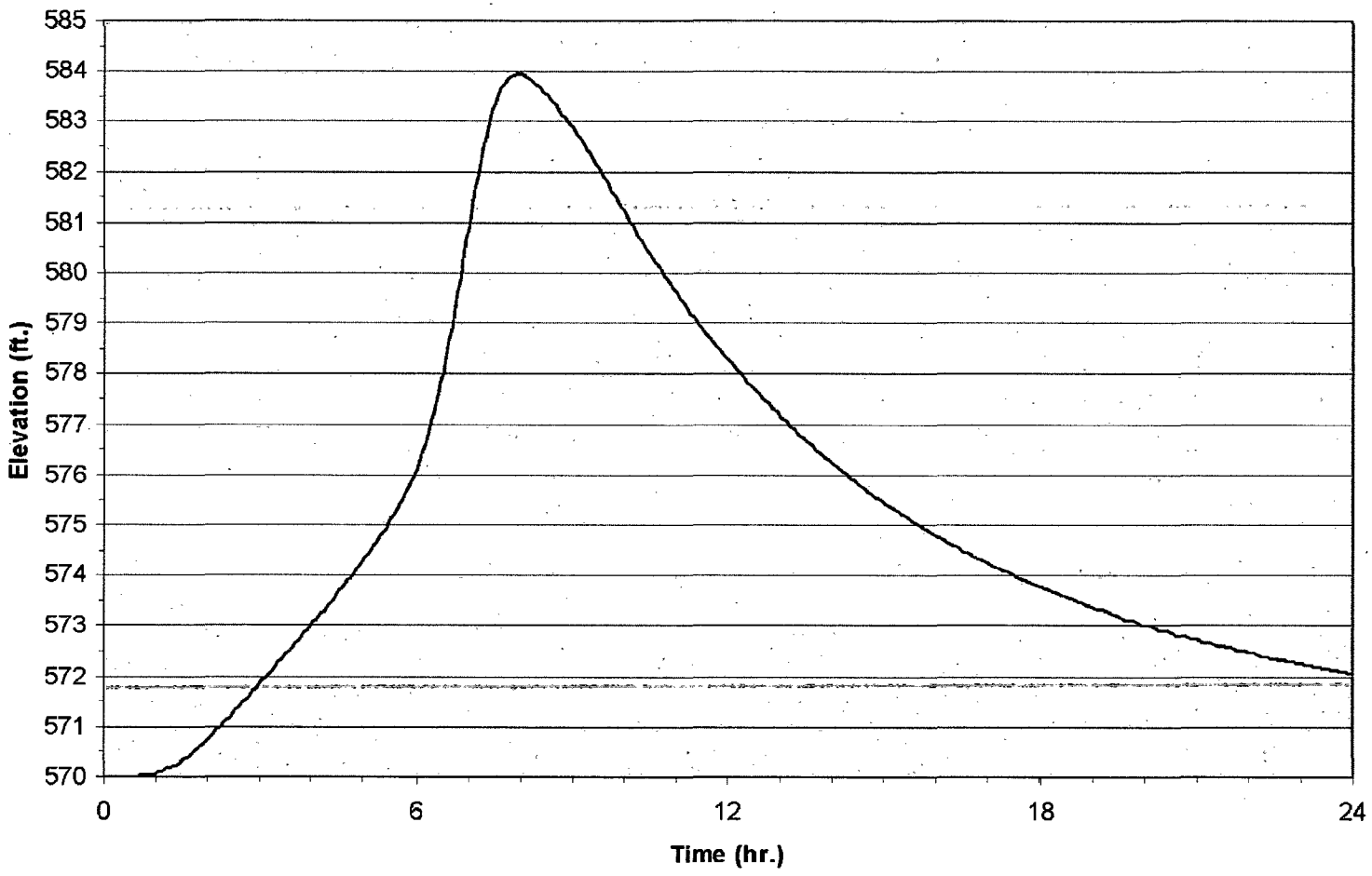
PMF Hydrograph,
Make-Up Pond B

FIGURE 2.4.3-227

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 11 to RAI 02.04.03-006

Revised FSAR Figure 2.4.3-230



WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

Flood Elevation Hydrograph,
Make-Up Pond B
6-Hour Local Intense Precipitation

