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Serial: NPD-NRC-2014-038
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10CFR50.12
10CFR52.63

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

LEVY NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 52-029 AND 52-030
SUPPLEMENT 5 TO SUBMITTAL OF EXEMPTION REQUEST AND DESIGN CHANGE DESCRIPTION FOR DEPARTURE FROM AP1000 DCD REVISION 19 TO ADDRESS CONTAINMENT CONDENSATE RETURN COOLING DESIGN

Reference:

1. Letter from Christopher Fallon (DEF) to Nuclear Regulatory Commission (NRC), dated April 18, 2013, "Submittal of Exemption Request and Design Change Description for Departure from AP1000 DCD Revision 19 to Address Containment Condensate Return Cooling Design", Serial: NPD-NRC-2013-010

2. Letter from Christopher Fallon (DEF) to Nuclear Regulatory Commission (NRC), dated June 3, 2013, "Supplement to Submittal of Exemption Request and Design Change Description for Departure from AP1000 DCD Revision 19 to Address Containment Condensate Return Cooling Design", Serial: NPD-NRC-2013-023

3. Letter from Christopher Fallon (DEF) to Nuclear Regulatory Commission (NRC), dated October 21, 2013, "Supplement 2 to Submittal of Exemption Request and Design Change Description for Departure from AP1000 DCD Revision 19 to Address Containment Condensate Return Cooling Design", Serial: NPD-NRC-2013-044

4. Letter from Christopher Fallon (DEF) to Nuclear Regulatory Commission (NRC), dated February 7, 2014, "Supplement 3 to Submittal of Exemption Request and Design Change Description for Departure from AP1000 DCD Revision 19 to Address Containment Condensate Return Cooling Design", Serial: NPD-NRC-2014-005

5. Letter from Christopher Fallon (DEF) to Nuclear Regulatory Commission (NRC), dated July 10, 2014, "Supplement 4 to Submittal of Exemption Request and Design Change Description for Departure from AP1000 DCD Revision 19 to Address Containment Condensate Return Cooling Design", Serial: NPD-NRC-2014-023

Ladies and Gentlemen:

Duke Energy Florida, Inc. (DEF) hereby submits Supplement 5 to our request for exemption and associated design change description to address a design change to the AP1000 Design Control Document (DCD) Revision 19 (Reference 1). This design change requires Nuclear Regulatory Commission (NRC) notification and review in accordance with Interim Staff

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NRO

Guidance DC/COL-ISG-011, "Finalizing Licensing-basis Information." The Levy Nuclear Plant (LNP) Combined License Application (COLA) incorporates the AP1000 DCD by reference.

In Enclosure 5 to letter NPD-NRC-2014-005, "Supplement 3 to Submittal of Exemption Request and Design Change Description for Departure from AP1000 DCD Revision 19 to Address Containment Condensate Return Cooling Design" (Reference 4), DEF submitted an exemption request which included a revision to the Technical Specification Bases for Surveillance Requirement 3.5.4.7 to reflect the addition of downspout screens to the Condensate Return Cooling Design. A change to the corresponding Technical Specification Surveillance Requirement to add the downspout screens was not, however, included in that exemption request. In response to a request by the NRC staff to DEF on October 6, 2014, this supplemental submittal amends the exemption request to incorporate a revision to Technical Specification Surveillance Requirement 3.5.4.7. This submittal replaces Enclosure 5 and supplements Enclosure 7 from the Reference 5 submittal. Enclosures 1 through 4 and Enclosure 6 are unchanged. The changes to the COLA identified in Enclosure 7 will be included in a future update of the COLA.

If you have any further questions, or need additional information, please contact Bob Kitchen at (704) 382-4046, or me at (704) 382-9248.

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

Executed on November 17, 2014.

Sincerely,

Christopher M Fallon

Christopher M. Fallon
Vice President - Nuclear Development

Enclosures:

1. Westinghouse APP-GW-GLR-161, Revision 1 (PROPRIETARY)
2. Westinghouse APP- GW-GLR-607, Revision 1 (NON-PROPRIETARY VERSION)
3. Westinghouse Application Letter CAW-14-3877 and Affidavit
4. Proprietary Information Notice and Copyright Notice
5. Request for Exemption Regarding Containment Condensate Return Cooling
6. Tier 1 and Tier 2 Licensing Basis Documents - Proposed Changes
7. Levy Nuclear Plant Units 1 and 2 COLA Revisions

cc : U.S. NRC Region II, Regional Administrator
Mr. Donald Habib, U.S. NRC Project Manager

Enclosure 1
Westinghouse APP-GW-GLR-161, Revision 1
(PROPRIETARY)
(See Reference 4 for this enclosure)

Enclosure 2
Westinghouse APP-GW-GLR-607, Revision 1
(NON-PROPRIETARY VERSION)
(See Reference 4 for this enclosure)

Enclosure 3
Westinghouse Application Letter CAW-14-3877 and Affidavit
(See Reference 4 for this enclosure)

Enclosure 4
Proprietary Information Notice and Copyright Notice
(See Reference 4 for this enclosure)

Duke Energy
Enclosure 5
Levy Nuclear Plant Units 1 and 2

Request for Exemption Regarding Containment Condensate Return Cooling

(10 pages including cover page)

1.0 Summary Description

The Passive Residual Heat Removal Heat Exchanger (PRHR HX) is safety-related and provides emergency core decay heat removal. It is located in the In-containment Refueling Water Storage Tank (IRWST) as shown on Tier 2 DCD Figure 6.3-2. The heat exchanger is used in non-loss of coolant accident (LOCA) transients and also in LOCA events until voiding begins in the RCS Hot Leg. For any non-LOCA event, the PRHR HX plays an integral role in decay heat removal, as opening one of the two outlet isolation valves initiates natural circulation of the heat exchanger, transferring heat from the RCS into the IRWST. This transfer of heat from the Reactor Coolant System to the IRWST causes the water in the tank to heat up, eventually become saturated, and initiate steaming of the tank.

