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Serial: NPD-NRC-2016-001
January 06, 2016

10 CFR 52.79

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
REVISED PARTIAL RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 121 RELATED TO SRP SECTION 6.2.5, COMBUSTIBLE GAS CONTROL IN CONTAINMENT

References:
1. Letter from Donald Habib (NRC) to Christopher M. Fallon (DEF), dated September 24, 2014, "Request for Additional Information Letter No. 121 Related to Standard Review Plan Sections 6.2.5 and 6.4 for the Levy Nuclear Plant, Units 1 and 2, Combined License Application" (ML14259A096)

2. Letter from Christopher M. Fallon (DEF) to USNRC, dated June 30, 2015, "Partial Response to Request for Additional Information Letter No. 121 Related to SRP Section 6.2.5, Combustible Gas Control in Containment," Serial: NPD-NRC-2015-008 (ML15187A049)

Ladies and Gentlemen:

Duke Energy Florida (DEF) hereby submits a revised response to the Nuclear Regulatory Commission's (NRC) request for additional information (RAI) provided in Reference 1. DEF's initial response was provided in Reference 2. The revised response, which addresses NRC audit questions discussed in a July 28, 2015 teleconference, replaces the initial response, and is provided in Enclosure 1. A presentation was made to the NRC staff by Westinghouse Electric Company, LLC (WEC) on October 15, 2015, "Hydrogen Venting and Diffusion Flame Analysis." This presentation described the evaluation methodology which supports this revised RAI response.

The response to the RAI involves a change to the **AP1000** Design Control Document (DCD) Revision 19 information. The Levy Nuclear Plant (LNP) Combined License Application (COLA) incorporates the **AP1000** DCD by reference. The change involves a departure from DCD Tier 1 Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) as well as an associated DCD Tier 2 departure, but does not involve a change to the design. A revised request for exemption from Tier 1 material is provided in Enclosure 2. The revised request for exemption includes a summary and detailed description of the change to the acceptance criteria for the combustible gas control system inside containment, the associated changes to the licensing basis, the technical evaluation of the change, the regulatory evaluation (including the exemption, justification and the Significant Hazards Consideration determination) of the change, and the risk assessment.

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The change to the ITAAC in DCD Tier 1 Table 2.3.9-3 requires NRC notification and review in accordance with Interim Staff Guidance DC/COL-ISG-011 "Finalizing Licensing-basis Information," A WEC detailed analysis, APP-VLS-M3C-008, Revision 0, "Hydrogen Diffusion Flame and Containment Integrity Analysis," was performed which demonstrates that the revised ITAAC will not result in a challenge to containment integrity. This analysis is available for NRC review and audit.

Enclosure 3 contains revisions to the LNP Final Safety Analysis Report (FSAR) and LNP COLA Parts 7 and 10 in order to implement the change. These revisions will be incorporated into a future revision of the LNP 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 January 06, 2016.

Sincerely,

Christopher M. Fallon

Christopher M. Fallon
Vice President
Nuclear Development

Enclosures:
1. Revised Partial Response to NRC RAI Letter No. 121
2. Revised Request for Exemption Regarding Combustible Gas Control in Containment
3. Levy Nuclear Plant Units 1 and 2 COLA Revisions

cc: U.S. NRC Region II, Regional Administrator (w/o enclosures)
Mr. Donald Habib, U.S. NRC Project Manager (w/ enclosures)

Levy Nuclear Plant Units 1 and 2 (LNP)
Revised Partial Response to NRC Request for Additional Information Letter No. 121
Related to Standard Review Plan Section 6.2.5, Combustible Gas Control in Containment, dated September 24, 2014

NRC RAI #	Duke Energy RAI #	Duke Energy Response
06.02.05-1	L-1151	Revised Partial response enclosed – see following pages

NRC Letter No.: LNP-RAI-LTR-121

NRC Letter Date: September 24, 2014

NRC Review of Final Safety Analysis Report

NRC RAI NUMBER: 06.02.05-1

Text of NRC RAI:

AP1000 Hydrogen Vent Path - Chemical and Volume Control System (CVS) and Passive Core Cooling System (PXS) compartments allow for venting of hydrogen into the Core Makeup Tank (CMT) rooms above. Vent layout is designed so hydrogen burns away from the containment shell. This is to ensure containment integrity during postulated beyond-design-basis hydrogen releases from small compartments to keep sustained burning hydrogen plumes away from the containment shell.

