

## NUCLEAR REGULATORY COMMISSION

[Docket Nos. 50–269, 50–270, and 50–287]

### Duke Energy Corporation; Oconee Nuclear Station, Units 1, 2, and 3; Exemption

#### 1.0 Background

The Duke Energy Corporation (the licensee) is the holder of Facility Operating License Nos. DPR–38, DPR–47, and DPR–55, which authorize operation of the Oconee Nuclear Station, Units 1, 2, and 3 (ONS). The licenses provide, among other things, that the facilities are subject to all rules, regulations, and orders of the U.S. Nuclear Regulatory Commission (NRC, the Commission) now or hereafter in effect.

The facility consists of three pressurized water reactors located in Seneca County in South Carolina.

#### 2.0 Request/Action

By letter dated July 26, 2000, Duke Energy Corporation, licensee for the ONS, requested an exemption from certain requirements of 10 CFR 50.44, 10 CFR part 50, Appendix A, General Design Criterion 41, and 10 CFR part 50, Appendix E, Section VI pertaining to the hydrogen control system requirements (*i.e.*, recombiners and containment post-accident hydrogen monitors) and the removal of these requirements from the ONS design basis.

Regulatory requirements for the hydrogen control system are specified in 10 CFR 50.44 and 10 CFR part 50, Appendix A, (General Design Criteria 41, 42, and 43). Additional staff guidance is provided in Regulatory Guide (RG) 1.7. Staff review and acceptance criteria are specified in Section 6.2.5 of the Standard Review Plan. With regard to combustible gas control system requirements, ONS is subject to the requirements of 10 CFR 50.44(g).

#### 3.0 Discussion

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR part 50, when (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and (2) when special circumstances are present.

For this exemption, these special circumstances include consideration that the quantity of hydrogen prescribed

by 10 CFR 50.44(d) and RG 1.7 which necessitated the need for hydrogen recombiners would be bounded by the hydrogen generated during a severe accident. As shown in the attached safety evaluation, the staff has found that the relative importance of hydrogen combustion for large, dry containments with respect to containment failure is quite low. This finding supports the argument that the hydrogen recombiners are not risk significant from a containment integrity perspective and that the risk associated with hydrogen combustion is not from design basis accidents but from severe accidents. Studies have shown that the majority of risk to the public is from accident sequences that lead to containment failure or bypass, and that the contribution to risk from accident sequences involving hydrogen combustion is actually quite small for large, dry containments such as Oconee's. This is true despite the fact that the hydrogen produced in these events is substantially larger than the hydrogen production postulated by 10 CFR 50.44(d) and RG 1.7. Hydrogen combustion sequences that could lead to early containment failure typically involve up to 75 percent core metal-water reaction. Hydrogen combustion sequences that could lead to late containment failure involve additional sources of hydrogen due to the interaction of corium and the concrete basemat after vessel breach. Although the recombiners are effective in maintaining the RG 1.7 hydrogen concentration below the lower flammability limit of 4 volume percent, they are overwhelmed by the larger quantities of hydrogen associated with severe accidents that would typically be released over a much shorter time period (*e.g.*, 2 hours). However, NUREG/CR–4551 states that hydrogen combustion in the period before containment failure is considered to present no threat to large, dry containments. Table A.4–5 of NUREG/CR–4551 shows that the contribution of hydrogen combustion to late containment failure is also very small. Therefore, the relative importance of hydrogen combustion for large, dry containments with respect to containment failure has been shown to be quite low.

The recombiners can, however, prevent a subsequent hydrogen burn if needed due to radiolytic decomposition of water and corrosion in the long term. Analysis performed in accordance with the methodology of RG 1.7 shows that the hydrogen concentration will not reach 4 volume percent for 15 days after

initiation of a design basis Loss of Coolant Accident (LOCA). Additionally, as described in the attached safety evaluation, hydrogen concentrations on the order of 6 percent or less are bounded by hydrogen generated during a severe accident and would not be a threat to containment integrity since there is ample time between burns to reduce elevated containment temperatures using the installed containment heat removal systems. The ONS Individual Plant Examination (IPE) concluded that containment survival is almost certain following hydrogen combustion when the Reactor Building Cooling Units and the Reactor Building Spray System are operating.

The underlying purpose of 10 CFR 50.44 is to show that, following a LOCA, an uncontrolled hydrogen-oxygen recombination would not take place, or that the plant could withstand the consequences of uncontrolled hydrogen-oxygen recombination without loss of safety function. Based on the analysis, which includes the staff's evaluation of the risk from hydrogen combustion, resolution of Generic Issue 121, "Hydrogen Control for PWR Dry Containments," and the ONS IPE, the plant could withstand the consequences of uncontrolled hydrogen-oxygen recombination without loss of safety function without credit for the hydrogen recombiners for not only the design basis case, but the more limiting severe accident with up to 100 percent metal-water reaction. Therefore, the requirements for hydrogen recombiners as part of the ONS design basis are unnecessary and their removal from the design basis is justified. Additionally, elimination of the hydrogen recombiners from the Emergency Operating Instructions would simplify operator actions in the event of an accident and, therefore, would be a safety benefit. Consequently, pursuant to 10 CFR 50.12(a)(2)(ii), application of the regulation is not necessary to achieve the underlying purpose of the rule.