The steam generated will discharge through a series of vents located near the steam generator compartments at the roof of the IRWST. The steam generator wall vents open with a slight pressure differential between the IRWST and containment, providing a path to vent steam produced by the PRHR HX into the containment atmosphere. The steam generator wall vents open at a lower differential pressure than the IRWST hood vents located near the containment wall, which ensures the steam generator wall vents will open first. The location of the steam generator wall vents (near the center of containment) contributes to mixing of the containment atmosphere. The steam released from the IRWST condenses on "passive heat sinks" within the containment, such as the containment vessel wall, Polar Crane Girder (PCG), concrete, piping, components, or any other subcooled surface until these passive heat sinks reach saturation temperature. Condensation on the inside of the containment vessel wall forms a thin fluid film and runs down the containment wall surface. Provisions are made to collect and channel condensate to the IRWST.

The PCG and internal hoop stiffener (internal stiffener) are horizontal, circumferential attachments to the containment sidewalls that interrupt condensate flow. The PCG and internal stiffener increase the radial and rotational stiffness of the containment vessel, and are designed to allow condensate to drain back to the IRWST gutter. The PCG also supports the polar crane.

The PCG is a box girder consisting of 80 enclosed boxes; and is shown in Tier 2 DCD Figure 3.8.2-1 (Sheet 3 of 3). The front face of each box (facing into containment) has a 2 foot diameter opening. The rear face of each box is the containment wall. The PCG is constructed with chamfers and fabrication holes to allow condensate to drain past the PCG to the internal stiffener. The internal stiffener is an angle stiffener and also contains fabrication holes to allow condensate to drain past it to the IRWST gutter.

Condensate is collected in the IRWST gutter, which extends around the circumference of containment and returns condensate to the IRWST.

Upon actuation of the PRHR HX, two air-operated valves in series are actuated to isolate the normal gutter drain path to the Liquid Radwaste System, and divert condensate to the IRWST. It is important that sufficient condensate return is achieved during non-LOCA PRHR HX operation. The ability to maintain closed-loop PRHR HX cooling for long periods minimizes the probability that open-loop cooling will be needed. Although maintaining IRWST level above the top of the HX tubes is not a prerequisite for maintaining adequate decay heat removal, reduction of IRWST level to below the top of the tubes will begin to degrade the heat exchanger performance.

As steaming to the containment begins following PRHR HX operation and saturation of the IRWST, there are a number of mechanisms, both thermodynamic and geometric, that can prevent the condensed steam from returning to the IRWST. The mechanisms are as follows:

1) Steam to pressurize the containment
2) Steam condensation on passive heat sinks
3) Raining from the containment roof, containment ring misalignment
4) Losses at the Polar Crane Girder and Stiffener
5) Losses at support plates attached to the containment vessel
6) Losses at the Equipment Hatch and Personnel Airlock
7) Losses at entry to IRWST gutter

Condensation losses were evaluated by calculations and prototype testing. The losses due to pressurization, raining and condensation on passive heat sinks were quantified with the development of two new calculations and the revision of two existing calculations. A full scale section of the containment wall was constructed to test condensate losses.

As a result of the condensate return testing, modifications to the Polar Crane Girder, internal stiffener, and IRWST gutter design were made. The fabrication holes at the top surface of the PCG and in the stiffener are blocked, drainage holes in the bottom of the PCG boxes are blocked, and flow communication holes between PCG boxes are added. A downspout piping network was added to collect and transport condensation from the top and interior of the PCG and the stiffener to the Passive Core Cooling System (PXS) Collection Boxes. Eight new PXS downspout screens were added at the entrance of each of the downspouts at the top of the PCG and the stiffener to prevent any larger debris from blocking the downspout piping. Extensions of the IRWST gutter were added above the Upper Personnel Airlock and Upper Equipment Hatch.

2.0 Description of Licensing Basis Impacts

Tier 1 Changes

The added components of the PXS are integral to providing safety-related core decay heat removal during non-LOCA events. Therefore, it is appropriate to apply inspections, test, analyses and acceptance criteria to the added PXS components to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the applicable design criteria, codes and standards. To provide assurance that ITAAC design commitments will be met, the component numbers for the following downspout screens are added to Table 2.2.3-1:

PXS-MY-Y81	PXS-MY-Y83	PXS-MY-Y85	PXS-MY-Y87
PXS-MY-Y82	PXS-MY-Y84	PXS-MY-Y86	PXS-MY-Y88

To provide assurance that ITAAC design commitments will be met, the additional downspout piping is added to the PXS recirculation system as captured in Table 2.2.3-2:

PXS-L301A	PXS-L306A	PXS-L301B	PXS-L306B
PXS-L302A	PXS-L307A	PXS-L302B	PXS-L307B
PXS-L303A	PXS-L308A	PXS-L303B	PXS-L308B
PXS-L304A	PXS-L309A	PXS-L304B	PXS-L309B
PXS-L305A	PXS-L310A	PXS-L305B	PXS-L310B

Tier 2 Changes

The new PXS downspout screens are AP1000 Safety Class C and Seismic Category I components. These components meet the quality assurance requirements of 10 CFR 50, Appendix B. Additionally, the screens must be demonstrated to have no functional damage following a seismic ground motion exceeding the one-third of the safe shutdown earthquake ground motion before resuming operations in accordance with 10 CFR Part 50, Appendix S. Component numbers for the following downspout screens are added to Table 3.2-3, AP1000 Classification of Mechanical and Fluid Systems, Components, and Equipment, to capture these requirements.