Acceptance Criteria in AP1000 DCD, Tier 1 Table 2.3.9-3 Inspection, Tests, Analyses and Acceptance Criteria, requires 98 percent of the primary openings through the ceilings of the passive core cooling system valve/accumulator rooms and the containment shell is to be at least 19 feet and all other openings must be 3 feet away. At a public meeting held on July 23, 2014 (ML14192A803) with Westinghouse, the staff received information that challenges the ability of the plant to meet the ITAAC. Please provide an explanation for how you intend to satisfy the existing ITAAC.

Design Criteria in AP1000 DCD, Tier 2 Section 6.2.4.5.1 Preoperational Inspection and Testing for Hydrogen Ignition Subsystem, references the above Acceptance Criteria for location of the openings.

DEF RAI ID #: L-1151

DEF Revised Partial Response to NRC RAI:

The intent of the ITAAC in question is to ensure that in the postulated beyond-design-basis accident (severe accident) scenarios discussed in DCD Subsections 19.34 and 19.41, hydrogen generated as a result of the accident which migrates to the passive core cooling system (PXS) compartments (Rooms 11206 and 11207) is vented through large openings in the ceilings of these rooms such that, in the event of ignition of the hydrogen plume, a failure of the containment shell will not result.

The original design analysis to determine diffusion flames and thermal loading on the containment boundaries at the Core Makeup Tank (CMT) level (as shown in DCD Figure 1.2-7) during severe accidents was based on the original **AP1000** plant configuration. This analysis provided the basis for stating that the Containment Hydrogen Control System (VLS) does not result in a failure of the containment shell in the event of ignition of a postulated hydrogen plume. The ITAAC acceptance criteria currently contained in the **AP1000** DCD Revision 19, Tier 1 Table 2.3.9-3, Item 3, for control of containment hydrogen concentration for beyond design basis accidents, was based on the original plant configuration, and does not reflect the current design of the subject PXS compartments. The ITAAC as written is not consistent with

the actual plant configuration of large ceiling openings contained in DCD Revision 19 and the proximity of these openings to the containment shell.

In a July 28, 2015 public teleconference, the NRC raised specific concerns and questions resulting from an NRC staff audit of the calculation APP-VLS-M3C-007, Revision 0, "Thermal Analysis for Hydrogen Venting and Burning from PXS-A Compartment," which utilized a computational fluid dynamics (CFD) model for the analysis. This analytical method was discussed with the NRC in previous meetings as a proposed approach to resolve the issue associated with the combustible gas control in containment ITAAC.

Following the teleconference referenced above, the analytical approach was changed from a CFD model to a one dimensional heat transfer calculation. This new calculation, APP-VLS-M3C-008, Revision 0, "Hydrogen Diffusion Flame and Containment Integrity Analysis," is independent of the CFD model. The calculation evaluates the potential containment pressure boundary transient during a diffusion flame hydrogen burn in the CMT compartment for the defined bounding hydrogen release. Insights from the CFD analysis were only used if they pointed to a potential non-conservative assumption in the original methodology such as the flame temperature or the view factor.

The completed analyses confirm containment integrity is not challenged due to a diffusion flame hydrogen burn in the CMT compartment. Because the heat transfer is not dominated by the radiation heat transfer, the results are not particularly sensitive to the location of the source vent. The results show the peak wall temperature occurs on the equipment hatch cover and the peak containment steel temperature does not exceed the acceptance criterion.

The proposed revision of the ITAAC acceptance criteria for Table 2.3.9-3, Item 3, reflects the actual design distances of the PXS vents, with consideration of the construction tolerances. The proposed ITAAC reads as follows:

> "iii) The equipment access opening and CMT-A opening constitute at least 98% of vent paths within Room 11206 that vent to Room 11300. The minimum distance between the equipment access opening and containment shell is at least 24.3 feet. The minimum distance between the CMT-A opening and the containment shell is at least 9.4 feet. The CMT-B opening constitutes at least 98% of vent paths within Room 11207 that vent to Room 11300 and is a minimum distance of 24.6 feet away from the containment shell. Other openings through the ceilings of these rooms must be at least 3 feet from the containment shell."

