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RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Responds to NRC 980504 ltr re violations noted in insp repts 50-269/98-03,50-270/98-03 & 50-287/98-03.Corrective actions: documented event in Duke's corrective actions program & commence operability evaluations.

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June 4, 1998

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Subject: Oconee Nuclear Site
Docket Nos. 50-269, -270, -287
Inspection Report 50-269, -270, -287/98-03
Reply to Notices of Violation

Gentlemen:

By letter dated May 4, 1998, the NRC issued three Notices of Violation as described in Inspection Report No. 50-269/98-03, 50-270/98-03, and 50-287/98-03.

Duke Energy Corporation (Duke) is denying two of the violations cited in the inspection report and accepting one of the violations. Duke's explanation of the denials is provided in Attachments 1 and 2. Specifically, Duke requests that the staff reconsider Violation 98-03-01 based on the attached description of Duke's reportability process and how it satisfies the regulatory requirements and guidance. Duke is denying Violation 98-03-02 because the subject Penetration Room Ventilation System surveillance activities are conservative with respect to technical specification requirements and therefore meet or exceed the technical specification requirements. Duke requests that the NRC staff review the information provided in response to these two violations and reconsider the need to cite these items as violations.

Duke Energy Corporation (Duke) is accepting Violation 98-03-07. As described in Attachment 3, Duke is proposing corrective actions to address the root causes of this violation.

Pursuant to the provisions of 10 CFR 2.201, the attachments provide written responses to the subject violations as identified in the subject Inspection Report.

Corrective actions in Section 3 of each response are the only regulatory commitments in this submittal.

1/1
IE01

Very truly yours,

W. R. McCollum, Jr.
Site Vice President
Oconee Nuclear Station

Attachments (3)

cc: Mr. L. A. Reyes, Regional Administrator
U. S. Nuclear Regulatory Commission, Region II

Mr. D. E. LaBarge, Project Manager
Office of Nuclear Reactor Regulation

Mr. M. A. Scott
Senior Resident Inspector
Oconee Nuclear Site

bcc: M. K. Nazar
W. W. Foster
J. S. Forbes
P. R. Newton
C. A. Little
T. D. Curtis
J. E. Burchfield
L. A. Keller - G.O.
M. S. Kitlan - CNS
M. T. Cash - MNS
J. E. Smith
ELL - EC05O
NSRB - EC05N
NRC Commitments
Bob Gill

Attachment 1
Reply to Notice of Violation (Reply)
Violation 98-03-01

Restatement of the Violation

10 CFR 50.73 requires, in part, that the licensee shall submit a Licensee Event Report (LER) within 30 days of the discovery of the nuclear power plant being in a condition that was outside the design basis of the plant or in an unanalyzed condition that significantly compromised plant safety.

10 CFR 50.72 requires, in part, that the licensee shall notify the NRC within four hours of the occurrence of any event, found while the reactor is shut down, that, had it been found while the reactor was in operation, would have resulted in the nuclear power plant, including its principal safety barriers, being seriously degraded or being in an unanalyzed condition that significantly compromises plant safety.

Contrary to the above, the licensee did not adequately implement the timeliness requirements of 10 CFR 50.73 and 10 CFR 50.72 for reporting design basis events or conditions in the following examples. These examples include six untimely 50.73 reports and five untimely 50.72 reports.

LER Number	LER Title	Condition Identified	Reportability Determined	LER Date
269/97-03	Post LOCA Boron Dilution Design Bases Not Met Due to Deficient Design Analysis	1/21/97	3/17/97*	4/16/97
270/96-07	LPI System Technically Inoperable for Appendix R Scenario	12/5/96	12/19/96*	1/16/97
270/96-01	Post LOCA Boron Dilution Basis Not Met Due to Inadequate Work Practices	3/28/96	4/16/96*	5/15/96
269/96-03	RCP Makeup Pump System Technically Inoperable for Appendix R Scenario Due to Design Analysis	2/5/96	2/14/96**	3/12/96

Attachment 1
Reply to Notice of Violation (Reply)
Violation 98-03-01

LER Number	LER Title	Condition Identified	Reportability Determined	LER Date
269/95-06	LPI Technically Inoperable Due to Design Deficiencies	6/21/95	7/25/95*	8/23/95
269/95-03	LPI System Technically Inoperable Due to a Design Analysis	12/27/94	1/31/95*	3/2/95

*NOTE: A 50.72 report was made on this condition on this date.
**NOTE: No 50.72 report required.

