June 13, 1997

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:
Peter B. Bloch, Presiding Officer
(Dr. Peter Lam, Special Assistant)

In the Matter of	)	
	)	
RALPH L. TETRICK	)	Docket No. 55-20726-SP
	)	
(Denial of Application for Senior Reactor Operator License)	)	ASLBP No. 96-721-01-SP

SUPPLEMENTAL AFFIDAVIT OF
BRIAN HUGHES AND THOMAS A. PEEBLES

Brian Hughes (BH) and Thomas A. Peebles (TAP), having first been duly sworn, do hereby state as follows:

1(a). (BH) My name is Brian Hughes. I am employed as a Reactor Engineer (Examiner Qualified), in the Operator Licensing Branch, Division of Reactor Controls and Human Factors, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission (NRC), in Washington, D.C. A statement of my professional qualifications is attached hereto.

1(b). (TAP) My name is Thomas A. Peebles. I am employed as Chief, Operator Licensing and Human Performance Branch, Division of Reactor Safety, NRC Region II, in Atlanta, Georgia. A statement of my professional qualifications is attached hereto.

2. This Supplemental Affidavit is prepared in response to the Presiding Officer's "Memorandum and Order (Questions Relevant to Remand)" ("Order"), dated May 27, 1997, in which the Presiding Officer posed three sets of questions with respect to Ralph L. Tetrick's request for reconsideration of his Initial Decision of February 28, 1997 (LBP-97-2), concerning Question 63 of Mr. Tetrick's Senior Reactor Operator (SRO) license written examination. This Supplemental Affidavit also responds to Mr. Tetrick's letter of June 6, 1997, filed in response to the Presiding Officer's Order.

3. The written examination which was administered to Mr. Tetrick tested applicants on their knowledge and abilities in connection with their applications for SRO licenses for use at Turkey Point Nuclear Generating Plant, Units 3 and 4 ("Turkey Point"), operated by Florida Power & Light Company ("FP&L"). Question 63 of that examination stated as follows:

EXAMINATION QUESTION 63

Plant conditions:

- *Preparations are being made for refueling operations.*
- *The refueling cavity is filled with the transfer tube gate valve open.*
- *Alarm annunciators H-1/1, SFP LO LEVEL and G-9/5, CNTMT SUMP HI LEVEL are in alarm.*

Which ONE of the following is the required IMMEDIATE ACTION in response to these conditions?

a. Verify alarms by checking containment sump level recorder and spent fuel level indication.

b. *Sound the containment evacuation alarm.*

c. *Initiate containment ventilation isolation.*

d. *Initiate control room ventilation isolation.*

As stated in our Affidavit of January 23, 1997 ("Initial Affidavit"), attached to the NRC Staff's Written Presentation filed on that date, the correct answer to this question was "b" ("Sound the containment evacuation alarm"); Mr. Tetrick's answer was "a" ("Verify alarms by checking containment sump level recorder and spent fuel level indication"). Initial Affidavit, ¶ 17 at 7.

4. As explained in our Initial Affidavit, reactor operators are expected to analyze alarms and determine the appropriate course of action based upon the specific plant conditions and indications (Initial Affidavit, ¶ 20 at 8, *citing* procedure O-ADM-219). Further, under the specific plant conditions recited in Question 63, the Turkey Point procedures <u>require</u> the operators to take the "IMMEDIATE ACTION" of sounding the containment evacuation alarm. We stated as follows:

> [S]teps 5.1.15 and 5.6.8 of procedure O-ADM-200, "Conduct of Operations," direct on-shift licensed operators involved in abnormal or emergency operations to believe and respond to their instrument indications until the instruments are proven to be incorrect. The plant conditions and indications specified in this question (*i.e.*, the refueling cavity filled and the transfer tube gate valve open with coincident SFP LOW LEVEL and CONTAINMENT SUMP HIGH LEVEL alarms) *are mutually supportive and confirmatory, and require entry into Off-Normal Operating Procedure 3-ONOP-033.2, "Refueling Cavity Seal Failure"* ([Hearing File] Item 24). That procedure has only one IMMEDIATE ACTION - to sound the containment evacuation alarm.