A corresponding change to the second paragraph of the **AP1000** DCD, Tier 2, Subsection 6.2.4.5.1, Preoperational Inspection and Testing for the Hydrogen Ignition Subsystem, is proposed to read as follows:

> "Pre-operational inspection is performed to verify the location of openings through the ceilings of the passive core cooling system valve/accumulator rooms with respect to the containment pressure boundary. The primary openings are those that constitute 98% of the opening area. The primary openings in Room 11206 that vent to Room 11300 are the equipment access opening and CMT-A opening. These openings are verified to be a minimum distance of 24.3 feet and 9.4 feet, respectively, from the containment shell. The primary opening in Room 11207 that vents to Room 11300 is the CMT-B opening, which is

verified to be a minimum distance of 24.6 feet away from the containment shell. Other openings through the ceilings of these rooms are verified to be at least 3 feet from the containment shell."

In addition, a change to the last two paragraphs of Tier 2, Subsection 19.41.7, Diffusion Flame Analysis, is proposed to read as follows.

"In the event that ADS stage 4 fails to adequately direct hydrogen away from confined compartments, the compartment vents are designed to release the hydrogen at locations where it burns, but does not challenge the containment shell integrity.

Vents from the PXS and CVS compartments to the CMT room are located away from the containment shell and containment penetrations. Access hatches to the subcompartments that are near the containment shell are covered and secured closed such that they will not open as a result of a pipe break inside the compartment. Therefore, hydrogen releases to the CMT room from the subcompartments have been shown to not challenge the containment integrity."

A departure from the DCD is required to address the changes described above, and the change to Tier 1 Table 2.3.9-3 requires an exemption. The exemption request and the departure evaluation are part of this response and are addressed in Enclosures 2 and 3.

References:

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

2) Westinghouse Electric Company, APP-VLS-M3C-007, Revision 0, " Thermal Analysis for Hydrogen Venting and Burning from PXS-A Compartment"

3) Westinghouse Electric Company, APP-VLS-M3C-008, Revision 0, "Hydrogen Diffusion Flame and Containment Integrity Analysis"

Associated LNP COL Application Revisions:

See Enclosure 3.

Duke Energy
Enclosure 2
Levy Nuclear Plant Units 1 and 2
Revised Request for Exemption
Regarding
Combustible Gas Control in Containment
(8 pages including cover page)

1.0 Summary Description

Passive Core Cooling System (PXS) compartments allow for venting of hydrogen into the Core Makeup Tank (CMT) rooms above. Vent layout is designed such that burning of postulated beyond-design-basis accident hydrogen releases from small compartments will not result in a failure of the containment shell..

Acceptance Criteria in **AP1000** DCD, Revision 19, Tier 1 Table 2.3.9-3 Inspections, Tests, Analyses and Acceptance Criteria (ITAAC), requires 98% of the primary openings through the ceilings of the PXS valve/accumulator rooms must be at least 19 feet away from the containment shell and all other openings must be at least 3 feet away.

The ITAAC acceptance criteria for the primary ventilation paths through the ceilings of the PXS valve/accumulator rooms (Rooms 11206 and 11207) and the proximity of these paths to the containment shell are not consistent with the current design of the plant.

2.0 Description of Licensing Basis Impacts

Tier 1 Changes

The change to Tier 1 does not involve physical plant changes to the Tier 1 information contained in the **AP1000** DCD, but rather is a change to the acceptance criteria to be applied to a specific ITAAC design commitment and associated inspection, test or analysis based on the existing design configuration. The revised Tier 1 Table 2.3.9-3, Item 3, Acceptance Criteria iii, states:

> "The equipment access opening and CMT-A opening constitute at least 98% of vent paths within Room 11206 that vent to Room 11300. The minimum distance between the equipment access opening and containment shell is at least 24.3 feet. The minimum distance between the CMT-A opening and the containment shell is at least 9.4 feet. The CMT-B opening constitutes at least 98% of vent paths within Room 11207 that vent to Room 11300 and is a minimum distance of 24.6 feet away from the containment shell. Other openings through the ceilings of these rooms must be at least 3 feet from the containment shell."

