UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931

April 8, 2004

EA-04-018

Duke Energy Corporation
ATTN: Mr. Ronald A. Jones
Vice President
Oconee Site
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTY - $60,000 (NRC INSPECTION REPORT NO. 05000269/2004007, 05000270/2004007, AND 05000287/2004007)

Dear Mr. Jones:

This refers to the inspection completed on January 21, 2004, involving an issue at your Oconee Nuclear Station. The issue involved Duke Energy Corporation's (DEC) revision to the Oconee Updated Final Safety Analysis Report (UFSAR) for the High Energy Line Break (HELB) analysis in May 2001. The results of the inspection, including the identification of an apparent violation of 10 CFR 50.59, were discussed with your staff on January 27, 2004, and were forwarded to you by letter dated January 29, 2004. Based on the results of the inspection, a pre-decisional enforcement conference was held on March 2, 2004, in the NRC's Region II Office in Atlanta, Georgia, with you and members of your staff to discuss the apparent violation, its significance, root causes, and your corrective actions. A listing of conference attendees, material presented by the NRC, and material presented by DEC are included as Enclosures 2, 3, and 4, respectively.

Based on the information developed during the inspection, and the information presented at the conference, the NRC has determined that a violation of NRC requirements occurred. The violation is cited in the enclosed Notice of Violation (Notice), and the circumstances surrounding it are described in detail in the subject inspection report. The violation involves a failure to adhere to the requirements of 10 CFR 50.59, in that DEC made changes to the Oconee facility as described in Section 3.6.1.3 of the UFSAR and referenced analyses that involved unreviewed safety questions (USQs) without obtaining prior NRC approval. In this case, DEC revised an analysis for HELB accidents, which permitted the facility to initiate emergency feedwater (EFW) up to 30 minutes after a HELB accident, instead of 15 minutes as was discussed in the UFSAR and associated reference documents. In addition, the revised analysis permitted the facility to initiate high pressure injection (HPI) up to eight hours after a HELB, instead of one hour. DEC concluded that the May 2001 changes did not require prior NRC review and approval, but that its 10 CFR 50.59 evaluation of May 2001 of the changes was not thoroughly documented. The NRC determined that DEC's review of the UFSAR changes did not adequately consider the impact to plant safety and, therefore, involved performance issues beyond poor documentation of the review that resulted in USQs, as discussed below.

The NRC's conclusion that DEC's May 2001 change to the facility involved USQs is based on our review of two particular areas. The first area involves EFW and HPI initiation changes that necessitated the use of the boiler condenser mode (BCM) for cooling the reactor core. DEC stated at the conference that BCM is an approved methodology, and always has been a part of the expected plant response to a small break loss of coolant accident (SBLOCA). In addition, DEC stated that BCM was formally reviewed by the NRC as part of the SBLOCA analysis.

The NRC concluded that the use of BCM for an extended time and under the potential accident scenario of a HELB is a USQ because it creates the possibility of an accident of a different type than any evaluated previously in the UFSAR. The delay in the initiation of EFW would allow the scenario to evolve into a HELB with significant RCS volume loss with some limited SBLOCA characteristics and no immediate safety pump injection. In addition, the initiation of EFW for up to 30 minutes after a HELB, and the initiation of HPI into the RCS up to eight hours after the HELB, would necessitate the use of BCM for RCS cooling for up to eight hours to preclude core damage. The use of BCM mode for this extended time has not been reviewed or approved by the NRC for the Oconee facility. BCM may introduce reactivity concerns, which introduces the possibility of an accident of a different type than any evaluated previously in the UFSAR. DEC stated at the conference that the RELAP5 computer code was used to model the response of the system because the RCS is responding in a similar fashion to a SBLOCA due to significant inventory loss and RCS voiding. This significant loss of inventory resulted from an increased number of pressurizer safety relief valve (PSV) lifts in combination with reactor coolant pump leakage. Additionally, DEC stated that the increased degree of voiding within the RCS necessitated a change from the original code of record to RELAP5. While the use of RELAP5 may be appropriate for the modeling of SBLOCA events, the degree with which conditions within the RCS deviated from the original analysis is an indication of the possibility of an accident of a new and different type than evaluated previously in the UFSAR. For these reasons, the NRC concluded that a USQ exists, thereby requiring NRC review and approval prior to DEC's implementation of the facility change.

The second area in which the NRC concluded that DEC's May 2001 change resulted in a USQ involved the increased cycling of the pressurizer safety valves (PSV). Because of the facility change to allow EFW initiation within 30 minutes after a HELB, additional PSV cycling would occur. At the conference, DEC stated that the Oconee UFSAR does not assume failures of the PSVs to close, and that a small number of additional valve operation cycles during the subject HELB event would appear to be an insignificant factor regarding PSV qualification. DEC provided substantive information during the conference from the valve's vendor, the results of its own review of the EPRI test data, and information on the actual configuration/operating conditions of the PSVs, to conclude that the small number of additional valve cycles during the analyzed event would have a minimal impact. DEC also contended that there would not be a decreased reliability of the PSVs to close due to the increased number of cycles, citing the EPRI test data and other information provided by the vendor where other model safety valves were cycled numerous times without a failure to reseat. Furthermore, DEC stated that the NRC's USQ concern regarding the additional cycling of the PSVs represented a change in regulatory position.

The NRC concluded that, because the May 2001 change would result in increased cycling of the PSVs under steam and liquid conditions, this condition represented a USQ due to an increase in the probability of malfunction of equipment important to safety that was previously evaluated in the UFSAR. Notwithstanding the information provided by DEC at the conference, the EPRI test data for water conditions represented four actuations of a single valve which is not considered sufficient to demonstrate valve reliability under the revised HELB event. The additional vendor test data presented by DEC was not representative of the Oconee model PSV for liquid discharge conditions. The NRC did not agree that the limited available test data would support the conclusion that the increased number of cycles at Oconee would have little affect on the PSV's reliability and ability to perform additional operational cycles. Because of the increased reliance on the PSV to perform multiple cycles under both steam and liquid conditions, the NRC contends that there is a more than minimal increase in the probability that the PSVs will not reclose. Furthermore, the NRC concludes that when any component, be it a safety valve or some other component, has an associated probability of failure per challenge, multiple challenges would result in a greater cumulative probability of failure. With a greater cumulative probability of failure of one or more of the PSVs to close, there is an associated increase in the core damage frequency.