Id., ¶ 21 at 8; emphasis added.

5. As further stated in our Initial Affidavit, the Turkey Point procedures (step 5.2.1 of O-ADM-211, "Emergency and Off-Normal Operating Procedure Usage" (Hearing File Item 25), require that operators must "be capable of performing IMMEDIATE ACTION steps from memory." *Id.* at 8-9. Further, we explained that this "IMMEDIATE ACTION" is necessary because "under the stated conditions, personnel located in the containment would quickly be exposed to high levels of radiation (due to the loss of water which normally acts as a radiation shield) unless they are promptly notified by a containment alarm to evacuate the area." *Id.* at 9.

6. In his Initial Decision of February 28, 1997, the Presiding Officer concluded that the correct answer to this question is "b" -- "Sound the containment evacuation alarm." The Presiding Officer stated, in part, as follows:

> The Staff has persuaded me that when two concurrent annunciators sound, indicating that there is an off-normal event that could cause harmful radiation within the containment, that the Operator should take the required IMMEDIATE ACTION. Given the important safety problem that is being indicated by the two different annunciators, that is not the time to verify that each of the annunciators is working properly. That they sound *together* is enough corroboration to act immediately to prevent injury to the health of plant employees.

LBP-97-2, slip op. at 7-8 (emphasis in original).

7. In our view, the Presiding Officer's Initial Decision concerning Question 63 was absolutely correct. Moreover, the Presiding Officer's decision seized the essence of the matter -- which Mr. Tetrick has missed repeatedly -- that when these two specific diverse indicators sound together, "that is enough corroboration" to take the

required immediate action -- and the operator must be able to perform this action "*from memory and before opening and reading the emergency procedures.*" *Id.* at 5; emphasis in original. In sum, when these two diverse, mutually supportive and confirmatory alarms sound together, there is no need to perform any further verification -- and the Turkey Point Off-Normal Operating Procedures clearly specify that under these specific plant conditions, the "IMMEDIATE ACTION" of sounding the containment evacuation alarm is required. Accordingly, the Presiding Officer's Initial Decision correctly resolved this matter.

8. In a submittal to the Commission dated April 23, 1997, Mr. Tetrick sought "reconsideration" of the Presiding Officer's decision on this matter, largely based on his previous argument that when one of these annunciators has sounded, the correct procedure is to verify the correctness of the signal. Mr. Tetrick argued (*Id.*):

> At Turkey Point there are two Spent Fuel Pool level indications and five sump level indications in the control room. I contend that the 10 to 20 seconds it takes to verify the alarm would not expose personnel inside containment to high levels of radiation, also, this brief period of time to verify the alarms is preferable to causing panic and possible hard [sic] to personnel evacuating containment if the alarm is invalid.

Mr. Tetrick attached to his submittal an undated personal letter signed by Brian J. Stamp, the Acting Operations Supervisor at Turkey Point. Mr. Stamp expressed the view that reactor operators are "expected" to verify plant conditions when one or more annunciator alarms are received, before taking corrective actions; and he further opined, in part, that this should be done under the conditions stated in Question 63.

9. On April 25, 1997, the Commission instructed the NRC Staff ("Staff"), *inter alia*, to file a response to Mr. Tetrick's argument concerning Question 63. *See* "Scheduling Order" dated April 25, 1997.