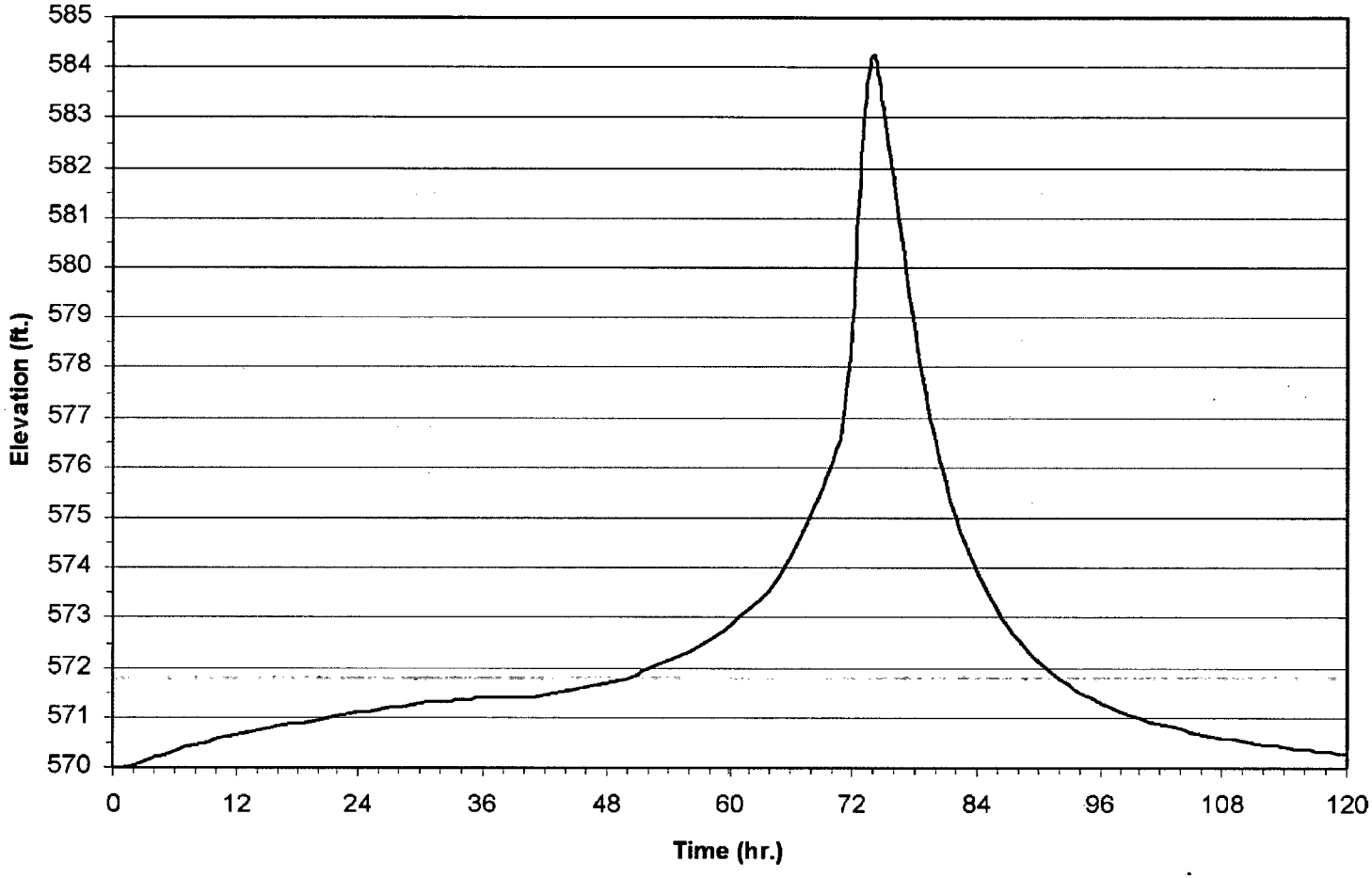
FIGURE 2.4.3-230

WLS COL 2.4-2

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 12 to RAI 02.04.03-006

Revised FSAR Figure 2.4.3-231



WLS COL 2.4-2

WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

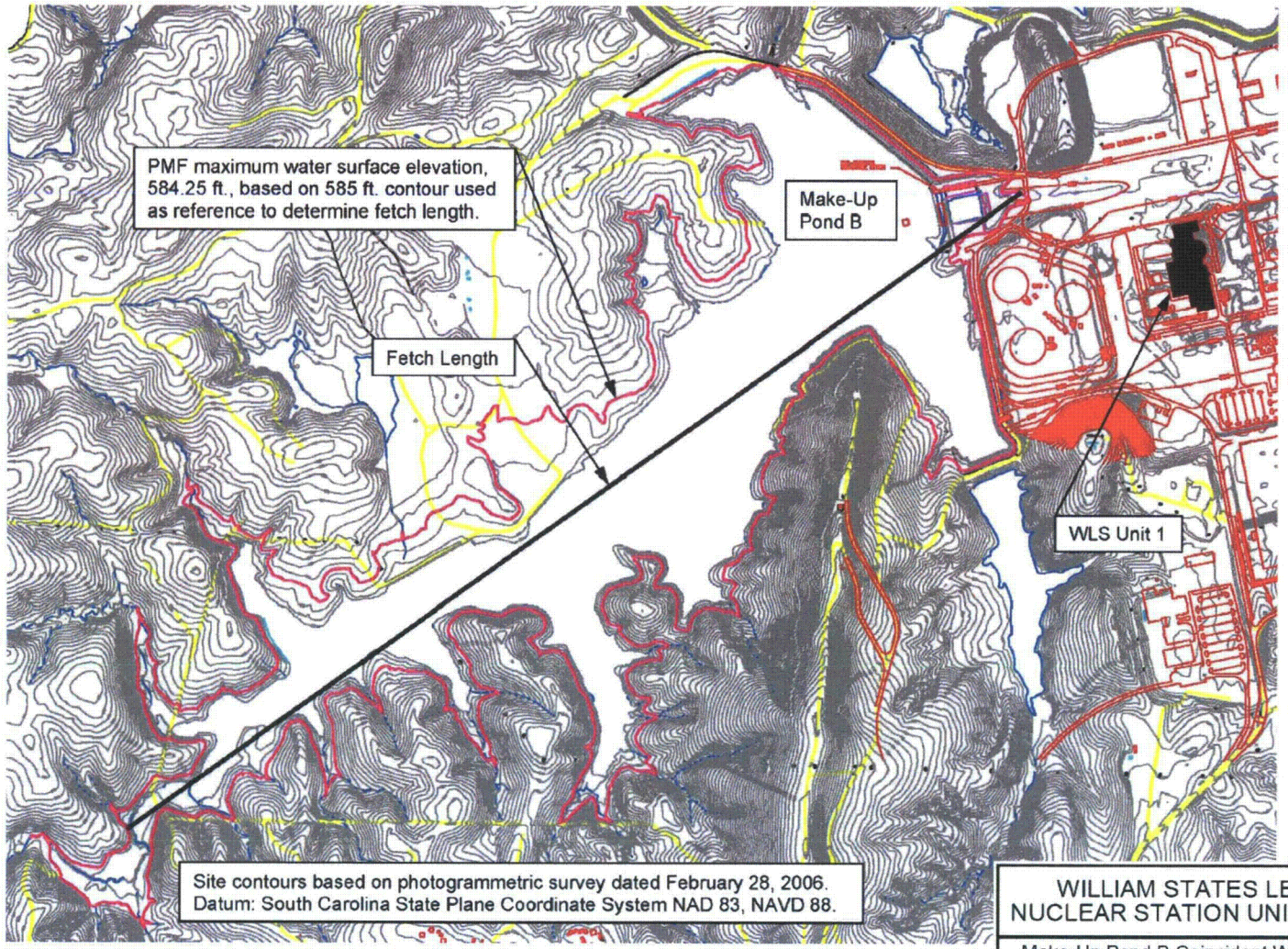
Flood Elevation Hydrograph,
Make-Up Pond B
72-Hour Local Intense Precipitation