This is a Severity Level IV violation (Supplement 1).

OCONEE REPLY TO NRC NOTICE OF VIOLATION 98-03-01

Reasons for Denial of the Violation

Duke Energy Corporation (Duke) denies the violation. Duke clearly understands the importance of making timely notifications to the Commission in accordance with the requirements of 10 CFR 50.72 and 10 CFR 50.73. It is Duke's belief that its reporting process meets the regulatory requirements and is consistent with Commission regulatory guidance in NUREG-1022, Rev. 1 ("Event Reporting Guidelines 10 CFR 50.72 and 50.73") (January 1998).

In the response below, we describe Duke's reportability process and how this process is based on regulatory guidance. These sections form the basis of Duke's position that its reporting process is in conformance with NRC reporting requirements. In essence, the issue is whether NRC regulations permit some appropriate time for evaluation prior to the reporting requirements of 50.72 and 50.73 being triggered. The NOV cites six examples of reportable design conditions and bases its conclusion of untimeliness on the premise that the "discovery" of the condition (and, therefore, the initiation of the time period for reporting) occurs at the moment the Problem Investigation Process (PIP) begins. The NOV equates the occurrence or discovery of a condition to the initiation of a PIP and does not

allow time for an evaluation to determine if an issue is reportable. Inspection Report 98-03 states that licensee management described Duke's reportability process as allowing "up to 60 days from the discovery of a condition to issue an LER, if that condition required engineering or management review to determine reportability." Duke's process allows only 30 days to submit an LER *after the date on which a condition is discovered to be reportable.* It may be that Duke has done an inadequate job to date explaining the requirements of its process to the NRC staff. Duke believes its process is consistent with all applicable regulations.

Duke Reportability Process

Duke's reportability process was developed to satisfy the requirements of 10 CFR 50.72 and 50.73 and considers the guidance in Generic Letter 91-18 and NUREG-1022, Rev. 1. Operability and reportability determinations are made commensurate with the safety significance of the system, structure, or component in question. Duke's reportability process is set forth in Nuclear System Directive (NSD) 202, Reportability, and has been in effect since 1992. This process has assured that the staff is promptly notified of actual conditions in the plant that may warrant immediate agency attention. In addition, LERs are submitted within a time frame to allow the agency to fulfill its obligation to review industry operating experience and appropriately revise the regulatory framework to assure adequate protection of the public. Moreover, based on information gathered at industry workshops and interaction with other licensees, Duke does not believe that its reportability process is an outlier in the industry. Section 202.5.3.1 of NSD 202 emphasizes that prompt NRC notification is necessary as soon as a reportable condition is established, whether or not the requisite evaluation is fully complete. NSD 202 states:

> "An evaluation should generally proceed on a schedule commensurate with the safety significance of the question. Whenever a reasonable expectation of operability of the equipment in question no longer exists, or significant evidence is present to refute operability, the equipment should be considered inoperable and appropriate actions, including reporting, should be taken promptly."

Note that the evaluation begins when an initial question is raised. The existence of a question may not reveal a reportable condition, which may be discovered later, during the evaluation process. The events are not always simultaneous. Duke's reportability process follows the timeliness requirements of Sections 50.72 and 50.73 once a reportable condition is identified.

Further station guidance regarding timeliness of reporting is provided in Section 202.5.3.1 of NSD 202, which states, in part:

> "It is more important that the NRC be quickly made aware of the situation than it is for the station to answer every NRC question at the time of the initial notification. In other words, when evaluating a potentially reportable item, and there is doubt regarding whether to report or not, the NRC's policy is that licensees should make the report."

The occurrence or discovery of some reportable events, such as a reactor trip, ES actuation, or shutdown required by Technical Specifications is easily identified. The reportability clock starts at the time the event occurs. The Operations Shift Manager makes these reports within the appropriate one hour or four hour time requirements of 10 CFR 50.72. In addition, LERs are submitted within 30 days of the event, as required by 10 CFR 50.73.