In support of its contention that the additional cycling of the PSVs represented a change in the NRC's regulatory position, DEC stated that the PSVs have been determined to be qualified for the HELB event because the NRC closed TMI action item II.D.1 of NUREG-0737 in a safety evaluation to the licensee dated July 1989. DEC based this position on the similarity between the high temperature water discharge expected during the HELB event and other scenarios addressed in the NRC safety evaluation. However, an examination of the NRC safety evaluation reveals that the PSV discharge events reviewed in the July 1989 safety evaluation were those considered to be applicable at that time. These events included UFSAR transients (all of which result in discharge of steam only), extended HPI events (which include breaks in the feedwater system which could result in liquid discharge), and low temperature over pressurization events. The HELB event of interest here is significantly different from those evaluated for item II.D.1 in that for this feedwater line break scenario, there is no prompt, automatic safety system initiated EFW or HPI to maintain system pressure or to provide core cooling during the period of PSV discharge. For all the events evaluated for item II.D.1, core cooling is assured, even if one or more of the PSVs remain in the open position, which is significantly unlike the HELB event of interest where a stuck open PSV directly results in core damage. The staff believes that this consideration alone results in a conclusion that the revised HELB event of interest is a new or different scenario from any previously evaluated by the NRC regarding operation of the PSVs. Therefore, the staff does not believe that its concerns regarding use of the PSVs for the HELB event at issue represent a change in regulatory position, as the licensee contends.

In accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600, the NRC's evaluation of the safety significance of the violation is based on risk insights. At the conference, DEC presented the results of its risk assessment of the 10 CFR 50.59 change, including key inputs and assumptions. DEC estimated that the actual change in core damage frequency as a result of the May 2001 change was of minimal safety significance.

The NRC closely considered DEC's risk assessment of the May 2001 change, and found that this assessment did not evaluate the ramifications of a 30 minute delay in restoring secondary side heat removal following this particular HELB on core damage frequency. Instead, DEC presented the ramifications of training changes made under the authority of the safety evaluation in question. Therefore, this risk assessment only involved a 15 to 22 minute delay, depending upon the system used, in restoring secondary side heat removal following this particular HELB on core damage frequency. However, because the May 2001 change represented a change to the licensing basis under 10 CFR 50.59 and was not a performance deficiency, the NRC is of the view that the maximum times (30 minutes for EFW reestablishment, eight hours for HPI reestablishment), are the appropriate inputs to use for the risk estimate. Based on our consideration of the above and other unquantifiable factors that would increase the risk estimate (i.e., the potential for recriticality, the increased likelihood of steam generator tube failure due to the delayed onset of EFW), the NRC concluded that this violation is, at a minimum, of low to moderate safety significance. Therefore, the NRC concludes that this violation should be characterized at Severity Level III in accordance with the Enforcement Policy.

Because the 10 CFR 50.59 rule was amended in December 2000 (becoming effective for Oconee on July 2, 2001), the NRC also considered whether DEC's May 2001 changes would have constituted a violation of the amended 10 CFR 50.59 requirement. In this case, the NRC concluded that the changes would create the possibility for an accident of a different type or a malfunction with a different result than any previously evaluated in the UFSAR, and would result in a more than minimal increase in the likelihood of occurrence and in the consequences of a malfunction of the PSVs. As such, the NRC concluded that DEC's changes of May 2001 also would have represented a violation of the current 10 CFR 50.59 requirements.

In accordance with the Enforcement Policy, a base civil penalty in the amount of $60,000 is considered for a Severity Level III violation. Because your facility has not been the subject of escalated enforcement actions within the last 2 years, the NRC considered whether credit was warranted for *Corrective Action* in accordance with the civil penalty assessment process in Section VI.C.2 of the Enforcement Policy. As stated at the conference, DEC's corrective actions included rewriting the May 2001, 10 CFR 50.59 evaluation to address issues that DEC considered to be documentation matters and the conducting a root cause investigation. DEC indicated that its root cause investigation was still in progress at the time of the conference.

Based on our review, DEC failed to take sufficient corrective actions to restore the facility to compliance with the requirements of 10 CFR 50.59, failed to identify the root cause of the violation, and failed to take adequate corrective actions to prevent recurrence of the violation. Specifically, DEC neither submitted the May 2001 facility change to the NRC for review and approval, nor returned the facility to the conditions specified in the UFSAR prior to the May 2001 facility change. The NRC would have given consideration to certain interim corrective actions taken by DEC while the acceptability of the facility change was under NRC review; however, DEC failed to offer any such interim measures for NRC consideration. As such, DEC offered no viable corrective actions to restore compliance for this violation.

At the conference, DEC concluded only that the violation was due to a lack of documented detail in its original 10 CFR 50.59 evaluation of May 2001. Although the NRC agrees with DEC that the original 10 CFR 50.59 evaluation was not sufficiently documented, the NRC also believes that the review itself was not detailed and lacked thoroughness in certain areas. The NRC concluded that DEC's failure to recognize that the May 2001 changes represent USQs, even as of the date of the enforcement conference, is indicative of a fundamental lack of understanding of the 10 CFR 50.59 process. This lack of understanding appears to have contributed to the licensee's failure to address the noncompliance or to implement corrective actions to prevent recurrence of future violations of 10 CFR 50.59. Based on the above, the NRC concluded that credit was not warranted for the factor of *Corrective Action*.