10. Inasmuch as Mr. Stamp's letter did not appear to constitute a submittal by FP&L, the Staff requested that FP&L provide its views with respect to Question 63. By letter dated May 1, 1997, FP&L responded to the Staff's request. *See* Letter from R. J. Hovey, Vice President, Turkey Point Plant, to Stuart A. Richards (NRC), dated May 1, 1997. Therein, FP&L indicated that Mr. Stamp's letter represents "his personal opinion" and "does not represent the position of FPL" (*Id.* at 1). FP&L then provided its views concerning Question 63, stating as follows:

> 2. If the question is interpreted to be asking for an Off Normal Operating Procedure (ONOP) immediate action, response (b) is correct. Question 063 however, asks for an IMMEDIATE ACTION without specifying that it is looking for the ONOP IMMEDIATE ACTION. The only way this is implied in the question is by the words "IMMEDIATE ACTION" being capitalized, which is the format use in the ONOPs.
>
> If the question is interpreted to be asking for an immediate action for the receipt of an annunciator, response (a) is correct. Management's policy and expectation of operators is to validate all alarms by checking appropriate instrumentation prior to taking action. Additionally, the Annunciator Response Procedure (ARP) instructs the operator to verify the alarm with the indications contained in response (a). See the attached ARPs for the two annunciators listed in Question 063.
>
> It is FPL's position that the best answer to the question is response (b), but that the question could be interpreted such that response (a) is also correct. As a result,

> Question 063 as written, has two possible correct answers.
>
> 3. Management's policy and expectation of operators to validate all alarms by checking appropriate instrumentation prior to taking action has been reinforced in the simulator training program. This policy provides assurance that the appropriate actions are being taken for valid plant conditions and does not result in an operator failing to follow an appropriate procedure.

Id. at 1-2; emphasis added. As discussed *infra* at **11-13**, we believe that the views expressed in FP&L's letter of May 1, 1997, are without merit.

11. In accordance with the Commission's Order, the Staff filed its response to Mr. Tetrick's request for reconsideration of the Initial Decision's treatment of Question 63 on May 2, 1997. Therein, the Staff, *inter alia*, provided its views concerning Mr. Stamp's letter and FP&L's letter of May 1, 1997, supported by the Affidavit of Brian Hughes. *See* "NRC Staff's Response to Questions Posed in the Commission's Order of April 25, 1997," at 3-12 ("Staff's Response") (attaching FP&L's letter of May 1, 1997).

12. On May 20, 1997, the Commission remanded Mr. Tetrick's request for reconsideration of Question 63 to the Presiding Officer for "further factual and technical inquiry," in light of FP&L's letter of May 1, 1997. *Ralph L. Tetrick* (Denial of Application for Reactor Operator License), CLI-97-5, 45 NRC ___ (May 20, 1997), slip op. at 3.

13. On May 27, 1997, the Presiding Officer issued his "Memorandum and Order (Questions Relevant to Remand"), in which he posed three sets of questions. A

response to the Presiding Officer's questions was filed by Mr. Tetrick on June 6, 1997. We have prepared the Staff's response to these questions, as follows.

QUESTION ONE

14. In his first question, the Presiding Officer inquired (*Id.* at 2):

> . . . It would appear that Mr. Tetrick's discussion of his answer is addressed not to the proper "IMMEDIATE ACTION" -- a term defined in the plant procedures -- but to an action he says he would take before taking the IMMEDIATE ACTION set forth in 3-ONOP-033.1. As I understand it, Mr. Tetrick's answer is that he would respond in a way that is not defined in the procedures as an IMMEDIATE ACTION and is not, in my opinion, responsive to a question that asks for an IMMEDIATE ACTION. Is there any provision of the procedures or any aspect of the examination question that casts doubt on this train of reasoning?

15. In response to this question, Mr. Tetrick recited his contention that "answer 'a' is also and [sic] 'Immediate Action' and therefore correct. Question #63 does not specify a specific ONOP and I contend that several ONOP's and ARP's could apply." Letter from Ralph L. Tetrick to the Presiding Officer, dated June 6, 1997, at 1. Mr. Tetrick then cited several Annunciator Response Procedures (ARPs) and Off Normal Operating Procedure (ONOP) 3-ONOP-033.1, which direct operators to verify the alarms. *Id.* Mr. Tetrick also asserted that "the ARP's are considered ONOP's as defined in 0-ADM-211," and he stated that "[s]ince no specific ONOP is named, I contend that answer "A" - Verify Alarms by checking containment sump level recorder and Spent Fuel Level Indication is an "Immediate Action" with regard to 3-ARP-097.CR and 3-ONOP-033.1 and this would also be correct." *Id.*