However, in some instances, the need for reporting to the NRC under Sections 50.72 and 50.73 may not be self-evident. This may be particularly true for some design conditions, such as the six examples cited in the NOV. Past operability is a structured process used by Duke to evaluate these potentially reportable conditions. NSD 203, Operability, specifically addresses past operability evaluations in Section 203.6.3. This NSD allows a reasonable amount of time to determine past operability since the issue may be complex and a detailed evaluation may be necessary to determine if the structure, system, or component in question could have performed its intended function under past conditions. If, at any time during the evaluation process, the system, structure, or component is determined to have been inoperable in the past, a reportability determination is required immediately.

For example, an operator may raise a question regarding the performance of an SSC. If the answer to the question is not

readily apparent based on discussions with Engineering and a review of available licensing and engineering documentation, a PIP would be initiated and Engineering would evaluate the question. The engineer would initiate the necessary analyses to address the issue. In most instances, the analyses would support a finding that the SSC is operable. However, in some cases, additional analysis by the engineer may conclude that the SSC was not capable of performing its intended safety function in the past. If during the course of reviewing the issues associated with this question, the engineer gathers enough information to support a finding that the SSC had been inoperable, the reportability process would commence at that time. The issue would be promptly reported as appropriate per Section 50.72 and an LER would be submitted within 30 days of this determination.

NRC Regulatory Guidance Regarding Timeliness of Reportability

NRC reporting requirements in 10 CFR 50.72 concerning certain non-emergency events require licensees to notify the NRC "as soon as practical," and in all cases within either one hour or four hours, "of the occurrence" of such events or conditions. Parallel NRC reporting provisions in 10 CFR 50.73 require that licensees submit a Licensee Event Report (LER) for any event of the type described in Section 50.73(a) "within 30 days after the discovery of the event." The terms "occurrence" and "discovery" are not defined in Sections 50.72 and 50.73. Moreover, the regulations do not distinguish between the discovery or occurrence of potentially reportable current events or conditions and the discovery or occurrence of past events where the condition has since been rectified.

In making timeliness determinations for reporting purposes consistent with the regulatory requirement, NRC licensees also rely upon established regulatory guidance from the Commission. Relevant portions of NUREG-1022, Rev. 1 are set forth below.

> "Section 50.73 requires submittal of an LER "within 30 days after the discovery" of a reportable event.
>
> Many reportable events are discovered when they occur. However, if the event is discovered at some later time, the discovery date is when the reportability clock starts under 10 CFR 50.73.

> Discovery date is *generally* the date when the event was discovered rather than the date when an evaluation of the event is completed. For example, if a technician sees a problem, but a delay occurs before an engineer or supervisor has a chance to review the situation, the discovery date (which starts the 30-day clock) is the date that the technician sees a problem.
>
> In some cases, such as the discovery of an existing but previously unrecognized condition, *it may be necessary to undertake an evaluation in order to determine if an event or condition is reportable.* If so, the guidance provided in Generic Letter 91-18 … which applies primarily to operability determinations, is appropriate for reportability determinations as well. This guidance indicates that, whenever reasonable expectation that the equipment is operable no longer exists, or significant doubts begin to arise, appropriate actions, including reporting, should be taken." (NUREG 1022, Rev. 1, at 17) (emphasis added).

NUREG-1022 provides no further guidance beyond the language in the regulation regarding timeliness of reporting per Section 50.72. Reportability under Section 50.72 is tied to the "occurrence" of an event or condition. The "occurrence" of a design condition via an engineering review is not addressed.

As cited above, NUREG-1022, Rev. 1, acknowledges that, in some situations, an evaluation may be required to determine operability and subsequent reportability. In such instances, the NRC guidance directs licensees to NRC Generic Letter 91-18 to establish whether or not the plant may continue to operate, determine what actions are required on the part of the licensee to justify continued operation, and report the condition to the NRC. For example, Section 6.1 (at p. 8) directs that once a degraded or nonconforming condition of specific SSCs is identified, "an operability determination should be made as soon as possible consistent with the safety importance of the SSC affected." See also Section 5.5 (at p. 7), which states in pertinent part:

> "Timeliness of operability determinations should be commensurate with the safety significance of the issue. Once the deficiency has been identified and the specific component or system has been identified, the

determination can be made regarding the capability to perform the specified function(s). There is not an explicit requirement in the regulations for the timing of the decision."