Therefore, to emphasize the importance of compliance with the regulatory requirements which govern making changes to the facility, and the importance of prompt and comprehensive correction of violations, I have been authorized, after consultation with the Director, Office of Enforcement, to issue the enclosed Notice of Violation and Proposed Imposition of Civil Penalty in the base amount of $60,000 for the Severity Level III violation.

After the pre-decisional enforcement conference, it became apparent that appropriate corrective actions had not been taken to restore the facility to compliance with the requirements of 10 CFR 50.59. We initiated discussions with your staff on March 23, 2004, to emphasize the need to return the facility to compliance with regulatory requirements. Although you expressed your disagreement with the NRC's conclusions that this issue represented a violation of 10 CFR 50.59 and that the facility was in non-compliance, you indicated that this issue would be entered into your corrective action program such that compensatory measures and/or corrective actions would be considered.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), which is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, the response should not include any personal privacy, proprietary, classified, or safeguards information so that it can be made available to the Public without redaction. The NRC also includes significant enforcement actions on its Web site at www.nrc.gov; select **What We Do**, **Enforcement**, then **Significant Enforcement Actions.**

Sincerely,

Luis A. Reyes
Regional Administrator

Docket Nos. 50-269, 50-270, 50-287
License Nos. DPR-38, DPR-47, DPR-55

Enclosures:
1. Notice of Violation
2. List of Attendees
3. Information Presented by NRC

4. Information Presented by DEC
5. NUREG/BR-0254 Payment Methods (Licensee only)

cc w/encls:
Noel Clarkson
Compliance Manager (ONS)
Duke Energy Corporation
Electronic Mail Distribution

L. E. Nickolson
Safety Assurance Manager (ONS)
Duke Energy Corporation
Electronic Mail Distribution

Lisa Vaughn
Duke Energy Corporation
Mail Code - PB05E
422 South Church Street
P.O. Box 1244
Charlotte, NC 28201-1244

Anne Cottingham
Winston and Strawn
Electronic Mail Distribution

Beverly Hall, Acting Director
Division of Radiation Protection
N. C. Department of Environmental
Health & Natural Resources
Electronic Mail Distribution

Henry J. Porter, Director
Div. of Radioactive Waste Mgmt.
S. C. Department of Health and
Environmental Control
Electronic Mail Distribution

R. Mike Gandy
Division of Radioactive Waste Mgmt.
S. C. Department of Health and
Environmental Control
Electronic Mail Distribution

County Supervisor of
Oconee County
415 S. Pine Street
Walhalla, SC 29691-2145

Lyle Graber, LIS
NUS Corporation
Electronic Mail Distribution

M. T. Cash, Manager
Regulatory Issues & Affairs
Duke Energy Corporation
526 S. Church Street
Charlotte, NC 28201-0006

Peggy Force
Assistant Attorney General
N. C. Department of Justice
Electronic Mail Distribution

NOTICE OF VIOLATION
AND
PROPOSED IMPOSITION OF CIVIL PENALTY

Duke Energy Corporation
Oconee Units 1, 2 and 3

Docket No. 50-269, 50-270, 50-287
License No. DPR-38, DPR-47, DPR-55
EA-04-018

During an NRC inspection completed on January 21, 2004, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the NRC proposes to impose a civil penalty pursuant to Section 234 of the Atomic Energy Act of 1954, as amended (Act), 42 U.S.C. 2282, and 10 CFR 2.205. The particular violation and associated civil penalty is set forth below:

> 10 CFR 50.59 (a)(1) (1999 edition) states in part, that the licensee may make changes in the facility as described in the safety analysis report without prior Commission approval, provided the proposed change does not involve an unresolved safety question. 10 CFR 50.59 (a)(2) states, in part, that a proposed change involves an unresolved safety question if the probability of occurrence or the consequences of a malfunction of equipment important to safety previously evaluated in the safety analysis report may be increased or if the possibility of an accident or malfunction different from any previously evaluated accident or malfunction may be created.
>
> Oconee Nuclear Station Updated Final Safety Analysis Report, Section 3.6.1.3, states that the analysis of effects resulting from postulated piping breaks outside containment is contained in Duke Power MDS Report No. OS-73.2, dated July 16, 1973 including supplement 2, dated March 12, 1974.
>
> Duke Power MDS Report No. OS-73.2 and supplement 2 credited secondary side cooling within 15 minutes of a high energy line break (HELB) and reactor coolant system makeup from high pressure injection (HPI) within one hour of an HELB.
>
> Contrary to the above, on May 17, 2001, the licensee made a change to the facility, as described in the Updated Final Safety Analysis Report, Section 3.6.1.3, and referenced analyses, that involved unreviewed safety questions without obtaining prior NRC approval. Specifically, the Duke Power MDS Report No. OS-73.2 and supplement calculation OSC-7299 were revised to increase the maximum initiation time of Emergency Feedwater following a HELB from 15 to 30 minutes and of HPI from one hour to eight hours. These changes resulted in an increase in the probability of occurrence or the consequences of a malfunction of equipment important to safety, and created the possibility of an accident or malfunction different from any previously evaluated.

This is a Severity Level III Violation (Supplement I).
Civil Penalty - $60,000.

Pursuant to the provisions of 10 CFR 2.201, Duke Energy Corporation is hereby required to submit a written statement or explanation to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, within 30 days of the date of this Notice of Violation and Proposed Imposition of Civil Penalty (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation; EA-04-018" and should include: (1) admission or denial of the alleged violation, (2) the reasons for the violation if admitted, and if denied, the reasons why, (3) the corrective steps that have been taken and the results achieved, (4) the corrective steps that will be taken to avoid further violations, and (5) the date when full compliance will be achieved. Your response may reference or include previously docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked or why such other action as may be proper should not be taken. Consideration may be given to extending the response time for good cause shown.