Tier 2 Changes

The changes to Tier 2 do not involve physical plant changes to the Tier 2 information contained in the **AP1000** DCD, but reflect a change to the design criteria for the PXS valve/accumulator room vents as set forth in DCD Subsection 6.2.4.5.1, Preoperational Inspection and Testing for the Hydrogen Ignition Subsystem and Subsection 19.41.7, Diffusion Flame Analysis.

3.0 Technical Evaluation

Acceptance Criteria in Revision 19 of the **AP1000** DCD, Tier 1 Table 2.3.9-3 Inspections, Tests, Analyses and Acceptance Criteria, requires 98% of the primary openings through the ceilings of the passive core cooling system valve/accumulator rooms and the containment shell are at least 19 feet and all other openings must be 3 feet away.

The intent of this ITAAC is to ensure that in the postulated beyond-design-basis accident (severe accident) scenarios discussed in DCD Subsections 19.34 and 19.41, hydrogen generated as a result of the accident which migrates to the PXS compartments (Rooms 11206 and 11207) is vented through large openings in the ceilings of these rooms such that, in the event of ignition of the hydrogen plume, a failure of the containment shell will not result.

The ITAAC currently contained in the **AP1000** DCD, Tier 1 Table 2.3.9-3, Item 3, for control of containment hydrogen concentration for beyond design basis accidents, was based on the original **AP600** and **AP1000** design. The design of these areas has evolved over time, and the ITAAC acceptance criteria for the primary vent paths through the ceilings of the PXS valve/accumulator rooms (Rooms 11206 and 11207) and the proximity of these paths to the containment shell are not consistent with the current design of the plant.

Thus, a change to Tier 1 Table 2.3.9-3, Item 3, Acceptance Criteria iii, is required. An analysis was performed which concludes that the configuration of the vent paths from the PXS valve/accumulator rooms will not result in a failure of the containment shell in the event of ignition of a postulated hydrogen plume.

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 a plant-specific Tier 1 non-material departure from the **AP1000** DCD for Tier 1 information. This non-material departure is contained in Tier 1 Table 2.3.9-3. 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.

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."

4.1.2 DEF 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. 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 ITAAC acceptance criteria in Tier 1 Table 2.3.9-3 maintains the design margins of the Containment Hydrogen Control System, the changed acceptance criteria 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 of the public 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) information relating to the control of combustible gas inside containment. 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, one of these special circumstances must 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 Table 2.3.9-3 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. 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. 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 change to the ITAAC acceptance criteria for combustible gas control does not reduce the design margins of the Containment Hydrogen Control 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 Table 2.3.9-3 will enable the applicant to safely construct and operate the **AP1000** plant 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 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 change to the plant-specific Tier 1 information and the understanding that this change does not impact the design function of the Containment Hydrogen Control System, other **AP1000** applicants and licensees will likely 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 function of the Containment Hydrogen Control System associated with this request will continue to be maintained. This exemption request and the associated marked-up Tier 1 Table 2.3.9-3

demonstrate that the Containment Hydrogen Control 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 Condition 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 revising the acceptance criteria for an ITAAC in Table 2.3.9-3. There is no physical change to the plant associated with the change to the ITAAC acceptance criteria. Because the Containment Hydrogen Control System function is met, there is no reduction in the level of safety. Therefore, the change 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** plant.

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 Containment Hydrogen Control System to control the burning of hydrogen gas vented through the ceilings of the PXS compartments. The proposed change is only to the acceptance criteria of an ITAAC to reflect the current plant design and does not result in any physical changes to the plant nor any components added to the plant. As the proposed change does not involve any components that could initiate an event by means of component or system failure, the change does not increase the probability of a previously evaluated accident.

The change does 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 change does 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.

The change to the ITAAC would not result in an increase to the consequences of an accident previously evaluated in the plant-specific DCD. The change only modifies the acceptance criteria of the ITAAC to be consistent with the design and does not add or remove components that would have an impact on the

consequences of an accident. Therefore, the proposed change does 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 analysis of the as-built ventilation path configuration described in the revised ITAAC acceptance criteria demonstrates that a failure of the containment shell does not result. Therefore, the proposed change does 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 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 functions.

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 change. Therefore, the proposed change does 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 Table 2.3.9-3, with a Tier 2 involved departure.