16. We have carefully considered Mr. Tetrick's answer to this question. In our view, it reflects a fundamental misunderstanding of the importance and significance of an ONOP, in contrast to a nuclear facility's many other plant procedures. Further, Mr. Tetrick's answer ignores the significance of the specific plant conditions described in the stem of Question 63, which must be considered in an SRO applicant's selection of the proper answer to this question. Question 63 explicitly posited the following specific plant conditions:

> *Plant conditions:*
>
> - *Preparations are being made for refueling operations.*
> - *The refueling cavity is filled with the transfer tube gate valve open.*
> - *Alarm annunciators H-1/1, SFP LO LEVEL and G-9/5, CNTMT SUMP HI LEVEL are in alarm.*

Under these plant conditions, where these two mutually supportive and confirmatory annunciators (spent fuel pool low level and containment sump high level) are sounding together, a competent applicant for a senior reactor operator license should have recognized, unequivocally, that the operator is <u>required</u> to sound the containment evacuation alarm, in accordance with 3-ONOP-033.2. We note that although Mr. Tetrick's July 1996 submittal did not discuss this ONOP, in his filings before the Presiding Officer in September and December 1996 he agreed the two annunciators specified in Question 63 are "mutually supportive and sufficient to enter 3-ONOP-033.2 "REFUELING CAVITY SEAL FAILURE."

17. Question 63 does not constitute an abstract question of only theoretical interest. Rather, the question seeks to test applicants on their fundamental competence to respond to actual plant conditions, specified therein. Question 63 describes a potential refueling cavity seal failure, during refueling operations. The initial plant conditions provided in the stem of the question state that "the refueling cavity is filled with the transfer tube gate valve open." This condition means that the Spent Fuel Pool is connected (through the transfer tube) to the refueling cavity in the Containment Building. Another initial condition states "Alarm annunciators H-1/1, SFP LO LEVEL and G-9/5, CNTMT SUMP HI LEVEL are in alarm." The concurrent sounding of these two alarms would indicate that the water level has decreased in the Spent Fuel Pool and has increased in the Containment Building sump. Because the Spent Fuel Pool is connected to the Refueling Cavity (inside the Containment Building) through the transfer canal, the actuation of these two alarms at the same time would confirm leakage from the Refueling Cavity to the Containment Building sump. This leakage would most probably be due to the refueling cavity seal leaking or failing. Under the conditions described in Question 63, prompt notification to plant personnel of the nature of the emergency by sounding the containment evacuation alarm is the only appropriate IMMEDIATE ACTION.

18. Question 63 is based upon a real-life incident that occurred at the Haddam Neck plant, where a refueling cavity seal failure resulted in a substantial drainage of the water in the refueling cavity within a matter of minutes -- an event which could have potentially resulted in lethal radiation doses to plant personnel. This event led to the

issuance of IE Bulletin 84-03 on August 24, 1984. At the time of the event, the refueling cavity was filled in preparation for refueling and, fortuitously, the transfer tube gate valve (which connects the spent fuel pool to the refueling cavity) was closed. The Staff evaluated this event as Generic Issue 82, and determined that it has significant safety implications for all water-cooled nuclear power plants in the United States, -- and each such facility, including Turkey Point, was required to address this problem. *See* NUREG/CR-4525, "Closeout of IE Bulletin 84-03: Refueling Cavity Water Seal" (June 1990) (portions of which are provided as Attachment 1 hereto).

19. It should be further noted that Question 63 posits a situation in which "the refueling cavity is filled with the transfer tube gate valve open" -- unlike the event at Haddam Neck, where the gate was closed. While significant radiation doses may have been avoided at Haddam Neck due to the transfer tube gate being closed, a different result might have occurred at Turkey Point, under the conditions stated in Question 63, if the plant operators decided, like Mr. Tetrick, to verify alarms before taking the required "IMMEDIATE ACTION" of sounding the containment evacuation alarm.