Within the same time as provided for the response required above under 10 CFR 2.201, the Licensee may pay the civil penalty proposed above in accordance with NUREG/BR-0254 and by submitting to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, a statement indicating when and by what method payment was made, or may protest imposition of the civil penalty in whole or in part, by a written answer addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission. Should the Licensee fail to answer within 30 days of the date of this Notice of Violation and Proposed Imposition of Civil Penalty, an order imposing the civil penalty will be issued. Should the Licensee elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalty, in whole or in part, such answer should be clearly marked as an "Answer to a Notice of Violation" and may: (1) deny the violation listed in this Notice, in whole or in part, (2) demonstrate extenuating circumstances, (3) show error in this Notice, or (4) show other reasons why the penalty should not be imposed. In addition to protesting the civil penalty in whole or in part, such answer may request remission or mitigation of the penalty.

In requesting mitigation of the proposed penalty(ies), the factors addressed in Section VI.C.2 of the Enforcement Policy should be addressed. Any written answer in accordance with 10 CFR 2.205 should be set forth separately from the statement or explanation in reply pursuant to 10 CFR 2.201, but may incorporate parts of the 10 CFR 2.201 reply by specific reference (e.g., citing page and paragraph numbers) to avoid repetition. The attention of the Licensee is directed to the other provisions of 10 CFR 2.205, regarding the procedure for imposing a civil penalty.

Upon failure to pay any civil penalty due which subsequently has been determined in accordance with the applicable provisions of 10 CFR 2.205, this matter may be referred to the Attorney General, and the penalty, unless compromised, remitted, or mitigated, may be collected by civil action pursuant to Section 234c of the Act, 42 U.S.C. 2282c.

The response noted above (Reply to Notice of Violation, statement as to payment of civil penalty, and Answer to a Notice of Violation) should be addressed to: Frank Congel, Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852-2738, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region II, and a copy to the NRC Resident Inspector at the facility that is the subject of this Notice.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 8th day of April 2004

LIST OF ATTENDEES

Nuclear Regulatory Commission:
L. Plisco, Deputy Regional Administrator, Region II (RII)
C. Casto, Director, Division of Reactor Safety (DRS), RII
L. Wert, Deputy Director, Division of Reactor Projects (DRP), RII
M. Lesser, Chief, Engineering Branch, DRS, RII
R. Haag, Chief, DRP, RII
W. Rogers, Senior Reactor Analyst, DRS, RII
C. Evans, Enforcement Officer and Regional Counsel, RII
S. Sparks, Senior Enforcement Specialist, RII
M. Scott, Senior Reactor Inspector, DRS, RII
M. Maymi, Reactor Inspector, DRS, RII
R. Taylor, Reactor Inspector, DRS, RII
M. Pribish, Project Engineer, DRP, RII
C. Nolan, Office of Enforcement
F. Akstulewicz, Office of Nuclear Reactor Regulation (NRR)
R. Franovich, NRR
L. Olshan, NRR
G. Hammer, NRR
E. McKenna, NRR

Duke Energy Corporation:
R. Jones, Senior Vice President, Oconee Nuclear Station
G. Swindlehurst, Manager of Safety Analysis
D. Baxter, Engineering Division Manager
L. Nicholson, Safety Assurance Manager
E. Burchfield, Special Assistant, Operations
D. Brewer, Probablistic Risk Assessment Manager
S. Newman, Regulatory Compliance
G. Davenport, Regulatory Compliance
T. Shafeek-Horton, Assistance General Counsel
N. Clarkson, Senior Engineer
D. Garland, Senior Engineer
K. Sandel, Engineer
S. Hart, Engineer
R. Huffman, Engineer, Dresser, Inc.

PREDECISIONAL ENFORCEMENT CONFERENCE AGENDA
OCONEE NUCLEAR STATION

MARCH 2, 2004, 1:30 P.M.
NRC REGION II OFFICE, ATLANTA, GEORGIA

I. OPENING REMARKS, INTRODUCTIONS, AND SUMMARY OF ISSUES
   L. Plisco, Deputy Regional Administrator

II. NRC ENFORCEMENT POLICY
   C. Evans, Director, Enforcement and Investigation Coordination Staff

III. STATEMENTS OF CONCERNS / APPARENT VIOLATION
   C. Casto, Director, Division of Reactor Safety

IV. LICENSEE PRESENTATION

V. BREAK / NRC CAUCUS

VI. NRC FOLLOWUP QUESTIONS

VII. CLOSING REMARKS
   L. Plisco, Deputy Regional Administrator

Enclosure 3

Apparent Violation[1]

10 CFR 50.59 (a)(1) (1999 edition) states in part, that the licensee may make changes in the facility as described in the safety analysis report without prior Commission approval, provided the proposed change does not involve an unresolved safety question. 10 CFR 50.59 (a)(2) states, in part, that a proposed change involves an unresolved safety question if the probability of occurrence or the consequences of a malfunction of equipment important to safety previously evaluated in the safety analysis report may be increased or if the possibility for an accident or malfunction different from any previously evaluated may be created.

[1] Apparent violations discussed at this conference are pre-decisional and are subject to change.

On May 17, 2001, the licensee made a change to the facility, as described in the Updated Final Safety Analysis Report, Section 3.6.1.3, associated with the High Energy Line Break (HELB) analysis, which involved unreviewed safety questions, and failed to obtain prior NRC approval. Specifically, calculation OSC-7299 was changed to increase the maximum initiation time of Emergency Feedwater following HELB from 15 to 30 minutes and of High Pressure Injection from 1 hour to 8 hours. The analysis discussed increased cycling of pressurizer Safety Relief Valves on steam and water and, boiler condenser mode of decay heat removal, and a computer code for application to HELB, but failed to recognize that such changes may increase the probability of occurrence or the consequences of a malfunction of equipment important to safety or may create an accident different from any previously evaluated.

[1] Apparent violations discussed at this conference are pre-decisional and are subject to change.