FIGURE 2.4.3-231

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 13 to RAI 02.04.03-006

Revised FSAR Figure 2.4.3-234



WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

Make-Up Pond B Coincident Wind Wave Fetch Length

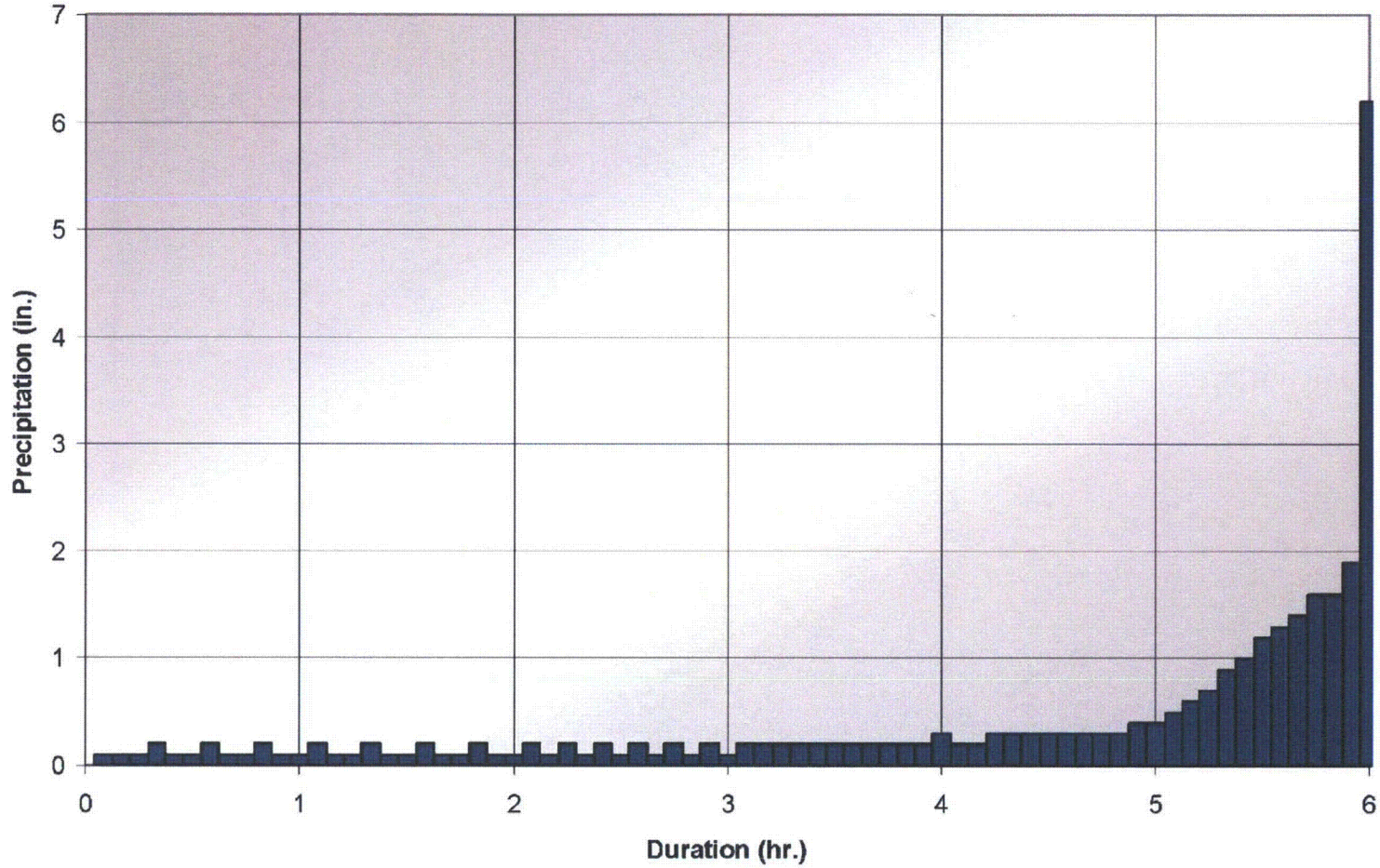
FIGURE 2.4.3-234

WLS COL 2.4-2