20. We have carefully considered the views expressed by Mr. Stamp and by FP&L. In our view, they, like Mr. Tetrick, ignore the fact that specific plant conditions are posited in the stem of the question. Question 63 does not inquire as to whether operators are generally "expected" to verify alarms (as stated by Mr. Stamp), or whether they should verify alarms upon receipt of "an" (*i.e.*, a single) annunciator, or whether they are required to verify alarms under ARPs or ONOPs which apply in other situations, or whether they are trained in the simulator to verify alarms -- all as suggested in

FP&L's letter. Rather, the SRO applicant was required to identify the correct answer which applies under the specific plant conditions stated in the question. Only one immediate action applies under those plant conditions -- sound the containment evacuation alarm. In contrast, if only one of these annunciators had actuated, entry into the ONOP would not have been required, and it would have been proper to go to the ARP for the alarm which had actuated -- *i.e.*, under those conditions, where confirmation was not provided by the sounding of these two annunciators, the ONOP would not have been triggered and it would have been proper for the operators to verify the alarm in accordance with the ARP.

21. Further, there is simply no reasonable basis for FP&L's suggestion that "if the question is interpreted to be asking for an immediate action for the receipt of an annunciator, response (a) is correct," or that "the question could be interpreted such that response (a) is also correct." Letter of May 1, 1997, at 1 (emphasis added). Contrary to FP&L's (and Mr. Tetrick's) suggestion, Question 63 does not state that "an" (*i.e.*, a single) annunciator has sounded -- in which case it might be appropriate for the operator to follow some procedure other than 3-ONOP-033.2, so that answer "a" may be viewed as an "additional" correct answer. Nor is there any rational basis, under the circumstances stated in Question 63, to support FP&L's statement that "Management's policy and expectation of operators is to validate all alarms by checking appropriate instrumentation prior to taking action," and that this "policy and expectation . . . has been reinforced in the simulator training program." *Id.* at 1, 2. While this "policy and expectation" that alarms should be verified may apply in other circumstances, FP&L's

written ONOPs clearly demonstrate that this principle does not apply under the plant conditions specified in Question 63.

22. The fact that FP&L's general "policy and expectation" is inapplicable under the conditions specified in Question 63 is demonstrated by a review of the answers to Question 63 that were given by FP&L's other reactor operator (RO) and SRO license applicants. Fully six of the seven FP&L SRO applicants to whom this examination was administered, selected answer "b" (sound containment evacuation alarm) as the correct answer. Only one of the seven SRO applicants -- Mr. Tetrick -- failed to recognize that the plant conditions specified in Question 63 require that this immediate action be taken. Further, nine of the twelve RO applicants (whose knowledge and abilities are not expected to be as high as those possessed by SRO applicants) answered this question correctly; only three of the 12 RO applicants failed to recognize the significance of the specified plant conditions, and selected answer "a." If FP&L's "policy and expectation" is truly that operators are to verify alarms under the conditions specified in Question 63 prior to taking the immediate action specified in 3-ONOP-033.2, one must wonder why the overwhelming majority of its SRO and RO candidates chose to disregard that general policy under the specified conditions and selected answer "b."

23. The Presiding Officer's first question notes that Question 63 asked for an "IMMEDIATE ACTION," framed in upper case letters. The question did not ask what should be done immediately or promptly, but used the term "IMMEDIATE ACTION." The phrase "IMMEDIATE ACTION" (written in upper case letters) is a recognized term, used in the Off-Normal Operating Procedures (ONOPs) -- and should be well known to

Mr. Tetrick, who is a licensed reactor operator at Turkey Point. While the use of this phrase, especially in upper case letters, should have been a "tip-off" that Question 63 might be inquiring about an ONOP, SRO applicants are required to recognize, even without the use of upper case letters, that the specified plant conditions form the predicate for an immediate action specified in the ONOPs, *i.e.*, sound the containment evacuation alarm. In the event of an actual incident at the plant, if these annunciators sound, the operator does not receive a "tip-off" that an ONOP may apply, nor does a message appear instructing operators to ponder whether these conditions require that some "IMMEDIATE ACTION" be taken. Rather, the operators are expected and required to know -- from memory, as was previously noted by the Presiding Officer -- that an IMMEDIATE ACTION (sound containment evacuation alarm) is required under these specified conditions.