Distribution w/encls:
W. Travers, EDO
S. Collins, NRR
W. Borchardt, NRR
L. Chandler, OGC
D. Dambly, OGC
E. Julian, SECY
B. Keeling, OCA
Enforcement Coordinators
RI, RIII, RIV
E. Hayden, OPA
G. Caputo, OI
H. Bell, OIG
C. Carpenter, NRR
M. Johnson, NRR
R. Franovich, NRR
F. Congel, OE
L. Plisco, RII
V. McCree, RII
L. Wert, RII
C. Casto, RII
M. Lesser, RII
W. Rogers, RII
R. Haag, RII
S. Sparks, RII
M. Shannon, RII
C. Evans, RII
R. Carroll, RII
R. Hannah, RII
K. Clark, RII
PUBLIC
OEMAIL
OEWEB

OFFICE	RII:DRS	RII:DRS	RII:DRS	RII:EICS	OGC	OE	NRR/DIPM
SIGNATURE	/RA/	/RA/	/RA/CHRISTENSEN		/RA/EMAIL	/RA/EMAIL	/RA/EMAIL
NAME	MLESSER	WROGERS	CCASTO	CEVANS	DDAMBLY	FCONGE	BBOGER
DATE							

OFFICIAL RECORD COPY DOCUMENT NAME: M:\ENFORCE\04Cases\018Oco\Copy of Final 1.Oconee.OE.wpd

Distribution w/encls:
W. Travers, EDO
S. Collins, NRR
W. Borchardt, NRR
L. Chandler, OGC
D. Dambly, OGC
E. Julian, SECY
B. Keeling, OCA
Enforcement Coordinators
  RI, RIII, RIV
E. Hayden, OPA
G. Caputo, OI
H. Bell, OIG
C. Carpenter, NRR
M. Johnson, NRR
R. Franovich, NRR
F. Congel, OE
L. Plisco, RII
V. McCree, RII
L. Wert, RII
C. Casto, RII
M. Lesser, RII
W. Rogers, RII
R. Haag, RII
S. Sparks, RII
M. Shannon, RII
C. Evans, RII
R. Carroll, RII
R. Hannah, RII
K. Clark, RII
PUBLIC
OEMAIL
OEWEB

OFFICE	RII:DRS	RII:DRS	RII:DRS	RII:EICS	OGC	OE	NRR/DIPM
SIGNATURE	[signature]	W Rogers	[signature] for	CDM for			
NAME	MLESSER	WROGERS	CCASTO	CEVANS	DDAMBLY	FCONGEL	BBOGER
DATE	4/7/04	4/7/04	4/7/04	4/7/04			

OFFICIAL RECORD COPY DOCUMENT NAME: A:\Copy of Final 1.Oconee.OE.wpd

Oconee Nuclear Station

Predecisional Enforcement
Conference

March 2, 2004

Duke Energy

Participants

Name	Title
Ron Jones	Site Vice President
Dave Baxter	Engineering Division Manager
Larry Nicholson	Manager – Safety Assurance
Ed Burchfield	Operations
Gregg Swindlehurst	Manager – Safety Analysis
Duncan Brewer	Manager – Severe Accident Analysis

Duke Energy

Agenda

- Opening Remarks – Larry Nicholson
- NRC Apparent Violation and Duke's Position – Larry Nicholson
- 50.59 Evaluation – Ed Burchfield
- NRC Concerns – Ed Burchfield, Gregg Swindlehurst
- Severity Level & Risk Insights – Duncan Brewer
- Regulatory Significance and Considerations – Larry Nicholson
- Closing Remarks – Ron Jones

Duke Energy

NRC Apparent Violation

- Three Issues:
  - Additional cycles of pressurizer safety valves and relief on both steam and water
  - Increased stresses on steam generator tubes during boiler-condenser mode (BCM) of operation
  - Concerns related to operation in BCM
    - Use of RELAP5 transient analysis methodology
    - Use of BCM for high-energy line break (HELB)
    - Recriticality concerns (boron dilution)
    - Stresses on RCS components

Opening Remarks

- Duke agrees that the 50.59 evaluation was not thoroughly documented
- Duke disagrees that a USQ exists
- Duke has revised the 50.59 evaluation to address documentation issues
- Corrective actions are being implemented
- Issue is not safety significant

Duke Energy

50.59 Evaluation - Background

- Background
  - One HELB scenario assumed to damage 4kV switchgear TC, TD and TE
    - Leads to unit blackout
    - Leads to loss of all feedwater (until EFW restored)
  - Original 1973 HELB Report in MDS OS-73.2 and referenced in UFSAR
    - Credited EFW restoration within 15 minutes to maintain hot shutdown, and
    - Credited HPI restoration prior to initiation of plant cooldown
  - Duke reanalyzed 4kV HELB scenario in 1998/1999

50.59 Evaluation - Background

- Background (continued)
  - 1999 EOP project thoroughly validated the EOP
    - Improved focus on restoration of secondary side cooling
  - In 4 kV HELB scenario, secondary side heat removal can be restored three ways:
    - Manually start TDEFWP
    - Cross-connect EFW between units
    - SSF ASW
  - RCS makeup provided by HPI

50.59 Evaluation

- Validation of restoration of EFW for 4kV HELB scenario
  - Could meet 15 minutes for TDEFWP and SSF ASW
  - Could not consistently meet 15 minutes to cross-connect EFW from unaffected unit
- Thermal hydraulic analysis demonstrates adequate core cooling is maintained with:
  - Secondary side cooling restored at 30 minutes
  - HPI restored prior to plant cooldown (up to 8 hours)
- UFSAR change pursued to reflect actual design margin in 4kV HELB scenario

Duke Energy.