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 14 to RAI 02.04.03-006

New FSAR Figure 2.4.3-235



WLS COL 2.4-2

WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

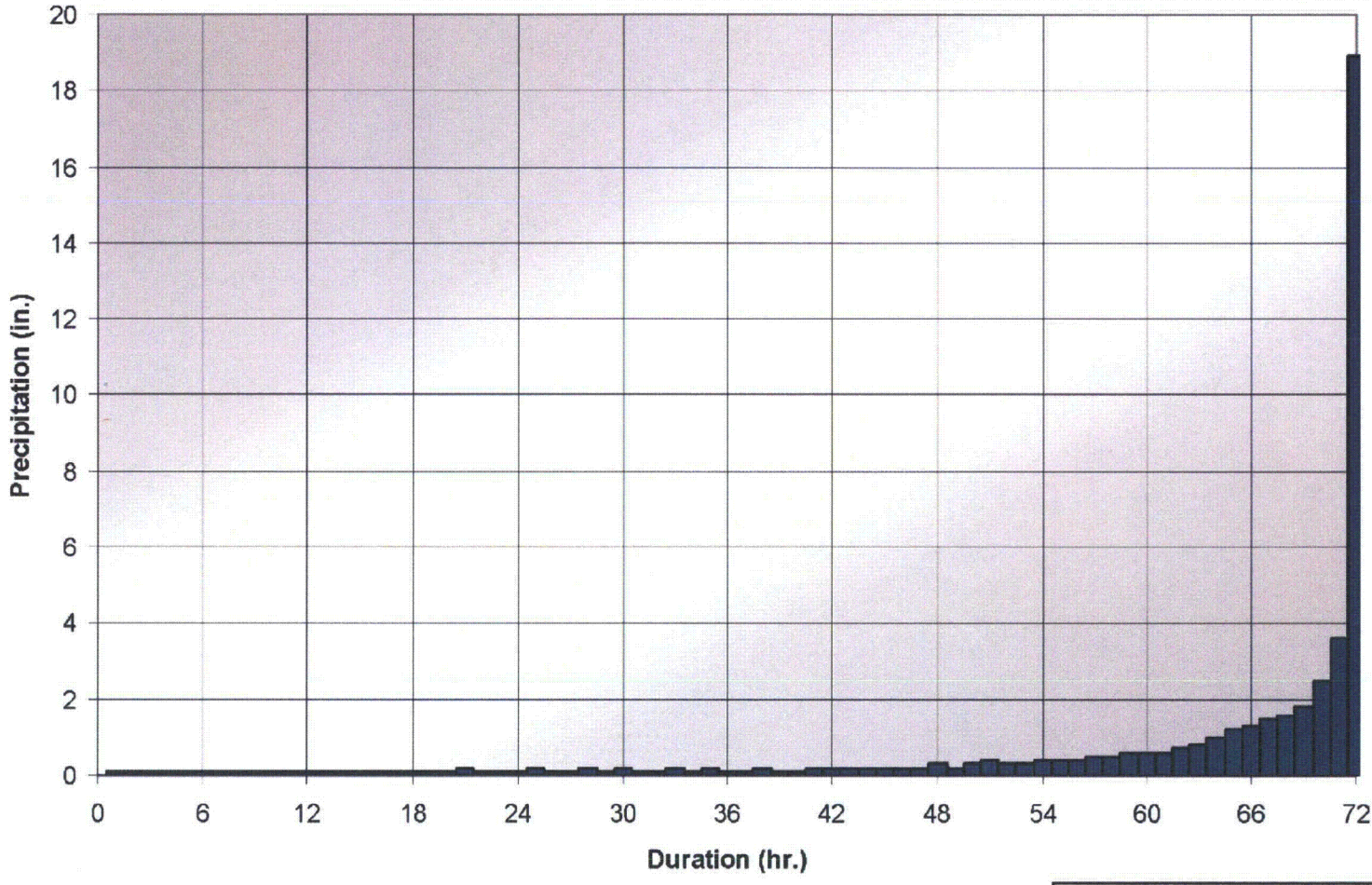
Local Intense Probable
Maximum Precipitation
6-Hour End Peaking Hyetograph