PXS-MY-Y81	PXS-MY-Y83	PXS-MY-Y85	PXS-MY-Y87
PXS-MY-Y82	PXS-MY-Y84	PXS-MY-Y86	PXS-MY-Y88

Pictorial detail of the Polar Crane Girder is shown in DCD Figure 3.8.2-1 (Sheet 3 of 3), Containment Vessel General Outline, and shows the fabrication holes in the top right figure. As the fabrication holes in the PCG would be blocked in the modified configuration, this detail would be removed from this figure.

To reflect the changes to the PXS system, the additional downspout piping is captured in the gutter discussion of DCD Subsection 6.3.2.1.1 and on a new sheet of the PXS piping and instrumentation diagrams (P&IDs). In order to add the new P&ID sheet to the licensing basis, Figure 6.3-1, Passive Core Cooling System Piping and Instrumentation Diagram will be expanded to include continuation flags for condensate returning to the IRWST originating from PXS Collection Boxes A and B in the IRWST gutter (Sheet 2) and show the relocated IRWST gutter and the screens and piping comprising the PXS downspouts originating from the Polar Crane Girder and internal stiffener (Sheet 3). Subsection 6.3.1.1.1 will be updated to describe the downspouts in the safety-related design criteria, subsections 6.3.2.2.7 and 6.3.2.2.7.1 will be updated to clarify the number of screen sets in the PXS and to which set of screens the criteria in this section apply, and subsection 6.3.2.2.7.2 will be updated to clarify the condensate return gutter arrangement related to LOCA operation.

The Technical Specifications (TS) and TS Bases will be updated to include the downspouts in the descriptions of the IRWST gutter arrangement, as described below. The Bases LCO for B 3.3.3 will be updated to reflect the addition of downspouts, the Surveillance Requirement (SR) and Bases for SR 3.5.4.7 will be updated to encompass the entire gutter arrangement, including the downspout screens, in the surveillance, and the Bases Background for B 3.5.4 will be updated to reflect the addition of downspouts. In addition, an editorial change will be made to replace the use of "gutters" with "gutter" in SR 3.5.4.7 and B 3.5.4.7.

The safe shutdown temperature evaluation was revised to address the effects of the design modifications and supporting analyses and calculations of condensate return to the IRWST on PXS performance. The resultant changes to the Chapter 19 shutdown temperature evaluation are shown in text revisions to subsection 19E.4.10.2, changes to Table 19E.4.10-1, and changes to Figures 19E.4.10-1 through 19E.4.10-4.

3.0 Technical Evaluation

General design criteria 34 and 35 require the PXS to be capable of removing core decay and residual heat, and provide an abundance of core cooling such that fuel design limits and the RCS design conditions are not exceeded. As the PXS provides core decay heat removal

during design basis events, performance of this safety-related function is confirmed through ITAAC design commitment 2.2.3.8.b. The changes described herein do not change the commitment to complete the performance test of the PRHR HX. This evaluation is based on information provided in Westinghouse report APP-GW-GLR-161, Revision 1, which is included as Enclosure 1 to this submittal.

4.0 Regulatory Evaluation

4.1 Exemption Justification

4.1.1 Pursuant to 10 CFR §52.63(b)(1), an exemption from elements of the design as certified in the 10 CFR Part 52, Appendix D, design certification rule is requested for plant-specific Tier 1 material departures from the AP1000 DCD for Tier 1 information and for a material departure from the generic TS. These material departures are contained in Tier 1 Subsection 2.2.3, Tables 2.2.3-1 and 2.2.3-2, and involve the addition of components to the condensate return design to enable the Passive Core Cooling System to more effectively perform its design functions. The material departures also include a change to TS SR 3.5.4.7 which involves adding the downspout screens. This exemption request is in accordance with the provisions of 10 CFR §50.12, 10 CFR §52.7, and 10 CFR Part 52, Appendix D, as demonstrated below.

<u>Applicable Regulation(s): 10 CFR Part 52, Appendix D, Section III.B</u>
Specific wording from which exemption is requested:

"III. Scope and Contents

B. An applicant or licensee referencing this appendix, in accordance with Section IV of this appendix, shall incorporate by reference and comply with the requirements of this appendix, including Tier 1, Tier 2 (including the investment protection short-term availability controls in Section 16.3 of the DCD), and the generic TS except as otherwise provided in this appendix. Conceptual design information in the generic DCD and the evaluation of severe accident mitigation design alternatives in appendix 1B of the generic DCD are not part of this appendix."

4.1.2 PEF evaluated this exemption request in accordance with 10 CFR Part 52, Appendix D, Section VIII.A.4, 10 CFR §50.12, 10 CFR §52.7 and 10 CFR §52.63, which state that the NRC may grant exemptions from the requirements of the regulations provided the following six conditions are met: 1) the exemption is authorized by law [§50.12(a)(1)]; 2) the exemption will not present an undue risk to the health and safety of the public [§50.12(a)(1)]; 3) the exemption is consistent with the common defense and security [§50.12(a)(1)]; 4) special circumstances are present [§50.12(a)(2)]; 5) the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption [§52.63(b)(1)]; and 6) the design change will not result in a significant decrease in the level of safety [Part 52, Appendix D, VIII.A.4]. The requested exemption satisfies the criteria for granting specific exemptions, as described below.

1. This exemption is authorized by law

The NRC has authority under 10 CFR §§ 50.12, 52.7, and 52.63 to grant exemptions from the requirements of NRC regulations. Specifically, 10 CFR §§50.12 and 52.7 state that the NRC may grant exemptions from the requirements of 10 CFR Part 52 upon a proper showing. No law exists that would preclude the changes covered by this exemption request. Additionally, granting of the proposed exemption does not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations.

Accordingly, this requested exemption is "authorized by law," as required by 10 CFR §50.12(a)(1).