PSV Water Relief and Valve Cycling - Technical Perspective

- EPRI test data indicate safety valves are susceptible to valve chatter under the following conditions
  - Highly subcooled liquid discharge
  - Long inlet piping configuration
  - Improper ring settings
- ONS Configuration
  - 4kV HELB scenario results in high temperature (620-650F), slightly subcooled discharge
  - ONS has very short inlet piping configuration compared to EPRI tests
  - Ring settings at ONS are reflective of valves that do not chatter
- Zero EPRI test cases of valve chatter for conditions comparable to ONS design and 4kV HELB scenario

PSV - Vendor And Testing Information

- Recent Dresser information supports the PSV capability for water relief and multiple cycles
  - Dresser information reinforces conclusion of EPRI testing
  - Manufacturer states: *"with appropriate inlet configurations sufficient flashing occurs through the valve when it lifts on saturated water and that valve performance should be similar to that on saturated steam. Therefore, the cycle life on saturated water should be similar to that of saturated steam."*
- ONS testing frequency exceeds OM-1 Code requirements
  - ONS conducts testing on both PSV's each RFO
- ONS Maintenance exceeds industry norm
  - All ONS PSV's have been refurbished in the last 3 years

PSV - EPRI Sample Size Concern

- Valve would be performing its qualified function
  - NRC closed TMI action item II.D.1 in July 19, 1989 letter, NUREG-0737 SER
- High water temperature during HELB is consistent with stable PSV operation
- Oconee 4kV HELB scenario is bounded by EPRI test conditions and NRC post-TMI SER
- EPRI testing
  - Joint industry, EPRI, and valve manufacturer venture
  - Sufficient to close out post-TMI action items for steam and water relief
  - Considered by Staff as sufficient to close out post-TMI action item for steam and water relief
- NRC's concern represents a change in regulatory position

PSV Water Relief and Valve Cycling - Regulatory Perspective

- ONS UFSAR analyses do not assume failures to close for primary or secondary spring-loaded relief valves
- Liquid relief function approved in post-TMI SER
  - Duke Westinghouse plants have NRC-approved topical report crediting PSV water relief with water > 500F
- PSV is functioning within its qualified envelope
- From a review of the EPRI Test Report, the small number of additional valve cycles during the analyzed event would appear to be an insignificant factor to consider

PSV Water Relief and Valve Cycling - Regulatory Perspective

- URI 01-09-01 – Establishment of Code Safety Relief Valves To Pass Water in Excess of 500 Degrees F and Then Reseat
- NRC Inspection Report 02-07 closed out URI 01-09-01 and concluded:
  - Currently installed valves would reseat
  - Issue does not affect operability or reliability of a mitigating system function

Duke Energy

Effect of Delayed EFW on Steam Generator Tubes

- A delay in EFW restoration causes the RCS and the SG tubes to heat up
- An increase in SG tube temperature increases the tube-to-shell delta-T compressive load
- HELB tube load has since been determined to be bounded by previous FANP analysis
- No tubes will fail for HELB scenario

BCM - Approved Methodology

- In 1973, no RCS cooling mode or method of evaluation was specified or established for HELB
- HELB analysis is consistent with NRC-approved use of RELAP5 model for SBLOCA
- BCM is part of the expected plant response to a SBLOCA

Duke Energy

BCM - Approved Methodology

- BCM was formally reviewed by NRC as part of the SBLOCA analysis
  - FANP topical report BAW-10164-P, (RELAP5 MOD2 B&W)
  - FANP topical report BAW-10192PA, (LOCA)
  - Duke Topical Report DPC-NE-3003-PA (RELAP5 M&E)
- NRC approved RELAP5 for SBLOCA analyses including BCM
- If licensing basis has been specific regarding RCS cooling mode (e.g., natural circulation), Duke would have considered NRC approval necessary for this change

BCM - Approved Methodology

- 3 NRC-approved topical reports detailed Duke's computer analysis for UFSAR thermal-hydraulic transients and accidents
  - DPC-NE-3000 – Thermal-Hydraulic Transient Analysis Methodology
  - DPC-NE-3003 – Mass and Energy Release and Containment Response Methodology
  - DPC-NE-3005 – UFSAR Chapter 15 Transient Analysis Methodology
- Full scope methodology except for LOCA Peak Clad Temperature (PCT) which is performed by FANP
- NRC approved computer codes used are RETRAN-2, RETRAN-3D, VIPRE-01, SIMULATE, RELAP5 MOD2-B&W, FATHOMS and GOTHIC

Duke Energy

BCM - Approved Methodology

- Approved methodology has been submitted for NRC review for application to UFSAR Section 6.2 and Chapter 15 (except LOCA PCT)
- Same computer codes have been used for a broad scope of additional thermal-hydraulic applications in support of Oconee
- Results of some of these additional applications have been submitted on the Oconee docket in response to NRC bulletins, Generic Letters or other issues
  - Prior NRC review and approval has not been an issue
  - Typical of the industry

Duke Energy

BCM - Approved Methodology

- Duke switched from RETRAN to RELAP5 due to higher void fractions in the HELB analysis
- Duke's position is that NRC approval for other applications (like HELB) is not required.
- NRC did not review HELB methodologies
- Typical of the industry
- Under the new 50.59 rule the change from FANP to RETRAN and from RETRAN to RELAP5 would not require NRC review, since the HELB methodology was not stated in the UFSAR

BCM - May Challenge RCS Components

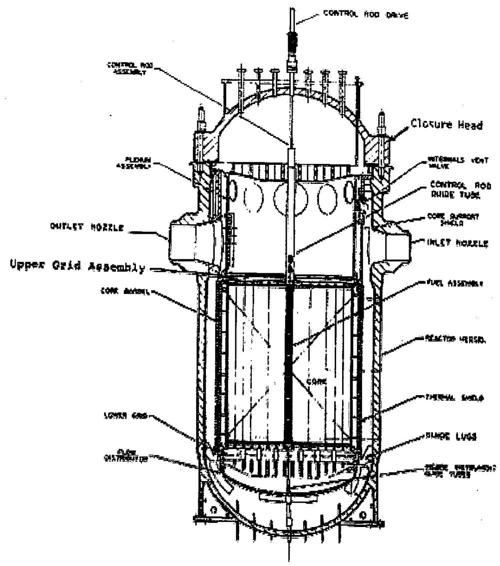
- Duke consulted with FANP on this concern
  - FANP replied that they know of no dynamic loading issues with BCM
- Integral test loops in BCM have not experienced any dynamic events