FIGURE 2.4.3-235

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 15 to RAI 02.04.03-006

New FSAR Figure 2.4.3-236



WLS COL 2.4-2

WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

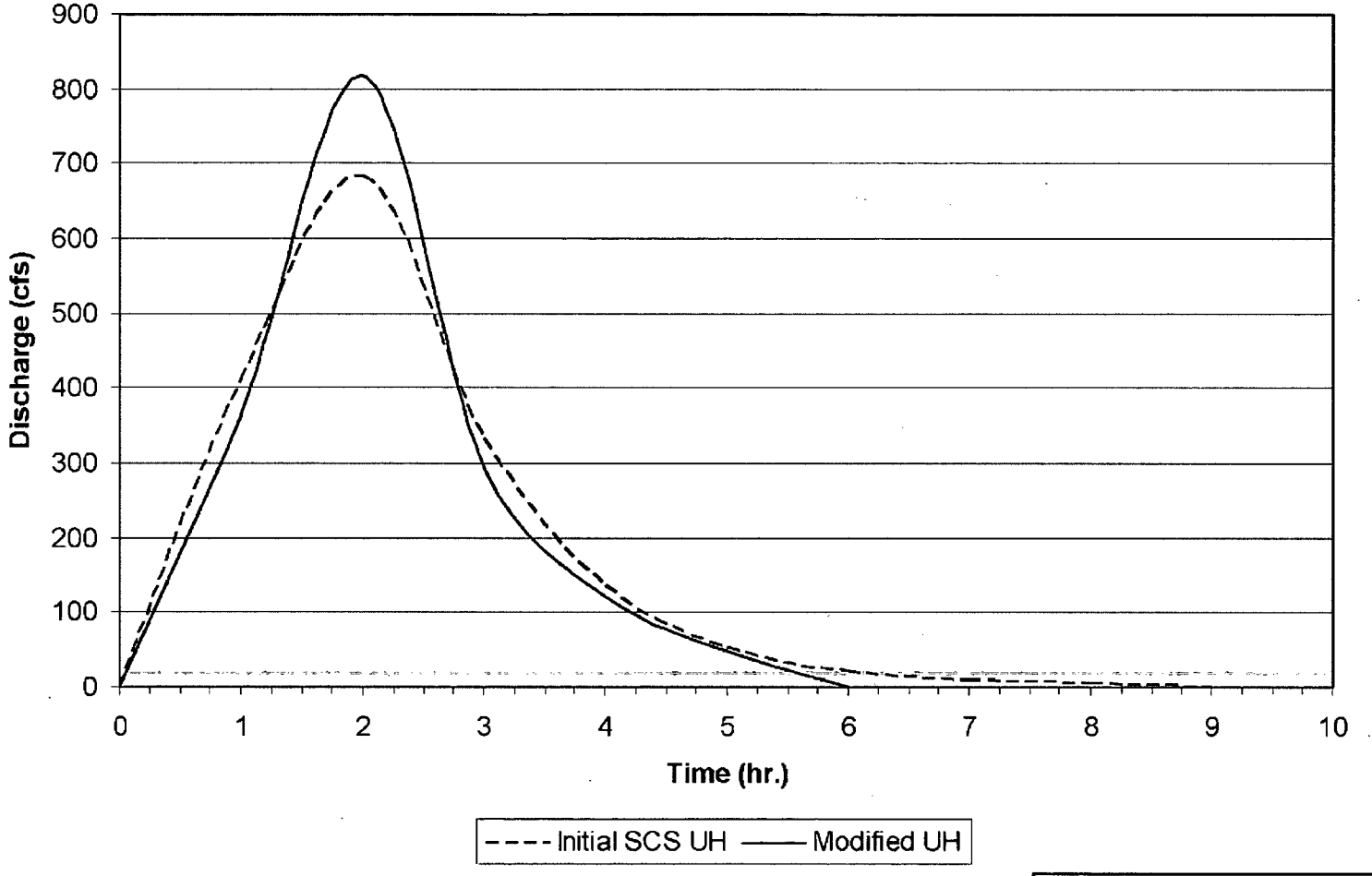
Local Intense Probable
Maximum Precipitation