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

Duke Energy
Enclosure 3
Levy Nuclear Plant Units 1 and 2
COLA Revisions
(11 pages including cover page)

COLA Part 2, FSAR

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

Departure Number	Departure Description Summary	FSAR Section or Subsection
LNP DEP 6.2-1	The ITAAC Acceptance Criteria for the in-containment PXS compartment vents are revised to reflect the current plant configuration. An analysis demonstrates a postulated hydrogen flame would not result in a failure of the containment shell. The following are the departures from the DCD: Tier 1 Table 2.3.9-3, and Tier 2 Subsections 6.2.4.5.1 and 19.41.7.	6.2.4.5.1 19.41.7

COLA Part 2, FSAR Chapter 6, will be revised by changing the second paragraph of Subsection 6.2.4.5.1, Hydrogen Ignition Subsystem, with an LMA of LNP DEP 6.2-1, to read:

6.2.4.5.1 Preoperational Inspection and Testing

Hydrogen Ignition Subsystem

Revise the second paragraph of DCD Subsection 6.2.4.5.1, Hydrogen Ignition Subsystem, to read as follows:

> Pre-operational inspection is performed to verify the location of openings through the ceilings of the passive core cooling system valve/accumulator rooms with respect to the containment pressure boundary. The primary openings are those that constitute 98% of the opening area. The primary openings in Room 11206 that vent to Room 11300 are the equipment access opening and CMT-A opening. These openings are verified to be a minimum distance of 24.3 feet and 9.4 feet, respectively, from the containment shell. The primary opening in Room 11207 that vents to Room 11300 is the CMT-B opening, which is verified to be a minimum distance of 24.6 feet away from the containment shell. Other openings through the ceilings of these rooms are verified to be at least 3 feet from the containment shell.

COLA Part 2, FSAR Chapter 19, will be revised by changing the last two paragraphs of Subsection 19.41.7, with a LMA of LNP DEP 6.2-1, to read:

19.41.7 Diffusion Flame Analysis

Revise the last two paragraphs of DCD Subsection 19.41.7, Diffusion Flame Analysis to read as follows:

> In the event that ADS stage 4 fails to adequately direct hydrogen away from confined compartments, the compartment vents are designed to release the hydrogen at locations where it burns, but does not challenge the containment shell integrity.

Vents from the PXS and CVS compartments to the CMT room are located away from the containment shell and containment penetrations. Access hatches to the subcompartments that are near the containment shell are covered and secured closed such that they will not open as a result of a pipe break inside the compartment. Therefore, hydrogen releases to the CMT room from the subcompartments have been shown to not challenge the containment integrity.

COLA Part 7, Departures and Exemption Requests

COLA Part 7 will be revised to add the following exemption and departure:

A. STD and LNP Departures

This Departure Report includes deviations in the Levy Nuclear Plant, Units 1 and 2 COLA FSAR from the Tier 2 information in the applicable Design Control Document (DCD), pursuant to 10 CFR Part 52, Appendix D, Section VIII and Section X.B.1.

The following Departures are described and evaluated in detail in this report.

Departure Number	Description
STD DEP 1.1-1	Administrative departure for organization and numbering for the FSAR sections
LNP DEP 1.8-1	Correction of an inconsistency in regulatory citation in an interface description
LNP DEP 3.2-1	Addition of downspouts to the condensate return portion of the Passive Core Cooling System
LNP DEP 3.7-1	Use of site-specific horizontal seismic response spectra for the design of drilled shafts that support the seismic Category II portions of the Annex and Turbine Buildings.
LNP DEP 3.11-1	Revision of "Envir. Zone" numbers for Spent Fuel Pool Level instruments
LNP DEP 6.2-1	The ITAAC Acceptance Criteria for the in-containment PXS compartment vents are revised to reflect the current plant configuration.
LNP DEP 6.3-1	Quantification of the term "indefinitely" as used in the DCD for maintenance of safe shutdown conditions using the PRHR HX during non-LOCA accidents.
LNP DEP 6.4-1	Main Control Room Operator Dose
LNP DEP 6.4-2	Main Control Room Heatup
LNP DEP 7.3-1	Source Range Neutron Flux Doubling Block Permissive
STD DEP 8.3-1	Class 1E voltage regulating transformer current limiting features

Departure LNP DEP 6.2-1 is a departure from **AP1000** Tier 1 information, in addition to Tier 2 information in the DCD; an exemption request and NRC approval is required prior to implementation.