BCM - Recriticality Concern

- B&W Preliminary Safety Concern addressed by FANP for B&W Owner's Group
  - Study concluded that potential consequences of reactor coolant pump restart following BCM were unacceptable (except towards end of cycle) – EOP revisions implemented
  - Study concluded that potential consequences of restart of natural circulation were acceptable – no EOP revisions necessary

Duke Energy

BCM - Recriticality Concern



BCM - Recriticality Concern

- During BCM, boron mixing in Reactor Vessel (RV) occurs via recirculation flow (internals vent valves & core baffle bypass)
- BCM condensate flowrate is a small fraction of the vessel recirculation flow
- Restart of natural circulation, following HPI restoration, is the same as for the SBLOCA evaluated by FANP.

Safety Significance

- Safety Significance Evaluation considers actual plant configuration
- Best estimate assumptions are used – not design basis
- Several methods available for Secondary Side Heat Removal
  - TDEFW Pump (manual start)
  - SSF ASW Pump
  - EFW cross-connect from another unit

Safety Significance

- Key Inputs/Assumptions
  - HELB Frequency (2.2E-04/yr)
    - Duke uses an approved statistical method slightly different from ASP report
    - Capacity factor, 0.9
    - Certain AS breaks are excluded – no water relief is possible for 30 minutes
  - SSF Failure Rate (0.082)
    - Updated maintenance, reliability values
    - Excluded diesel run failure

Safety Significance

- Key Inputs/Assumptions (con't)
  - RCP Seal Failures (0.21)
    - Rhodes Model
  - Manually align TD EFW Pump (1.9E-01)
    - Human error probability, 1.7E-01
    - Hardware failures, 2.2E-02
  - Credit for auto-start will be possible for most scenarios (maybe all scenarios)

Safety Significance

- Key Inputs/Assumptions (con't)
  - Base case
    - assumed all successful EFW x-connect alignments accomplished in 15 minutes
    - Validation Times
      - X-connect (average) 12 minutes
      - X-connect (maximum) 19 minutes
      - TD EFW (all cases) < 15 minutes
      - SSF ASW (all cases) < 15 minutes
    - Relief valve failure rate, steam (9.6E-03)

Safety Significance

- Key Inputs/Assumptions (con't)
  - After 50.59 Change
    - assumed all successful EFW x-connect alignments accomplished in 30 minutes
    - Validation Times
      - X-connect (average) 21 minutes
      - X-connect (maximum) 22 minutes
      - TD EFW (all cases) < 15 minutes
      - SSF ASW (all cases) < 15 minutes
    - Relief valve failure rate, water (0.1)

Duke Energy

Safety Significance

- Actual Change in Core Melt Risk
  - Minimal, Delta CDF = 5.5E-07

Duke Energy Actual Influence on Regulatory Action

- 50.59 was not thoroughly documented
- Prompt and comprehensive CAs
  - Rewrite of 50.59 to address documentation issues
  - Root Cause investigation in progress
- Not a programmatic breakdown
- Individuals involved were qualified and experienced 50.59 evaluators
- Conclusions represent good faith engineering judgments
- Escalated enforcement not justified
  - Issue is not safety significant
  - Duke addressing licensing basis and 50.59 enhancements
    - Duke involved in HELB reconstitution
    - Duke addressing EFW system vulnerabilities

Current 50.59 Program

- Revised for current regulation
- Consistent with NEI 96-07, rev. 1
- Improved training introduced when new rule rolled out
- Program has been audited and inspected with no major deficiencies noted

Duke Energy

Summary

- Duke agrees 50.59 evaluation was not thoroughly documented
- Duke disagrees that USQ exists
  - Supporting documentation provides justification for conclusion reached
  - Duke has revised 50.59 to address NRC concerns and the same conclusions have been reached – no USQ exists
- Corrective actions are in progress to address 50.59 weakness
- Low safety significance
- Not demonstrative of 50.59 programmatic breakdown
- Escalated enforcement not justified

Closing Remarks

APPROVED BY OMB: NO. 3150-0190

Estimated burden per response to comply with this voluntary collection request: 5 minutes. This collection solicits information that will allow the respondent to transfer funds electronically. Forward comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0190), Office of Management and Budget , Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

The following are payment methods accepted by the NRC for payment of a proposed or imposed civil penalty, a full cost licensing or inspection invoice, a new license application fee or a revision to a reciprocity application:

1. PAYMENT BY ACH

The ACH (Automated Clearinghouse) Network is a highly reliable and efficient nationwide batch-oriented electronic funds transfer system governed by ACH operating rules which provide for the interbank clearing of debit and credit transactions and for the exchange of information among participating financial institutions.

A growing number of transactions involving the collection of funds by Federal agencies are being made through the ACH Network. The Federal government is the largest single user of the ACH Network, originating and receiving millions of transactions each month. At NRC, collections via the ACH Network have been increasing each year since 1996. In FY 1999, the NRC increased its collections using ACH 2-fold over collections received in FY 1998.

ACH offers several advantages over checks:

- Preferred method of payment
- Provides automatic bill payment
- Eliminates postage fees
- Eliminates lost check
- Eliminates late payments and associated late charges
- Reduces check writing and reconciliation fees
- Least expensive of all electronic collection systems
- Both payment and refunds (debits and credits) can be processed through the ACH network

To respond to the growing needs of companies to electronically send payment information as well as payments between trading partners, the ACH system incorporated Corporate-to-Corporate payments. Because of the importance to move information quickly NRC can now accept electronic payment through our Corporate-to-Corporate payment program.