72-Hour End Peaking Hyetograph

FIGURE 2.4.3-236

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 16 to RAI 02.04.03-006

New FSAR Figure 2.4.3-237



WLS COL 2.4-2

WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

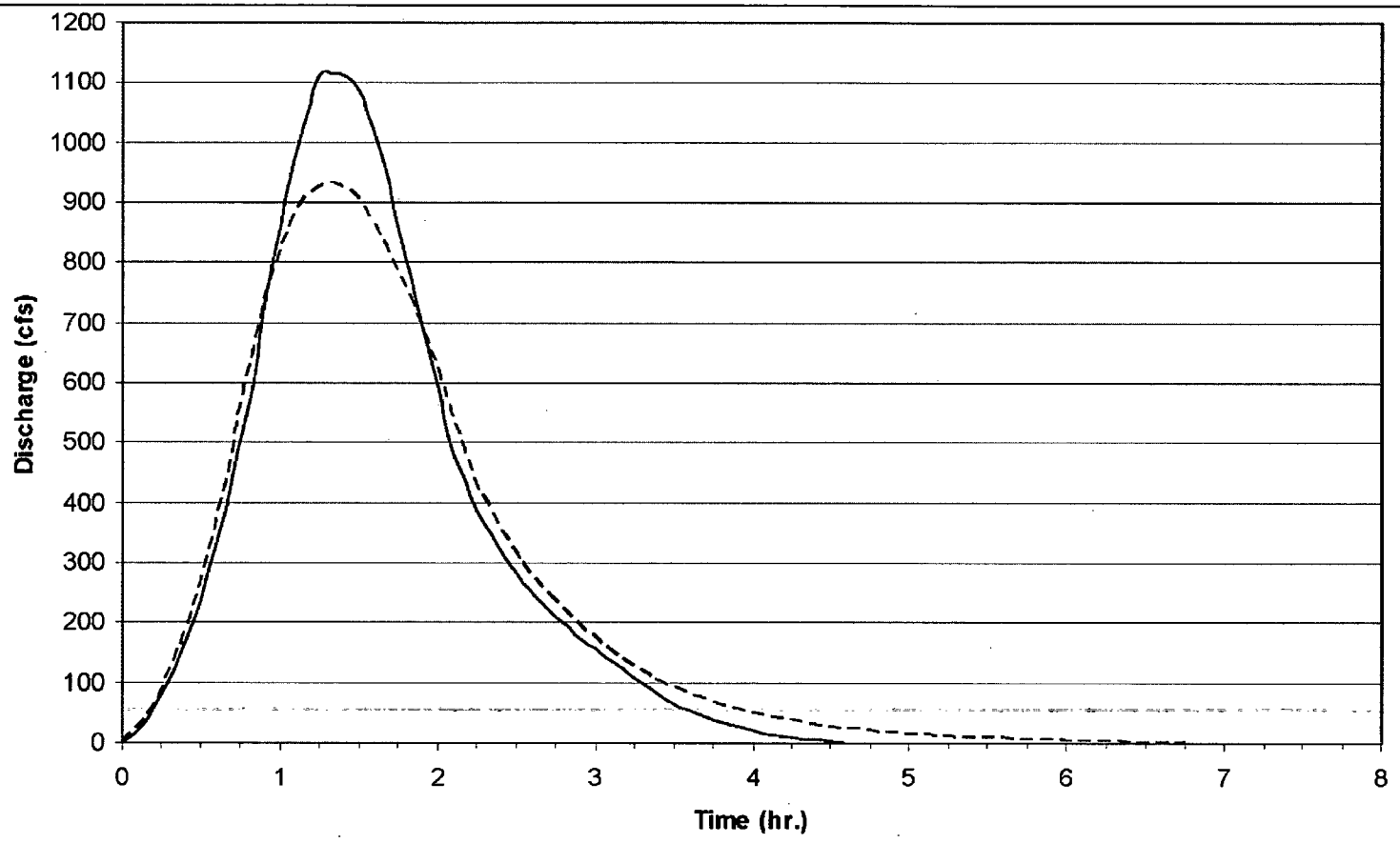
SCS and Modified Unit
72-Hour Hydrographs