Departure Number LNP DEP 6.2-1:

Affected DCD/FSAR Sections: Tier 1 Table 2.3.9-3, Tier 2 Subsections 6.2.4.5.1 and 19.41.7

Summary of Departure:

The Containment Hydrogen Control System (VLS) has a function to limit the hydrogen concentration in containment following a severe accident so that it does not result in a failure of the containment shell (DCD Subsection 6.2.4). A severe accident (considered to be a beyond design basis event) involves a major core degradation or core melt that results in hydrogen production among other effects. A severe accident involving major core degradation/core melt is not a design basis accident; however, the VLS contains design features to address this scenario. The VLS promotes hydrogen burning soon after reaching the lower flammability limit. Burning off hydrogen at lower flammability limits is intended to prevent the hydrogen from reaching high concentration levels and potential adverse effects on containment integrity. There

are hydrogen igniters positioned around various areas of containment to be able to burn off hydrogen in a controlled manner to help preserve containment integrity.

Openings in the ceilings of the Passive Core Cooling System (PXS) valve/accumulator rooms A and B (identified as Rooms 11206 and 11207, respectively) communicate with the room above where the CMTs are located (Room 11300). These openings allow access for hydrogen to vent. Igniters are placed in these areas to allow the hydrogen to ignite and burn. Evolution of the **AP1000** configuration moved some equipment and room layouts such that the existing VLS ITAAC and Subsections 6.2.4.5.1 and 19.41.7 wording is no longer consistent with the revised plant design. The CMT-A opening in Room 11206 was moved closer to the containment shell while the equipment hatch opening in the same room was moved farther away, and a weir was added for flood protection (not related to hydrogen venting). The CMT-B opening in Room 11207 was moved farther away from the containment shell.

The changes proposed to the DCD by this departure reflect the current vent path configuration in Rooms 11206 and 11207, and provide clarification of "primary openings" in Rooms 11206 and 11207.

Scope/Extent of Departure:

The changes to the DCD addressed by Departure 6.2-1 revise Tier 1 ITAAC Table 2.3.9-3, Item 3, Acceptance Criteria iii and Tier 2 Subsections 6.2.4.5.1 and 19.41.7 to reflect the actual vent path configuration, clarify the meaning of primary openings for Rooms 11206 and 11207, identify the vent path locations will be verified by pre-operational inspection, and hydrogen released from these vent paths will not challenge the integrity of the containment shell.

Departure Justification:

The proposed changes correct information in the DCD regarding the plant layout of the primary openings in Containment Rooms 11206 and 11207 that will be used to vent hydrogen; specifically, changes involve the distance between the openings and the containment shell and clarifies what is designated as a primary opening for these rooms. An analysis demonstrates ignition of hydrogen venting through these openings will not result in failure of the containment shell.

The proposed changes will not increase the frequency of occurrence of an accident, nor result in a malfunction of a structure, system or component (SSC). The proposed changes regarding the primary openings layout information to be applied to pre-operational measurements and clarification of the primary openings will not result in an accident or malfunction of an SSC. The revised hydrogen vent locations will not result in containment shell failure and as such, will not impact a design basis limit for a fission product barrier. The updated DCD language for primary openings used for venting hydrogen is supported by analysis and does not affect resolution of an ex-vessel severe accident design feature.

Departure Evaluation:

The proposed changes correct information in the DCD regarding the plant layout of the primary openings in Containment Rooms 11206 and 11207 that will be used to vent hydrogen during a beyond design basis event (severe accident). Pre-operational measurements will verify the

location of these openings, and an analysis demonstrates postulated hydrogen releases through these openings do not result in a failure of the containment shell.

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 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.
9. Affect resolution of an ex-vessel severe accident design feature 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. Therefore, an exemption is requested in Part B of this COL Application Part.

B. Levy Nuclear Plant, Units 1 and 2 Exemption Requests

Duke Energy Florida, Inc. (DEF) requests the following exemptions related to:

1. Not used, and
2. Combined License (COL) Application Organization and Numbering
3. Special Nuclear Material (SNM) Material Control and Accounting Program Description
4. Containment Cooling Changes in regard to Passive Core Cooling System Condensate Return
5. Main Control Room Dose
6. Main Control Room Heatup
7. Combustible Gas Control in Containment

8. Source Range Neutron Flux Doubling Block Permissive

Discussion and justification for each of these requests is provided in the following pages.