2. This exemption will not present an undue risk to the health and safety of the public

The proposed exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow changes to elements of the plant-specific Tier 1 DCD to depart from the AP1000 certified (Tier 1) design information and a change to a TS SR to depart from the AP1000 certified (Tier 2) information. The plant-specific Tier 1 DCD will continue to reflect the approved licensing basis for the applicant, and will maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the plant-specific DCD. Because the change to the condensate return portion of the passive core cooling system description maintains its design functions, the changed design will ensure the protection of the health and safety of the public. Therefore, no adverse safety impact which would present any additional risk to the health and safety is present. The affected Design Description in the plant-specific Tier 1 DCD will continue to provide the detail necessary to support the performance of the associated ITAAC.

Therefore, the requested exemption from 10 CFR 52, Appendix D, Section III.B would not present an undue risk to the health and safety of the public.

3. The exemption is consistent with the common defense and security

The exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would change elements of the plant-specific Tier 1 DCD by departing from the AP1000 certified (Tier 1) design information relating to the condensate return portion of the passive core cooling system and departing from the Tier 2 generic TS to include surveillance of added plant equipment. The exemption does not alter the design, function, or operation of any structures or plant equipment that are necessary to maintain a secure status of the plant. The proposed exemption has no impact on plant security or safeguards procedures.

Therefore, the requested exemption is consistent with the common defense and security.

4. Special circumstances are present

10 CFR §50.12(a)(2) lists six "special circumstances" for which an exemption may be granted. Pursuant to the regulation, it is necessary for one of these special circumstances to be present in order for the NRC to consider granting an exemption request. The requested exemption meets the special circumstances of 10 CFR §50.12(a)(2)(ii). That subsection defines special circumstances as when "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."

The rule under consideration in this request for exemption from Tier 1 Subsection 2.2.3, Tables 2.2.3-1 and 2.2.3-2, and the Tier 2 generic TS is 10 CFR 52, Appendix D, Section III.B, which requires that an applicant referencing the AP1000 Design Certification Rule (10 CFR Part 52, Appendix D) shall incorporate by reference and comply with the requirements of Appendix D, including Tier 1 information and generic TS. The Levy Units 1 and 2 COLA references the AP1000 Design Certification Rule and incorporates by reference the requirements of 10 CFR Part 52, Appendix D, including Tier 1 information and generic TS. The underlying purpose of Appendix D, Section III.B is to describe and define the scope and contents of the AP1000 design certification, and to require compliance with the design certification information in Appendix D to maintain the level of safety in the design.

The proposed changes to the condensate return portion of the passive core cooling system maintain the design margins of the Passive Core Cooling System. This change does not impact the ability of any structures, systems, or components to perform their functions or negatively impact safety. Accordingly, this exemption from the certification information in Tier 1 Subsection 2.2.3, Tables 2.2.3-1 and 2.2.3-2, and TS SR 3.5.4.7 will enable the applicant to safely construct and operate the AP1000 facility consistent with the design certified by the NRC in 10 CFR 52, Appendix D.

Therefore, special circumstances are present, because application of the current generic certified design information in Tier 1 and the generic TS as required by 10 CFR Part 52, Appendix D, Section III.B, in the particular circumstances discussed in this request is not necessary to achieve the underlying purpose of the rule.

5. The special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption

Based on the nature of the changes to the plant-specific Tier 1 information and Tier 2 generic TS and the understanding that these changes support the design function of the Passive Core Cooling System, it is likely that other AP1000 applicants and licensees will request this exemption. However, if this is not the case, the special circumstances continue to outweigh any decrease in safety from the reduction in standardization because the key design functions of the Passive Core Cooling System associated with this request will continue to be maintained. This exemption request and the associated marked-up tables and

TS SR demonstrate that the Passive Core Cooling System function continues to be maintained following implementation of the change from the generic AP1000 DCD, thereby minimizing the safety impact resulting from any reduction in standardization.

Therefore, the special circumstances associated with the requested exemption outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption. In fact, as described in 6. below, the exemption will result in no reduction in the level of safety.

6. The design change will not result in a significant decrease in the level of safety.

The exemption revises the plant-specific DCD Tier 1 information by adding components to Subsection 2.2.3, Tables 2.2.3-1 and 2.2.3-2, which were added to the condensate return design to enable the Passive Core Cooling System to more effectively perform its design functions. This exemption also revises the generic TS SR 3.5.4.7 to add the downspout screens. Because the Passive Core Cooling System design functions are met, there is no reduction in the level of safety.

Therefore, the design change and associated change to the TS will not result in a significant decrease in the level of safety.

As demonstrated above, this exemption request satisfies NRC requirements for an exemption to the design certification rule for the AP1000.

4.2 Significant Hazards Consideration

4.2.1 Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

No accident previously evaluated in the plant-specific DCD is attributed to the failure of the condensate return features of the design. The proposed changes add passive components that do not rely on instrumentation and control systems to move them to a safe position. The proposed changes also meet applicable NRC general design criteria requirements. As the proposed changes do not involve any components that could initiate an event by means of component or system failure, the changes do not increase the probability of a previously evaluated accident.

The added components are constructed of only those materials appropriately suited for exposure to the post-accident environment as described in DCD Subsection 6.1.1.4 of the plant-specific DCD. No aluminum is permitted to be used in the construction of these components to ensure they will not contribute to hydrogen production in containment. The changes do not alter design features available during normal operation or anticipated operational occurrences. Nonsafety-related features used for reactor coolant activity monitoring, or reactor coolant chemistry control remain unaffected. The changes do not adversely impact accident source term parameters or affect any release paths used in the safety analyses, which could increase radiological dose consequences. Thus the

radiological releases associated with the Chapter 15 accident analyses are not affected.