In sum, Generic Letter 91-18 evaluations require timely action by licensees *commensurate with the safety significance of the system, structure, or component in question.* "Discovery" is not defined, and no finite time requirements are established. According to the Generic Letter, inoperability requires a Section 50.73 reportability evaluation.

Duke's Position

In many cases, such as with the six examples, the initiation of a PIP should not trigger a reporting requirement. Duke management encourages a low threshold for the identification of potential problems through initiation of a PIP. For example, an engineer may determine that an engineering calculation is outdated and should be reconstituted. A PIP is initiated to track resolution of the engineer's questions related to the original calculation. Because of the complex nature of the engineering problem, it is expected to take weeks to reconstitute the calculation. After two weeks of engineering work, the engineer obtains updated vendor information that raises questions regarding operability of the system. At this time, if the evidence supports a finding that the discrepancy may make the system inoperable, or uncertainty regarding operability exists, a prompt notification to the Operations Shift Manager would be made to declare the system inoperable and the reporting requirements of 10 CFR 50.72 and 50.73 would be triggered once the OSM determines inoperability.

Duke's operability evaluations proceed on a time frame commensurate with the safety significance of the issue, consistent with the guidance in Generic Letter 91-18. If doubts regarding operability exist during the review of a question, the system is declared inoperable and the appropriate Technical Specifications and reporting requirements are followed. As explained above, for conditions that do not impact current operation, Duke's process recognizes a lower safety significance, and allows more time to complete the engineering analysis.

In the third paragraph of NUREG-1022 (cited above), the NRC's use of the term "generally" conveys the Commission's own recognition that the "discovery date" for reporting purposes cannot always be the date that a question is raised or the date an event or condition is identified. Also significant is the fourth paragraph quoted above, which apparently sets forth the exception (acknowledged by the NRC) to the "general" rule articulated in the third paragraph. The NOV does not refer to or acknowledge this paragraph of the regulatory guidance.

All six examples cited in the NOV are examples of past operabilities. Duke has reviewed them, and believes that all six were reported in a manner consistent with Duke's internal procedures, with the exception of the 50.72 notification for LER 269/96-03. This 50.72 notification was not made within four hours of determining reportability because of a communication breakdown. Appropriate corrective actions were taken, and no recurrence has taken place. Duke considers this example to be an isolated occurrence. This untimely 50.72 report was addressed by the staff in Inspection Report 96-03, dated April 4, 1996.

NRC Inspection Report 98-03 states:

> "However, 10 CFR 50.72 allows only four hours from the time of occurrence of an event, for making a telephone report of a past unanalyzed condition that significantly compromised plant safety. Also, 10 CFR 50.73 allows only 30 days, from the discovery of a condition that was outside the design basis of the plant, for issuing an LER. These regulations allow no additional time for engineering or management review of the condition to determine if it is reportable."

Thus, based on the "condition identified" dates in the NOV, the NRC Staff's position appears to be that reportability determinations for past conditions should be made within four hours of the initiation of the PIP. Again, the threshold for writing a PIP at Duke includes the mere raising of a question, and is not limited to issues which meet reportability criteria. The Staff's position allows no time for evaluation, even though Generic Letter 91-18 clearly states that comparable operability evaluations should proceed "commensurate with the safety significance … For structures, systems, and components in Technical Specifications, the Allowed Outage Times (AOTs) contained in Technical Specifications generally provide

reasonable guidelines for safety significance." Thus, it appears that the position in Inspection Report 98-03 fails to reflect the degree of flexibility afforded licensees under that regulatory guidance.

Duke is aware of the Staff's concern over open-ended due dates for reporting. The Federal Register notice associated with the issuance of NUREG-1022, Revision 1 addresses a comment relevant to the reportability clock as follows:

> Comment: Some comment letters recommended that the definition of "discovery date" in Section 2.11, which starts the 30-day reportability clock for licensee event reports (LERs), be revised to allow for appropriate management and/or engineering review. One suggested definition, for example was "The discovery date is when someone in the plant recognized that a reportable event has occurred or it is determined that an existing condition is reportable."
>
> Response: The NRC staff continues to conclude that the current guidance, which has been in use since 1984, is appropriate. Allowing additional time for management and/or engineering review in the definition of discovery date could lead to open ended due dates for reporting.