7) Combustible Gas Control in Containment

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 a plant-specific Tier 1 non-material departure from the **AP1000** DCD for Tier 1 information. 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 2.3.9-3 and associated Tier 2 changes to Subsections 6.2.4.5.1 and 19.41.7 provide a revised acceptance criteria for hydrogen venting inside containment, provide reasonable assurance that the facility has been constructed and will be operated in conformity with the applicable design criteria, codes and standards, and demonstrate acceptable Containment Hydrogen Control System performance during design basis scenarios.

Conclusion:

DEF 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. 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 ITAAC acceptance criteria in Tier 1 Table 2.3.9-3 maintains the design margins of the Containment Hydrogen Control System, the changed acceptance criteria 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 of the public 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 control of combustible gas inside containment. 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, one of these special circumstances must 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 Table 2.3.9-3 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. 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. 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 change to the ITAAC acceptance criteria for combustible gas control maintains the design margins of the Containment Hydrogen Control 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 Table 2.3.9-3 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 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 the understanding that these changes support the design function of the Containment Hydrogen Control System, other **AP1000** applicants and licensees will likely 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 Containment Hydrogen Control System associated with this request will continue to be maintained. This exemption request and the associated marked-up Tier 1 Table 2.3.9-3 demonstrates that the Containment Hydrogen Control 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 Condition 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 revising the acceptance criteria for an ITAAC in Table 2.3.9-3. There is no physical change to the plant associated with the change to the ITAAC acceptance criteria. Because the Containment Hydrogen Control System function is met, there is no reduction in the level of safety. Therefore, the change 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** plant.

COLA Part 10

COLA Part 10, Appendix B. Inspections, Tests, Analyses and Acceptance Criteria, **AP1000** DCD Tier 1 ITAAC, will be revised to add the following departure.

Containment Hydrogen Control System ITAAC

The ITAAC Acceptance Criteria for the in-containment PXS compartment vents are revised to reflect the current plant configuration. The ITAAC acceptance criteria for Table 2.3.9-3, Item 3, are clarified to read as shown in the attached Table 2.3.9-3, with a LMA of LNP DEP 6.2-1.

Attachment:

Revised Table 2.3.9-3

Table 2.3.9-3
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the VLS is as described in the Design Description of this Section 2.3.9.	Inspection of the as-built system will be performed.	The as-built VLS conforms with the functional arrangement as described in the Design Description of this Section 2.3.9.
2.a) The hydrogen monitors identified in Table 2.3.9-1 are powered by the non-Class 1E dc and UPS system.	Testing will be performed by providing a simulated test signal in each power group of the non-Class 1E dc and UPS system.	A simulated test signal exists at the hydrogen monitors identified in Table 2.3.9-1 when the non-Class 1E dc and UPS system is provided the test signal.
2.b) The components identified in Table 2.3.9-2 are powered from their respective non-Class 1E power group.	Testing will be performed by providing a simulated test signal in each non-Class 1E power group.	A simulated test signal exists at the equipment identified in Table 2.3.9-2 when the assigned non-Class 1E power group is provided the test signal.
3. The VLS provides the nonsafety-related function to control the containment hydrogen concentration for beyond design basis accidents.	i) Inspection for the number of igniters will be performed. ii) Operability testing will be performed on the igniters. iii) An inspection of the as-built containment internal structures will be performed. iv) An inspection will be performed of the as-built IRWST vents that are located in the roof of the IRWST along the side of the IRWST next to the containment shell.	i) At least 64 hydrogen igniters are provided inside containment at the locations specified in Table 2.3.9-2. ii) The surface temperature of the igniter exceeds 1700°F. iii) The equipment access opening and CMT-A opening constitute at least 98% of vent paths within Room 11206 that vent to Room 11300. The minimum distance between the equipment access opening and containment shell is at least 24.3 feet. The minimum distance between the CMT-A opening and the containment shell is at least 9.4 feet. The CMT-B opening constitutes at least 98% of vent paths within Room 11207 that vent to Room 11300 and is a minimum distance of 24.6 feet away from the containment shell. Other openings through the ceilings of these rooms must be at least 3 feet from the containment shell. iv) The discharge from each of these IRWST vents is oriented generally away from the containment shell.

DEP 6.2-1