FIGURE 2.4.3-237

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 17 to RAI 02.04.03-006

New FSAR Figure 2.4.3-238



WLS COL 2.4-2

WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

SCS and Modified Unit
6-Hour Hydrographs

FIGURE 2.4.3-238

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 18 to RAI 02.04.03-006

Revised FSAR List of Figures

COLA Part 2, FSAR, Chapter 2, List of Figures, Page 2-xxxii, is revised to insert the following figure numbers and titles after "2.4.3-234 Make-Up Pond B Coincident Wind Wave Fetch Length," as follows:

Number	Title
2.4.3-235	Local Intense Probable Maximum Precipitation 6-Hour End Peaking Hyetograph
2.4.3-236	Local Intense Probable Maximum Precipitation 72-Hour End Peaking Hyetograph
2.4.3-237	SCS and Modified Unit 72-Hour Hydrographs
2.4.3-238	SCS and Modified Unit 6-Hour Hydrographs

Lee Nuclear Station Response to Request for Additional Information (RAI)

RAI Letter No. 069

NRC Technical Review Branch: Hydrologic Engineering Branch (RHEB)

Reference NRC RAI Number(s): RAI 02.04.03-007

NRC RAI:

The design-basis flood water surface elevation must be based on an appropriate and conservative method. The applicant should re-estimate the design-basis flood water surface elevation coincident with wind waves based on a re-estimated stillwater flood elevation. The stillwater flood elevation should be estimated from the analysis that includes the effects of nonlinear basin response.

Duke Energy Response:

With respect to the analysis of coincident wind wave activity and consideration of nonlinear basin response, see responses to RAI 02.04.03-006 (Enclosure 1 to this letter) regarding Make-Up Pond B and RAI 02.04.03-008 (Enclosure 3 to this letter) regarding the Broad River and Make-Up Pond A.

Associated Revision to the Lee Nuclear Station Final Safety Analysis Report:

None

Attachments:

None

Lee Nuclear Station Response to Request for Additional Information (RAI)

RAI Letter No. 069

NRC Technical Review Branch: Hydrologic Engineering Branch (RHEB)

Reference NRC RAI Number(s): RAI 02.04.03-008

NRC RAI:

The design-basis flood water surface elevation must be based on an appropriate and conservative method. The applicant should re-estimate wind waves in the Broad River and in Make-Up Pond A using a method that estimates the stillwater flood elevation by accounting for the nonlinear basin response.

Duke Energy Response:

To provide additional water make-up capacity for the Lee Nuclear Site to address abnormally low flow conditions on the Broad River, a new supplemental pond is planned. The new pond will be formed by placing a dam on London Creek. The resulting pond will be designated "Make-Up Pond C" and will be located to the northwest of the current Make-Up Pond B.