This NRC Staff concern is addressed in Duke's internal reporting policy, under which, reportability proceeds on a time frame commensurate with the safety significance. Duke limits the evaluation time allowed for past operabilities. NSD 203 sets forth an expectation that, for more complex issues, the evaluation should normally be completed within 30 working days. This expectation is associated with past conditions where it is not readily apparent that a reporting condition may be satisfied.

Summary of Duke Position

It is not clear that Commission guidance in Generic Letter 91-18 is fully reflected in the Staff's position in Inspection Report 98-03. Both Generic Letter 91-18 and NUREG-1022, Rev. 1 acknowledge that some time is warranted for an evaluation in order to determine if an event or condition is reportable.

Duke's corrective action program encourages a low threshold for identifying problems. The most recent Plant Performance Review, discussed at a public meeting at Oconee Nuclear Site on May 15, 1998, described Oconee's problem identification process as good. Engineers are encouraged to initiate PIPs when they have a question regarding a structure, system, or component that requires further evaluation. As described earlier, in some instances an evaluation of a question raised in a PIP may be necessary to determine if a reportable condition exists. Duke's process performs these evaluations commensurate with the safety significance of the question at hand. Notifications per Section 50.72 are made within one or four hours, as appropriate, of the occurrence of a reportable condition and, in accordance with Section 50.73, LERs are submitted within 30 days of the discovery of a reportable condition. If the NRC Staff is equating "occurrence" or "discovery" of a reportable condition to the initiation of a PIP, it is not clear how the Staff would differentiate between problem identification thresholds from one licensee to the next. It would appear that a licensee that waits to initiate a condition report (PIP) until a condition is "discovered" from a reportability perspective would not be subject to enforcement, while a licensee that is proactive in initiating a condition report when a question is raised which later leads to discovery of a reportable condition would be subject to enforcement. Redefining the "discovery of a condition" to the initiation of a PIP would lead to unnecessary reports that would later be retracted and would inefficiently absorb licensee and NRC staff resources. Such a practice would have a negative effect on nuclear safety.

Duke has reviewed the requirements of 10 CFR 50.72 and 10 CFR 50.73, as well as the supporting guidance in NUREG-1022, Rev. 1, Generic Letter 91-18, Generic Letter 91-18, Rev. 1, and the Statement of Considerations for the issuance of 10 CFR 50.72 in 1983. It is Duke's position that, with respect to the examples cited, its procedures meet the regulatory requirements and interpretive guidance issued by NRC. Duke's procedures provide a structured process to manage the number of questions and potential concerns generated via our Problem Identification Process and determine, on a time frame commensurate with the safety significance, which of these questions or potential concerns constitute reportable conditions. Therefore, Duke respectfully requests that the staff reconsider its position regarding reportability timeliness as delineated in the subject NOV.

Attachment 2
Reply to Notice of Violation (Reply)
Violation 98-03-02

Restatement of the Violation 98-03-02

Technical Specification (TS) 4.5.4.1.b.1 states that during each refueling outage, it shall be demonstrated that the Penetration Room Ventilation System (PRVS) fans operate at design flow (+/- 10 percent) when tested in accordance with ANSI N510-1975. The ANSI N510-1975 specified test method for air flow capacity testing is with a pitot traverse tube which measures air-flow-velocity pressure and converts this to flow rate.

Contrary to the above, testing performed since initial plant construction and operation, to demonstrate design PRVS flow during the refueling outages, was not in accordance with ANSI N510-1975. The licensee's surveillance procedure which was used to perform this TS requirement, PT/1,2,3/A/0170/005, Penetration Room Ventilation System Monthly Test, Revision 7, used an installed orifice and differential pressure (dp) measurement method, which is not in accordance with ANSI N510-1975.

Reply to the Notice of Violation

PRVS is required to filter RB leakage which enters the East and West Penetration Rooms. The system performs this function by taking suction on the penetration rooms and filtering the air by the use of PAC filters. System flow requirements are maintained to assure that proper vacuum can be maintained within the penetration rooms, and proper residence time exists within the carbon filters. The system design flow rate is 1000 cfm (+/- 10%).