As previously described, the proposed changes would not adversely affect the ability of the PRHR HX to meet the design requirements of GDCs 34 and 35. The proposed equipment does not adversely interact with or affect safety-related equipment or a radioactive material barrier. The components added by this change would not increase the consequences of an accident previously evaluated in the plant-specific DCD. Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

4.2.2 Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

An evaluation of the downspout and gutter return subsystem determined the components are capable of acceptably performing their safety-related function, even if one of the downspouts were blocked. The new equipment does not interface with components in other systems that provide safety-related or defense-in-depth support to the plant, thus precluding the possibility condensate could be diverted to another system before reaching the gutter. The affected equipment does not interface with any component whose failure could initiate an accident, or any component that contains radioactive material. The modified components do not incorporate any active features relied upon to support normal operation. The downspout and gutter return components are seismically qualified to remain in place and functional during seismic and dynamic events. Consequently, the proposed component changes do not introduce new failure modes, interactions or dependencies, the malfunction of which could lead to new accident scenarios. Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

4.2.3 Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes do not involve a significant reduction in the margin of safety. The proposed changes do not reduce the redundancy or diversity of any safety-related functions. The proposed changes increase the amount of condensate available in the IRWST for heat transfer after shutdown following a non-LOCA event with long-term loss of AC power. Though the fraction of condensate returned is smaller than originally assumed, the proposed changes provide sufficient condensate return flow to maintain adequate IRWST water level for those events using the PRHR HX cooling function. While lower condensate return rates result in an earlier transition to PRHR HX uncovery, the long-term shutdown temperature evaluation results show that the PRHR HX would continue to meet its acceptance criteria.

The DCD Chapters 6 and 15 analyses results are not affected, thus margins to the regulatory acceptance criteria are unchanged. No design basis safety analysis or acceptance criterion is challenged or exceeded by the proposed changes. Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

4.3 Applicable Regulatory Requirements/Criteria

10 CFR 52, Appendix D, Section VIII.B.5.a requires that an applicant or licensee who references this appendix may depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2* information, or the Technical Specifications, or requires a license amendment under paragraphs B.5.b or B.5.c of that section. When evaluating the proposed departure, an applicant or licensee shall consider all matters described in the plant-specific DCD. This exemption request involves a departure from Tier 1 Subsection 2.2.3, Tables 2.2.3-1 and 2.2.3-2, the Tier 2 generic TS and Tier 2 involved departures.

4.4 Precedent

No precedent is cited.

4.5 Conclusions

Based on the considerations discussed above:

(1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and

(2) such activities will be conducted in compliance with the Commission's regulations, and

(3) the issuance of the exemption will not be inimical to the common defense and security or to the health and safety of the public.

The above evaluations demonstrate the requested changes can be accommodated without an increase in the probability or consequences of an accident previously evaluated, without creating the possibility of a new or different kind of accident from any accident previously evaluated, and without a significant reduction in a margin of safety. Having arrived at negative declarations with regard to the criteria of 10 CFR 50.92, this assessment determines the requested change does not involve a Significant Hazards Consideration.

5.0 Risk Assessment

A risk assessment was determined to be not applicable to address the acceptability of this request.

6.0 References

1) Westinghouse Electric Company, AP1000 Design Control Document, Revision 19, June 2011

2) Westinghouse Electric Company, Topical Report, APP-GW-GLR-161, Revision 1, Changes to Passive Core Cooling System Condensate Return

Duke Energy

Enclosure 6

Levy Nuclear Plant Units 1 and 2

Tier 1 and Tier 2 Licensing Basis Documents – Proposed Changes (See Reference 4 for this enclosure)

Duke Energy
Enclosure 7
Levy Nuclear Plant Units 1 and 2

COLA Revisions

(10 pages including cover page)

The following are the revisions to the LNP Units 1 and 2 COLA based on the additional changes presented in this supplemental submittal. These revisions will be made in a future update of the LNP COLA.

1. COLA Part 2, FSAR Chapter 1, Table 1.8-201, Summary of FSAR Departures from the DCD, will be revised to add additional changes to the following departure:

Departure Number	Departure Description Summary	FSAR Section or Subsection
LNP DEP 3.2-1	The condensate return portion of the Passive Core Cooling System has been upgraded to add downspouts and plug fabrication holes in the Polar Crane Girder in order to maximize the return of condensate to the In-Containment Refueling Water Storage Tank and ensure long-term operation of the Passive Residual Heat Removal Heat Exchanger to meet design requirements. The following are the departures from the DCD: Tier 1 Table 2.2.3-1 and Table 2.2.3-2, Tier 2 Table 3.2-3 (Sheet 16 of 75), Figure 3.8.2-1 (Sheet 3), Subsections 5.4.11.2 and 5.4.14.1, Chapter 6 TOC (Table of Contents, List of Figures), Subsections 6.3.1.1.1, 6.3.1.1.4, 6.3.1.1.6, 6.3.1.2, 6.3.1.3, 6.3.2.1, 6.3.2.1.1, 6.3.2.2.7, 6.3.2.8, 6.3.3, 6.3.3.2.1.1, Figure 6.3-1 (Sheets 1 through 3), Figure 6.3-2 (Not Used), Subsection 7.4.1.1, Table 14.3-2 (Sheets 7 and 8 of 17), Subsection 15.0.13, Chapter 16 (TS SR 3.5.4.7, TS Bases B3.3.3 and B3.5.4), Subsection 19E.4.10.2, Table 19E.4.10-1, Figures 19E.4.10-1 through 19E.4.10-4, and 19E.9.	Table 3.2-202, Figure 3.8-201, 5.4.11.2, 5.4.14.1, 6 TOC (List of Figures), 6.3.1.1.1, 6.3.1.1.4, 6.3.1.1.6, 6.3.1.2, 6.3.1.3, 6.3.2.1, 6.3.2.1.1, 6.3.2.2.7, 6.3.2.8, 6.3.3, 6.3.3.2.1.1, Figure 6.3-201, 7.4.1.1, 14 TOC (List of Tables), Table 14.3-202, 15.0.13, 16 (TS SR 3.5.4.7, TS Bases B3.3.3, and B3.5.4), 19 TOC (List of Tables and List of Figures), 19E.4.10.2, Table 19E.4.10-201, Figures 19E.4.10-201 through 19E.4.10-204, 19E.9