Included in the design work supporting Make-Up Pond C is the re-evaluation of surface water flooding impacts resulting from the addition of this new surface water feature in the area of the Lee Nuclear Site. Key areas of re-evaluation for the Broad River flooding analysis are as follows:

1. Re-determination of the probable maximum precipitation (PMP) levels associated for the Broad River watershed, considering the addition of the Make-Up Pond C reservoir and related drainage areas;
2. Re-evaluation of the probable maximum flood (PMF) associated with the updated PMP, as well as re-evaluation of postulated dam failure effects;
3. Consideration of nonlinear basin response; and
4. Determination of coincident wind wave activity based on the updated PMF maximum water surface elevation, including the accounting of nonlinear basin response.

It should be noted that the maximum flooding surface water elevation for the Broad River results in the inundation of Make-Up Pond A. Therefore, the accounting for nonlinear basin response for Make-Up Pond A is considered in the re-evaluation of the PMF with postulated dam failure effects for the Broad River.

The flooding analyses described above, reflecting the impacts of adding Make-Up Pond C, are currently in process. Any associated FSAR changes will be developed and submitted to the NRC for review under a separate submittal at a later date.

Associated Revision to the Lee Nuclear Station Final Safety Analysis Report:

None

Attachments:

None

Lee Nuclear Station Response to Request for Additional Information (RAI)

RAI Letter No. 069

NRC Technical Review Branch: Hydrologic Engineering Branch (RHEB)

Reference NRC RAI Number(s): RAI 02.04.03-009

NRC RAI:

The staff was unable to identify the cross section in the HEC-RAS setup that is located directly across from the site and should be used to estimate the PMF water surface elevation in the Broad River. The applicant should identify this cross section in the HECRAS setup.

Duke Energy Response:

The NRC Project Manager notified Duke Energy on June 8, 2009, that RAI 02.04.03-009 was withdrawn.

Associated Revision to the Lee Nuclear Station Final Safety Analysis Report:

None

Attachments:

None

Lee Nuclear Station Response to Request for Additional Information (RAI)

RAI Letter No. 069

NRC Technical Review Branch: Hydrologic Engineering Branch (RHEB)

Reference NRC RAI Number(s): RAI 02.04.03-010

NRC RAI:

In response to the staff's RAI 2.4.3-03, the applicant stated that a shoreline management program, consisting of removing trees from an area around the perimeter of Make-Up Pond B extending 50 ft beyond contour elevation 585 ft MSL and maintained as a grassed, paved, or otherwise suitably covered area, would be implemented and retained throughout the operational life of the proposed plants. The applicant stated that this program would limit the amount of debris generated during large floods in the watershed of Make-Up Pond B and therefore would help keep the outlet structure unblocked. The staff determined that the existence and intended functioning of the shoreline management program is essential to the justification of the assumption that the outlet structure of Make-Up Pond B's dam would remain unblocked during the PMF event. Therefore, the shoreline management program is essential to limiting the PMF water surface elevation in the Make-Up Pond B at or below the chosen design-basis flood water surface elevation. The applicant should include sufficient details of the shoreline management program in the FSAR. The applicant should also ensure that the details of the shoreline management plan are consistent with the re-estimated design-basis flood water surface elevation as indicated in staff's Supplemental RAIs RAI ID 2680 Question ID 10898, RAI ID 2680 Question ID 10899, and RAI ID 2680 Question ID 10900.

Duke Energy Response:

The details provided in the Duke Energy response to RAI 02.04.03-004 (Reference 1) regarding the shoreline management program have been provided in FSAR Subsection 2.4.1.2.2.6, Revision 1. As described in FSAR Subsection 2.4.1.2.2.6, trees will be removed from water's edge at elevation 570 ft. msl to 50 ft. beyond the contour elevation of 585 ft. msl around the perimeter of Make-Up Pond B.

The responses to RAIs 02.04.03-006, 02.04.03-007, and 02.04.03-008 (Enclosures 1, 2, and 3 to this letter, respectively) have no impact on the shoreline management program. Therefore, no changes are required.

Reference:

1. Bryan J. Dolan to Document Control Desk, U.S. Nuclear Regulatory Commission, Partial Response to Request for Additional Information (RAI Nos. 820, 821, 822, 823, 824, and 825) Ltr# WLG2008.10-14, dated October 27, 2008 (ML083040525).

Associated Revision to the Lee Nuclear Station Final Safety Analysis Report:

None

Attachments:

None