TS 4.5.4.1 requires that the PRVS fan flows be verified during each refueling outage in accordance with ANSI N510-1975, Testing of Nuclear Air-Cleaning Systems. TS 4.5.4.1 also requires that the PRVS fan flows be verified on a monthly basis, however, it does not require testing in accordance in ANSI N510-1975. Both monthly and refueling outage testing is performed using an installed orifice plate which was originally supplied with the filter package from American Air Filter.

The PRVS air flow path is constructed of 12" Standard Schedule pipe with an internal cross sectional area of 0.7854 square ft. Assuming the minimum acceptable flow for the system of 900 cfm

(1000 - 10%) the average velocity of the system would only be 1150 fpm. Pitot tube traverse points are taken at locations that represent equal annular areas. Therefore, more traverse points are located near the duct wall than are located near the centerline. The velocities at the duct wall are lower than the velocities at the centerline of the pipe. Therefore, the pitot tube measured velocity would also be lower than the average velocity at a given duct location.

Due to the current piping arrangement in the system, there is not an ideal location for taking a pitot tube traverse. The individual trains have numerous transitions and flow disturbances which prevent a uniform velocity profile from developing. The low flow rate in combination with piping size, configuration, and measurement location, would yield traverse points with velocities lower than 1000 fpm.

ANSI N510-1975 recognizes the concern of using pitot tube traverses in low velocity situations and states the following:

> "the traverse should be made at a point in the duct where airflow velocity is 1000 fpm or more, and, if possible, where velocity measurements can be made at least 7.5 duct diameters downstream of any airflow disturbance. If there is no place where the airflow is greater than 1000 fpm, use one of the other methods as described in Section 9 of the ACGIH Industrial Ventilation"

It is Duke's position that ANSI N510-1975 was sufficiently ambiguous such that it permitted the use of an alternative flow measurement device in the PRVS.

Additionally, Duke believes that the use of the installed orifice yields more accurate and more repeatable test results than a pitot tube traverse for the PRVS. Section 9.2.2 of ACGIH Industrial Ventilation describes the inherent problems associated with using pitot-tube velocity traverses in low velocity regimes (ie. less than 1000 fpm). The manual states in part:

> "A standard Pitot tube with an inclined manometer can be used with the following degree of accuracy:"

Velocity, fpm	% Error (+/-%)
2000	1.0
1000	4.0
800	6.0
600	15.0 "

The above error is only attributed to the readability of the manometer and does not include any errors associated with the correct positioning of the pitot tube. Figure 15.14 of Mechanical Measurements by Beckwith, Buck, & Marangoni shows that an error in the velocity pressure of more than 6% can result from a yaw (angle between pitot tube and pipe centerline) of 15 degrees. In addition the Industrial Ventilation manual specifies the location for the pitot tube measurements to within 0.001 of the pipe diameter. This is equivalent to approximately 1/100 of an inch for Oconee's PRVS (12 inch diameter duct). The error associated with not placing the pitot tube in the exact location is dependent on the uniformity of the velocity profile and cannot be accurately predicted. Because of these issues, Duke does not believe that the error associated with a pitot tube is limited to +/-4% as stated in the inspection report. It is possible that the pitot tube could indicate flow rates outside of the acceptance range while the actual flow could be within the range. This scenario could result in the flows being adjusted to a rate outside of the required 1000 cfm +/- 10%.

Section 9.5 and Figure 9-14 in ACGIH Industrial Ventilation describes the use of a sharp-edge orifice as a flow measuring device. This method takes a dP measurement across the orifice plate and converts it directly into a CFM flow rate. This installed instrument assures an accurate flow reading for our testing scenario. In addition, since the orifice plate is left in the exact location from one test to the next, it is excellent for trending flows which can be seen from Oconee's test results on these systems. Because of the issues addressed earlier, trending flow measurements collected by a manual pitot tube traverse would be much less meaningful. Table 9-7 of the ventilation manual allows an accuracy of +/- 5% to be assumed for predefined orifice plates. Even though Oconee's PRVS orifice plate size is not listed in the table, the tabular data is based on Equation 9.10 of the ventilation manual which is the same correlation used in Oconee's procedure to determine PRVS flow. ACGIH Industrial Ventilation also describes the use of orifice plates for calibrating other velocity measuring devices.