In the submittal, the licensee also requested an exemption from the functional requirement for hydrogen monitoring as promulgated in part 50, Appendix E, Section VI, "Emergency Response Data System (ERDS)," or any commitments made in regard to NUREG–0737, Item II.F.1, Attachment 6, "Containment Hydrogen Monitor." In the Statement of Considerations for Appendix E to part 50, the Commission stated that the ERDS data (which includes the continuous hydrogen monitors) provides the data required by the NRC to perform its role during an emergency. This conclusion is still valid

for not only the staff but licensees. The major vendors' core damage assessment methodologies continue to include continuous hydrogen monitoring. Core damage assessment methodologies were reviewed by the staff in response to NUREG-0737, Item II.B.3(2)(a). Continuous hydrogen monitoring is needed to support a plant's emergency plan as described in 50.47(b)(9). Implementing documents such as Regulatory Guide (RG) 1.101, Revision 2, which endorsed NUREG-0654, and RG 1.101, Revision 3, which endorsed NEI-NESP-007, Revision 2 define the highest Emergency Action Level, a General Emergency, as a loss of any two barriers and potential loss of the third barrier. Potential loss of a third barrier depends on whether or not an explosive mixture exists inside containment. The continuous hydrogen monitors are used for determining whether an explosive mixture exists inside containment. Therefore, the licensee's request for exemption from the functional requirements for hydrogen monitoring is not approved.

#### 4.0 Conclusion

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), the exemption pertaining to the recombiners is authorized by law, will not endanger life or property or common defense and security, and is, otherwise, in the public interest. Also, pursuant to 10 CFR 50.12(a)(2)(ii), special circumstances are present. Therefore, the Commission hereby grants Duke Energy Corporation an exemption from the recombiner requirements of 10 CFR 50.44 and 10 CFR part 50, appendix A, General Design Criterion 41 for the Oconee Nuclear Station, Units 1, 2, and 3.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will not have a significant effect on the quality of the human environment (66 FR 37073).

This exemption is effective upon issuance.

Dated at Rockville, Maryland, this 17th day of July 2001.

For the Nuclear Regulatory Commission.

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## NUCLEAR REGULATORY COMMISSION

[Docket No. 50-400]

### Carolina Power & Light Company; Shearon Harris Nuclear Power Plant; Environmental Assessment and Finding of No Significant Impact

The U.S. Nuclear Regulatory Commission (NRC) is considering issuance of an exemption from 10 CFR 55.59(a) for Facility Operating License No. NPF-63, issued to Carolina Power & Light Company (the licensee), for operation of the Shearon Harris Nuclear Power Station, Unit 1 (HNP), located in Wake and Chatham Counties, North Carolina. Therefore, as required by 10 CFR 51.21, the NRC is issuing this environmental assessment and finding of no significant impact.

#### Environmental Assessment

##### Identification of the Proposed Action

The proposed action would allow the licensed operator requalification examinations for HNP to be rescheduled. The requested exemption would extend the completion date for the examinations from December 31, 2001, to March 31, 2002.

The proposed action is in accordance with the licensee's application dated January 19, 2001, as supplemented by letter dated May 7, 2001.

##### The Need for the Proposed Action

The proposed action would extend the current HNP requalification program from December 31, 2001, to March 31, 2002. HNP is scheduled to be in extended shutdown for refueling, steam generator replacement, and power uprate modifications during the end period of the current requalification cycle and when the full annual examination (comprehensive written examination and annual operating test) would need to be given. The licensee has stated that based on the training required for the new site procedures, modifications of the simulator to support outage modifications, training prior to the outage, and the implementation of the extended outage, the ability to complete the full annual examination within the 24-month requalification cycle is not possible.

##### Environmental Impacts of the Proposed Action

The NRC has completed its evaluation of the proposed action and concludes that there are no environmental impacts associated with the extension of the operator requalification examinations from December 31, 2001, to March 31,

2002. The proposed action will not significantly increase the probability or consequences of accidents, no changes are being made in the types or amounts of effluents that may be released off site, and there is no significant increase in occupational or public radiation exposure. Therefore, there are no significant radiological environmental impacts associated with the proposed action.

With regard to potential non-radiological impacts, the proposed action does not have a potential to affect any historic sites. It does not affect non-radiological plant effluents and has no other environmental impact. Therefore, there are no significant non-radiological environmental impacts associated with the proposed action.

Accordingly, the NRC concludes that there are no significant environmental impacts associated with the proposed action.

##### Environmental Impacts of the Alternatives to the Proposed Action

As an alternative to the proposed action, the staff considered denial of the proposed action (*i.e.*, the "no-action" alternative). Denial of the application would result in no change in current environmental impacts. The environmental impacts of the proposed action and the alternative action are similar.

##### Alternative Use of Resources

This action does not involve the use of any different resource than those previously considered in the Final Environmental Statement for HNP.

##### Agencies and Persons Consulted

On June 29, 2001, the staff consulted with the North Carolina State official, Mr. Johnny James, of the Division of Radiation Protection, regarding the environmental impact of the proposed action. The State official had no comments.

##### Finding of No Significant Impact

On the basis of the environmental assessment, the NRC concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the NRC has determined not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the licensee's letter dated January 19, 2001, as supplemented by letter dated May 7, 2001. Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room, located at One White Flint North, 11555 Rockville Pike