2. COLA Part 4, Technical Specifications will be revised as follows:

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.4.1	Verify the outlet manual isolation valve is fully open.	12 hours
SR 3.5.4.2	Verify the inlet motor operated isolation valve is open.	12 hours
SR 3.5.4.3	Verify the volume of noncondensible gases in the PRHR HX inlet line has not caused the high-point water level to drop below the sensor.	24 hours
SR 3.5.4.4	Verify that power is removed from the inlet motor operated isolation valve.	31 days
SR 3.5.4.5	Verify both PRHR air operated outlet isolation valves and both IRWST gutter isolation valves are OPERABLE by stroking open the valves.	In accordance with the Inservice Testing Program
SR 3.5.4.6	Verify PRHR HX heat transfer performance in accordance with the System Level OPERABILITY Testing Program.	10 years
SR 3.5.4.7	Verify by visual inspection that the IRWST gutter and downspout screens are not restricted by debris.	24 months

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.4.7

This surveillance requires visual inspection of the IRWST gutter and downspout screens to verify that the return flow to the IRWST will not be restricted by debris. A Frequency of 24 months is adequate, since there are no known sources of debris with which the gutter or downspout screens could become restricted.

REFERENCES

1. Section 6.3, "Passive Core Cooling System."
2. Chapter 15, "Accident Analysis."
3. AP1000 PRA.

3. COLA Part 7, Departures and Exemption Requests, Departure LNP DEP 3.2-1 will be revised as shown below:

Departure Number LNP DEP 3.2-1:

Affected DCD/FSAR Sections: Tier 1 Table 2.2.3-1 and Table 2.2.3-2, Tier 2 Table 3.2-3 (Sheet 16 of 75), Figure 3.8.2-1 (Sheet 3), Subsections 5.4.11.2 and 5.4.14.1, Chapter 6 TOC (Table of Contents, List of Figures), Subsections 6.3.1.1.1, 6.3.1.1.4, 6.3.1.1.6, 6.3.1.2, 6.3.1.3, 6.3.2.1, 6.3.2.1.1, 6.3.2.2.7, 6.3.2.8, 6.3.3, 6.3.3.2.1.1, Figure 6.3-1 (Sheets 1 through 3), Figure 6.3-2 (Not Used), Subsection 7.4.1.1, Table 14.3-2 (Sheets 7 and 8 of 17), Subsection 15.0.13, Chapter 16 (TS SR 3.5.4.7, TS Bases B3.3.3 and B3.5.4), Subsection 19E.4.10.2, Table 19E.4.10-1, Figures 19E.4.10-1 through 19E.4.10-4, and Subsection 19.E.9.

Summary of Departure:

Modifications to the Polar Crane Girder (PCG), Internal Stiffener, and Passive Core Cooling System (PXS) gutter were made. The fabrication holes at the top surface of the PCG and in the stiffener are blocked, drainage holes in the bottom of the PCG boxes are blocked, and flow communication holes between PCG boxes are added. A downspout piping network is added to collect and transport condensation from the top and interior of the PCG and the stiffener to the PXS Collection Boxes. Eight new PXS downspout screens are added at the entrance of each of the downspouts at the top of the PCG and the stiffener to prevent any larger debris from blocking the downspout piping. Visual inspection requirements to verify that the return flow to the IRWST will not be restricted by debris have been added to the Technical Specifications and Technical Specification Bases.

Scope/Extent of Departure:

Upon actuation of the Passive Residual Heat Removal heat exchanger (PRHR HX), a series of air-operated valves are actuated to isolate the normal gutter drain path to the Liquid Radwaste System, and divert condensation to the In-containment Refueling Water Storage Tank (IRWST). It is important that sufficient condensate return is achieved during non-loss of coolant accident (LOCA) PRHR HX operation, since reduction of IRWST level to below the top of the tubes will begin to degrade the heat exchanger performance to the point where safe shutdown (<420 deg F in <36 hours) could be challenged.

As steaming in the containment begins, following initiation of PRHR HX operation and saturation of the IRWST, there are a number of mechanisms, both thermodynamic and geometric, that can prevent the condensed steam from returning to the IRWST. The mechanisms are as follows:

1) Steam to pressurize the containment
2) Steam condensation on Passive Heat Sinks
3) Raining from the containment roof, Containment ring misalignment
4) Losses at the Polar Crane Girder and Stiffener
5) Losses at support plates attached to the containment vessel
6) Losses at the Equipment Hatch and Personnel Airlock
7) Losses at entry to IRWST gutter

Losses due to pressurization and condensation on heat sinks were quantified with development of two new calculations. Two additional existing calculations were revised based on the results

of the new calculations in order to quantify the PRHR HX performance with the revised value of the condensate return and to ensure that the safe shutdown requirements are met. A full scale section of the containment wall was constructed to test condensate losses.

As a result of the condensate return testing, modifications to the Polar Crane Girder (PCG), Internal Stiffener, and Passive Core Cooling System (PXS) gutter designs are made. The fabrication holes at the top surface of the PCG and in the stiffener are blocked, drainage holes in the bottom of the PCG boxes are blocked, and flow communication holes between PCG boxes are added. A downspout piping network is added to collect and transport condensation from the top and interior of the PCG and the stiffener to the PXS Collection Boxes. Eight new PXS downspout screens are added at the entrance of each of the downspouts at the top of the PCG and the stiffener to prevent any larger debris from blocking the downspout piping. Visual inspection requirements to verify return flow to the IRWST will not be restricted by debris have been added to the Technical Specifications and Technical Specification Bases.