You may print a copy of NRC Form 628 FINANCIAL EDI AUTHORIZATION from the NRC web site at http://www.nrc.gov. Select Planning and Financial Management and then select the License Fee Program.

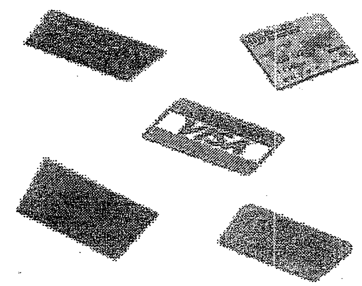
You may also obtain a copy of the form by calling Leah Tremper at 301-415-7347.

2. PAYMENT BY CREDIT CARD

The NRC is currently accepting credit cards for payment of annual fees, full cost licensing and inspection fees, new license fees, revisions to reciprocity applications, civil penalties and other fees. We accept Visa, MasterCard, Diners Club, American Express, Discover, and USA Cards. If you wish to pay by credit card, complete the authorization form included with your invoice or civil penalty. You may also print a copy of the form from the NRC web site. The URL is http://www.nrc.gov. Select Planning and Financial Management and then select the License Fee Program. The form is NRC Form 629, AUTHORIZATION FOR PAYMENT BY CREDIT CARD.

Mail Credit Card Authorization to:

U.S. Nuclear Regulatory Commission
License Fee and Accounts Receivable Branch
P.O. Box 954514
St. Louis, MO 63195-4514



or

Fax the Credit Card Authorization Form to Brenda Green or Leah Tremper at (301) 415-5387. You can e-mail Brenda Green at bmg@nrc.gov or Leah Tremper at lpt@nrc.gov.

Be sure to reference your invoice number if you are paying a bill. If you are submitting an application fee for a new license or revision to a reciprocity application, just state this in the invoice field.

If you are paying a civil penalty, reference the EA number in the invoice field.

3. PROCEDURES FOR ELECTRONIC FUNDS TRANSFER

The NRC can receive funds through the U.S. Department of the Treasury (Treasury) Fedwire Deposit System. The basic wire message format below complies with the Federal Reserve Board's standard structured third-party format for all electronic funds transfer (EFT) messages.

APPROVED BY OMB: NO. 3150–0190

Estimated burden per response to comply with this voluntary collection request: 5 minutes. This collection solicits information that will allow the respondent to transfer funds electronically. Forward comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0190), Office of Management and Budget , Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

The following are payment methods accepted by the NRC for payment of a proposed or imposed civil penalty, a full cost licensing or inspection invoice, a new license application fee or a revision to a reciprocity application:

1. PAYMENT BY ACH

The ACH (Automated Clearinghouse) Network is a highly reliable and efficient nationwide batch-oriented electronic funds transfer system governed by ACH operating rules which provide for the interbank clearing of debit and credit transactions and for the exchange of information among participating financial institutions.

A growing number of transactions involving the collection of funds by Federal agencies are being made through the ACH Network. The Federal government is the largest single user of the ACH Network, originating and receiving millions of transactions each month. At NRC, collections via the ACH Network have been increasing each year since 1996. In FY 1999, the NRC increased its collections using ACH 2-fold over collections received in FY 1998.

ACH offers several advantages over checks:

- Preferred method of payment
- Provides automatic bill payment
- Eliminates postage fees
- Eliminates lost check
- Eliminates late payments and associated late charges
- Reduces check writing and reconciliation fees
- Least expensive of all electronic collection systems
- Both payment and refunds (debits and credits) can be processed through the ACH network

To respond to the growing needs of companies to electronically send payment information as well as payments between trading partners, the ACH system incorporated Corporate-to-Corporate payments. Because of the importance to move information quickly NRC can now accept electronic payment through our Corporate-to-Corporate payment program.

You may print a copy of NRC Form 628 FINANCIAL EDI AUTHORIZATION from the NRC web site at http://www.nrc.gov. Select Planning and Financial Management and then select the License Fee Program.

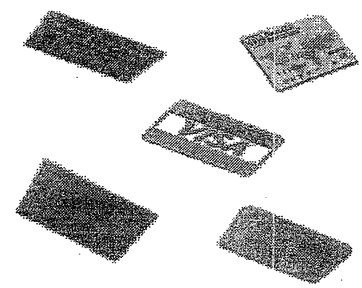
You may also obtain a copy of the form by calling Leah Tremper at 301-415-7347.

2. PAYMENT BY CREDIT CARD

The NRC is currently accepting credit cards for payment of annual fees, full cost licensing and inspection fees, new license fees, revisions to reciprocity applications, civil penalties and other fees. We accept Visa, MasterCard, Diners Club, American Express, Discover, and USA Cards. If you wish to pay by credit card, complete the authorization form included with your invoice or civil penalty. You may also print a copy of the form from the NRC web site. The URL is http://www.nrc.gov. Select Planning and Financial Management and then select the License Fee Program. The form is NRC Form 629, AUTHORIZATION FOR PAYMENT BY CREDIT CARD.

Mail Credit Card Authorization to:

U.S. Nuclear Regulatory Commission
License Fee and Accounts Receivable Branch
P.O. Box 954514
St. Louis, MO 63195-4514



or

Fax the Credit Card Authorization Form to Brenda Green or Leah Tremper at (301) 415-5387. You can e-mail Brenda Green at bmg@nrc.gov or Leah Tremper at ipt@nrc.gov.

Be sure to reference your invoice number if you are paying a bill. If you are submitting an application fee for a new license or revision to a reciprocity application, just state this in the invoice field.

If you are paying a civil penalty, reference the EA number in the invoice field.

3. PROCEDURES FOR ELECTRONIC FUNDS TRANSFER

The NRC can receive funds through the U.S. Department of the Treasury (Treasury) Fedwire Deposit System. The basic wire message format below complies with the Federal Reserve Board's standard structured third-party format for all electronic funds transfer (EFT) messages.