Three industry/code experts were consulted on this issue. All of three experts agreed that the use of an orifice plate to measure flow of PRVS met the requirements of ANSI N510. The experts all agreed, based on their engineering judgement, that the orifice plate method is most likely more accurate than a pitot tube traverse for the Oconee PRVS application. The individuals consulted were:

Ray Weidler - Duke Energy
John Pearson - NCS Corporation
Dick Williams - American Air Filter Corporation

As a result, from a compliance standpoint, Duke believes that the use of an orifice plate for measuring PRVS flow is in accordance with ANSI N510-1975, and therefore meets or exceeds the requirements of TS 4.5.4. From a technical standpoint, Duke believes that the orifice plate measurement method provides more accurate and more repeatable flow measurements in the Oconee PRVS application. The method of flow measurement currently in place in no way impacts the operability of Oconee's PRVS. Duke also believes that the staff should reconsider the need to issue this violation based on the above information.

As a conservative measure, a plan is currently being implemented to measure PRVS airflow with a pitot tube array to compare and verify agreement to the flows indicated by the orifice plates. This additional testing of flow rates will be completed in June 1998.

Attachment 3
Reply to Notice of Violation (Reply)
Violation 98-03-07

Restatement of Violation 98-03-07:

10 CFR 50, Appendix B, Criterion III, "Design Control", states, in part, that design control measures shall assure that appropriate quality standards are specified and included in design documents. Also, design control measures shall provide for verifying the adequacy of design.

10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings", requires that activities affecting quality shall be prescribed by documenting instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings.

Procedure EDM-101, "Engineering Calculations/Analyses", Rev. 7, dated September 16, 1997, Section 101.4.2.4 Assumptions, requires that assumptions used in calculations shall be technically accurate or have conservatism built in. Section 101.4.3 Verification and Certification, requires that a calculation be checked verifying the technical validity and appropriate degree of conservatism for the assumptions used.

Contrary to the above, as of March 5, 1998, a calculation for post-accident control room operator dose contained incorrect and non-conservative assumptions. Calculation OSC-6600, Control Room Operator Dose Due to Infiltration of Contaminated Air, Rev. 1, dated January 27, 1998, which had been verified, incorrectly assumed that there would be zero inleakage of unfiltered air into the control rooms through leaks in the ventilation ducting on the suction side of the control room ventilation and booster fans. However, inspection and testing on March 5, 1998, identified significant inleakage of unfiltered air through these leaks [as much as 400 cubic feet per minute (cfm) on Unit 3].

The calculation also incorrectly assumed that there would be zero inleakage of unfiltered air into the control rooms due to a potential time delay in starting the booster fans to pressurize the control rooms. However, a March 1998 review of operating procedures determined that, during a design basis accident, there would be a time delay of as much as 90 minutes before operators would manually start the booster fans. During this time, the control room would be unpressurized and could consequently have a

significant inleakage of unfiltered air (approximately 1350 cfm for Unit 3).

This is a Severity Level IV Violation (Supplement I).

Reply to the Notice of Violation:

1. The reason for the violation:

Duke Power acknowledges the violation.

On February 10, 1997, Duke made a Technical Specification submittal pertaining to the Penetration Room Ventilation System (PRVS). In support of this submittal, Duke performed an analysis of the impact of this submittal on Control Room Habitability (CRH), and documented this analysis in calculation OSC-6600, Revision 0. Revision 1 was made to OSC-6600 to incorporate changes to atmospheric dispersion (X/Q) factors and other parametric values. The analysis accounted for 10 cfm unfiltered inleakage to account for Control Room ingress and egress. However, the potential presence of additional unfiltered inleakage into the Control Room Ventilation System (CRVS) ductwork was not considered in the analysis. In addition, the unfiltered inleakage arising from operator delay in actuating the CRVS was not addressed.

Two root causes were identified:

a) Incorrect assumption of no unfiltered air inleakage into the control rooms through leaks in the CRVS ducting.