Departure Justification:

The proposed change does not involve a significant reduction in the margin of safety. The proposed change does not reduce the redundancy or diversity of any safety-related SSCs. The proposed changes increase the amount of condensate available in the IRWST after the initiation of a design basis event compared to the design described in the AP1000 DCD Revision 19. Though the fraction of condensate returned is smaller than originally assumed, the proposed changes provide sufficient condensate return flow to maintain adequate IRWST water level for those events using the PRHR HX cooling function. While lower condensate return rates result in an earlier transition to PRHR HX uncovery, the long-term shutdown temperature evaluation results show that the PRHR HX would continue to meet its acceptance criteria.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) approval of the change will not be inimical to the common defense and security or to the health and safety of the public.

Departure Evaluation:

This Tier 2 departure performs modifications to the PCG, Internal Stiffener, and PXS gutter designs. The fabrication holes at the top surface of the PCG and in the stiffener are blocked, drainage holes in the bottom of the PCG boxes are blocked, and flow communication holes between PCG boxes are added. A downspout piping network is added to collect and transport condensation from the top and interior of the PCG and the stiffener to the PXS Collection Boxes. Eight new PXS downspout screens are added at the entrance of each of the downspouts at the top of the PCG and the stiffener to prevent any larger debris from blocking the downspout piping. Visual inspection requirements to verify that the return flow to the IRWST will not be restricted by debris have been added to Technical Specifications and Technical Specification Bases. The proposed change does not involve a significant reduction in the margin of safety. The proposed change does not reduce the redundancy or diversity of any safety-related SSCs. The proposed changes increase the amount of condensate available in the IRWST after the initiation of a design basis event compared to the original design. Though the fraction of condensate returned is less than assumed in the original design, the proposed design does not result in significantly degraded overall PXS performance, in that the ability to achieve

safe shutdown within the required time frame is accomplished. Therefore, this departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific DCD.
2. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC important to safety and previously evaluated in the plant-specific DCD.
3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific DCD.
4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific DCD.
5. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific DCD.
6. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific DCD.
7. Result in a design basis limit for a fission product barrier as described in the plant-specific DCD being exceeded or altered.
8. Result in a departure from a method of evaluation described in the plant-specific DCD used in establishing the design bases or in the safety analyses.

This departure does not affect resolution of a severe accident issue identified in the plant-specific DCD. Therefore, this departure has no safety significance.

NRC Approval Requirement:

This departure requires an exemption from the requirements of 10 CFR Part 52, Appendix D, Section III.B, which requires compliance with Tier 1 requirements of the AP1000 DCD and the generic Technical Specifications. Therefore, an exemption is requested in Part B of this COL Application Part.

4. COLA Part 7, Departures and Exemption Requests, Exemption Request 4 will be revised as follows:

4) Containment Cooling Changes in regard to Passive Core Cooling System Condensate Return

Applicable Regulation(s): 10 CFR Part 52 Appendix D, Section III.B

Specific wording from which exemption is requested:

"III. Scope and Contents

B. An applicant or licensee referencing this appendix, in accordance with Section IV of this appendix, shall incorporate by reference and comply with the requirements of this appendix, including Tier 1, Tier 2 (including the investment protection short-term availability controls in Section 16.3 of the DCD), and the generic TS except as otherwise provided in

this appendix. Conceptual design information in the generic DCD and the evaluation of severe accident mitigation design alternatives in appendix 1B of the generic DCD are not part of this appendix."

Pursuant to 10 CFR §52.63(b)(1), an exemption from elements of the design as certified in the 10 CFR Part 52, Appendix D, design certification rule is requested for plant-specific Tier 1 material departures from the AP1000 DCD for Tier 1 information and for a material departure from the generic TS. These material departures are contained in Tier 1 Subsection 2.2.3, Tables 2.2.3-1 and 2.2.3-2, and involve the addition of components to the condensate return design to enable the Passive Core Cooling System to more effectively perform its design functions. The material departures also includes a change to TS Surveillance Requirement 3.5.4.7 which involves adding the downspout screens. This exemption request is in accordance with the provisions of 10 CFR §50.12, 10 CFR §52.7, and 10 CFR Part 52, Appendix D.

Discussion:

The changes requested to Tier 1 Table 2.2.3-1 and Table 2.2.3-2 and associated Tier 2 changes, to Table 3.2-3, Figure 3.8.2-1, Subsections 5.4.11.2 and 5.4.14.1, Subsections 6.3.1.1.1, 6.3.1.1.4, 6.3.1.1.6, 6.3.1.2, 6.3.1.3, 6.3.2.1, 6.3.2.1.1, 6.3.2.2.7, 6.3.2.8, 6.3.3, 6.3.3.2.1.1 and Figures 6.3-1 and 6.3-2, Subsection 7.4.1.1, Table 14.3-2, Subsection 15.0.3, TS SR 3.5.4.7, TS Bases B 3.3.3 and B 3.5.4, Subsection 19E.4.10.2, Table 19E.4.10-1, Figures 19E.4.10-1 through 19E.4.10-4, and Subsection 19E.9 provide additional equipment and surveillance requirements, provides reasonable assurance that the facility has been constructed and will be operated in conformity with the applicable design criteria, codes and standards, and demonstrates acceptable Passive Core Cooling System (PXS) system performance during design basis scenarios.