The root cause is an error in judgment by the engineering staff performing and reviewing the CRH dose calculation. When calculation OSC-6600 Revision 1 was performed, no test data or other quantified estimates of the control room inleakage rates were available for the Oconee CRVS. The staff performing and reviewing the CRH dose calculation were aware that other nuclear plants had measured inleakage rates greater than 10 cfm and recognized a need for quantifying this parameter. The error in judgment was made when the Engineering personnel decided to use only the 10 cfm Murphy-Campe ingress/egress value, rather than developing or obtaining a site-specific value or otherwise accounting for the potential for higher unfiltered air inleakage rates within the analysis.

b) Incorrect assumption of no unfiltered air inleakage into the control rooms due to a potential time delay in starting the booster fans to pressurize the control rooms.

The root cause is a misinterpretation of the relevance of technical information within the Standard Review Plan (SRP) to the Oconee CRH analysis. The engineering staff performing the analysis viewed the SRP 6.4 guidance regarding unfiltered inleakage as licensing requirements inapplicable to Oconee, rather than as potentially valid technical considerations. The decision was made not to use the SRP as a guiding document, because Oconee was not designed to conform to the SRP. At the time, the Oconee licensing basis for the CRVS was not consolidated or summarized in a single document or in the UFSAR. Therefore, with respect to assumptions for unfiltered inleakage, the SRP information was not used in the decision-making process.

Duke acknowledges that it is a reasonable assumption that there could be additional unfiltered inleakage before the Control Rooms are pressurized.

2. The corrective steps that have been taken and the results achieved:

a) Once the SSEI identified the presence of unfiltered inleakage in excess of the value assumed in OSC-6600, Revision 1, the immediate corrective action was to document this event in Duke's corrective action program and commence operability evaluations.

b) Maintenance work was initiated to promptly seal the CRVS ducting inleakage paths for the Unit 3 control room and the Units 1&2 combined control room. The unfiltered inleakage on the suction side of the ventilation and booster fans was reduced from an estimated 400 CFM to an estimated 300 CFM or less.

c) Immediate changes to the Station EOP were initiated to direct the operators to start the CRVS booster fans within 30 minutes.

d) An operability evaluation was performed that accounted for both (1) SRP 6.4-based unfiltered inleakage values prior to starting the CRVS booster fans within 30 minutes, and (2) up to 300 CFM unfiltered inleakage once the CR has been pressurized. The operability evaluation concluded that Oconee was presently operable.

e) A past operability evaluation was performed that accounted for both (1) SRP 6.4-based unfiltered inleakage values prior to starting the CRVS booster fans within 90 minutes, and (2) up to 400 CFM unfiltered inleakage once the CR has been pressurized. The past operability evaluation concluded that Oconee was past operable.

f) Calculation OSC-6600 was revised to document the assumptions used under the present and past operability evaluations.

g) Duke consolidated and summarized its understanding of the Oconee CRVS licensing basis, and communicated this to the NRC in a letter dated March 30, 1998.

h) The appropriate station personnel have been counseled regarding conservative decision-making and qualification, verification, and validation (QV&V) of assumptions in calculations.

3. The corrective steps that will be taken to avoid further violations:

a) Duke will perform tracer gas testing (June 1998) to better quantify the amount of unfiltered inleakage into the control room habitability envelopes.

b) The OSC-6600 CRH analysis will be updated by September 30, 1998, to reflect the results of the tracer gas tests.

c) Revisions to the Oconee CRH analyses for the steam generator tube rupture accident, the main steam line break accident, and the rod ejection accident are in progress and will be completed by December 1998, to incorporate the inleakage assumptions used in the latest revision of OSC-6600.

d) The lessons learned from this violation will be communicated to Duke individuals performing Oconee engineering calculations, during 1998 Engineering continuing training.

e) Duke will update the UFSAR, as appropriate, to reflect the licensing basis as described in the CRVS letter dated March 30, 1998.

4. The date when full compliance will be achieved:

Duke is in full compliance. Calculation OSC-6600 has been revised to incorporate CRH dose analyses that account for both (1) SRP 6.4-based unfiltered inleakage values prior to starting the CRVS booster fans, and (2) conservative unfiltered air inleakage flows once the CR has been pressurized.