Conclusion:

This exemption request is evaluated in accordance with 10 CFR Part 52, Appendix D, Section VIII.A.4, 10 CFR §50.12, 10 CFR §52.7 and 10 CFR §52.63, which state that the NRC may grant exemptions from the requirements of the regulations provided the following six conditions are met: 1) the exemption is authorized by law [§50.12(a)(1)]; 2) the exemption will not present an undue risk to the health and safety of the public [§50.12(a)(1)]; 3) the exemption is consistent with the common defense and security [§50.12(a)(1)]; 4) special circumstances are present [§50.12(a)(2)]; 5) the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption [§52.63(b)(1)]; and 6) the design change will not result in a significant decrease in the level of safety [Part 52, Appendix D, VIII.A.1]. The requested exemption satisfies the criteria for granting specific exemptions, as described below.

1. This exemption is authorized by law

The NRC has authority under 10 CFR §§ 50.12, 52.7, and 52.63 to grant exemptions from the requirements of NRC regulations. Specifically, 10 CFR §§50.12 and 52.7 state that the NRC may grant exemptions from the requirements of 10 CFR Part 52 upon a proper showing. No law exists that would preclude the changes covered by this exemption request. Additionally, granting of the proposed exemption does not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations.

Accordingly, this requested exemption is "authorized by law," as required by 10 CFR §50.12(a)(1).

2. This exemption will not present an undue risk to the health and safety of the public

The proposed exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow changes to elements of the plant-specific Tier 1 DCD to depart from the AP1000 certified (Tier 1) design information and a change to a TS Surveillance Requirement to depart from the AP1000 certified (Tier 2) information. The plant-specific Tier 1 DCD will continue to reflect the approved licensing basis for the applicant, and will maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the plant-specific DCD. Because the change to the condensate return portion of the passive core cooling system description maintains its design functions, the changed design will ensure the protection of the health and safety of the public. Therefore, no adverse safety impact which would present any additional risk to the health and safety is present. The affected Design Description in the plant-specific Tier 1 DCD will continue to provide the detail necessary to support the performance of the associated ITAAC.

Therefore, the requested exemption from 10 CFR 52, Appendix D, Section III.B would not present an undue risk to the health and safety of the public.

3. The exemption is consistent with the common defense and security

The exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would change elements of the plant-specific Tier 1 DCD by departing from the AP1000 certified (Tier 1) design information relating to the condensate return portion of the passive core cooling system and departing from the Tier 2 generic TS to include surveillance of added plant equipment. The exemption does not alter the design, function, or operation of any structures or plant equipment that are necessary to maintain a safe and secure status of the plant. The proposed exemption has no impact on plant security or safeguards procedures.

Therefore, the requested exemption is consistent with the common defense and security.

4. Special circumstances are present

10 CFR §50.12(a)(2) lists six "special circumstances" for which an exemption may be granted. Pursuant to the regulation, it is necessary for one of these special circumstances to be present in order for the NRC to consider granting an exemption request. The requested exemption meets the special circumstances of 10 CFR §50.12(a)(2)(ii). That subsection defines special circumstances as when "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."

The rule under consideration in this request for exemption from Tier 1 Subsection 2.2.3, Tables 2.2.3-1 and 2.2.3-2, and the Tier 2 generic TS is 10 CFR 52, Appendix D, Section III.B, which requires that an applicant referencing the AP1000 Design Certification Rule (10 CFR Part 52, Appendix D) shall incorporate by reference and comply with the requirements of Appendix D, including Tier 1 information and generic TS. The Levy Units 1 and 2 COLA references the AP1000 Design Certification Rule and incorporates by reference the requirements of 10 CFR Part 52, Appendix D, including Tier 1 information and generic TS. The underlying purpose of

Appendix D, Section III.B is to describe and define the scope and contents of the AP1000 design certification, and to require compliance with the design certification information in Appendix D to maintain the level of safety in the design.

The proposed changes to the condensate return portion of the passive core cooling system maintain the design margins of the Passive Core Cooling System. This change does not impact the ability of any structures, systems, or components to perform their functions or negatively impact safety. Accordingly, this exemption from the certification information in Tier 1 Subsection 2.2.3, Tables 2.2.3-1 and 2.2.3-2, and TS SR 3.5.4.7 will enable the applicant to safely construct and operate the AP1000 facility consistent with the design certified by the NRC in 10 CFR 52, Appendix D.

Therefore, special circumstances are present, because application of the current generic certified design information in Tier 1 and the generic TS as required by 10 CFR Part 52, Appendix D, Section III.B, in the particular circumstances discussed in this request is not necessary to achieve the underlying purpose of the rule.

5. The special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption

Based on the nature of the changes to the plant-specific Tier 1 information and Tier 2 generic TS and the understanding that these changes support the design function of the Passive Core Cooling System, it is likely that other AP1000 applicants and licensees will request this exemption. However, if this is not the case, the special circumstances continue to outweigh any decrease in safety from the reduction in standardization because the key design functions of the Passive Core Cooling System associated with this request will continue to be maintained. This exemption request and the associated marked-up tables and TS SR demonstrate that the Passive Core Cooling System function continues to be maintained following implementation of the change from the generic AP1000 DCD, thereby minimizing the safety impact resulting from any reduction in standardization.

Therefore, the special circumstances associated with the requested exemption outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption. In fact, as described in 6. below, the exemption will result in no reduction in the level of safety.

6. The design change will not result in a significant decrease in the level of safety.

The exemption revises the plant-specific DCD Tier 1 information by adding components to Subsection 2.2.3, Tables 2.2.3-1 and 2.2.3-2, which were added to the condensate return design to enable the Passive Core Cooling System to more effectively perform its design functions. This exemption also revises the generic TS SR 3.5.4.7 to add the downspout screens to the surveillance. Because the Passive Core Cooling System design functions are met, there is no reduction in the level of safety.

Therefore, the design change and associated change to the TS will not result in a significant decrease in the level of safety. As demonstrated above, this exemption request satisfies NRC requirements for an exemption to the design certification rule for the AP1000.