24. Reactor operators are instructed to meet certain standards promulgated by the American National Standards Institute (ANSI) and endorsed by the Commission in Reg. Guide 1.33, "Quality Assurance Program Requirements (Operation)" (Rev. 2, Feb. 1978). In particular, ANSI N18.7-1976 ("Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants"), section 5.3.9, requires procedures to be "written so that a trained operator will know in advance the expected course of events that will identify an emergency and the immediate action he should take." In accordance with this ANSI standard, Mr. Tetrick should have recognized the stated plant conditions as establishing an emergency, and he should have known the "Immediate Action" required to be taken under the stated conditions.

25. Further, it should be noted that there are only a limited number of "immediate actions" specified in Westinghouse plant procedures, such as the Turkey Point procedures. Operators are required to know the immediate actions specified in the ONOPs and Emergency Operating Procedures (EOPs) from memory. A Senior Reactor Operator candidate reading Question 63 should have been able to recognize that the plant conditions described in the question stem require entry into the ONOP "immediate action." An SRO candidate, in particular -- who is expected to have a higher level of knowledge than an RO candidate -- should have recognized that these conditions require entry into the ONOP "IMMEDIATE ACTION". Only one of FP&L's seven SRO candidates -- Mr. Tetrick -- failed to recognize the significance of these conditions.

26. In sum, in response to the Presiding Officer's first question, although the use of upper case letters should have alerted Mr. Tetrick to the fact that an ONOP may apply, we do not believe that the use of upper case typeface is controlling. Rather, regardless of which typeface may have been used in Question 63, an SRO applicant should have recognized that under the plant conditions specified in this question, with these two mutually supportive and confirmatory annunciators sounding together, one and only one "immediate action" is required -- and that action is the "IMMEDIATE ACTION" specified in the plant's ONOPs. As we have stated previously, pursuant to the "Priority of Procedures" established under Step 5.13 of O-ADM-211 ("Emergency and Off-Normal Operating Procedure Usage"), the plant's operators are initially directed to follow the procedures listed there, including the ONOPs, rather than the ARPs as contended by Mr. Tetrick. *See* Affidavit of January 23, 1997, ¶ 22. We are not aware

of any provision in the procedures or any aspect of Question 63 that casts doubt on this train of reasoning.

QUESTION TWO

27. The Presiding Officer's second set of questions stated as follows:

> 2. Mr. Tetrick has stated that he would spend 10 to 20 seconds "to verify the alarm." Is there any provision of plant procedures that would permit that action once the conditions for entering 3-ONOP-033.1 [*sic*] [3-ONOP-033.2] are met? What precisely would he do during these 20 seconds? What evidence might he find that would persuade him not to take the required IMMEDIATE ACTION after he took steps to verify the alarm? If he thought the IMMEDIATE ACTION was not needed, what supervisory approvals, if any, would he seek, and what records would he create?

Memorandum and Order at 2-3.

28. In response to these questions, Mr. Tetrick recited his view that the ARPs and 3-ONOP-033.1, require him to verify alarms; and he stated that "FP&L Management expectations and training reinforce this action." Letter of June 6, 1997, at 1. Further, Mr. Tetrick stated that during the 20 seconds prior to taking the immediate action specified in 3-ONOP-033.2, he "would refer to [Recorder] R-1418 and [Level Indicator] LI-3-651," in accordance with the procedures specified in 3-ARP-097.CR for Annunciators G-915 and H 1/1, respectively. *Id.* In addition, he responded to the Presiding Officer's inquiry as to what might persuade him not to take the required Immediate Action by stating that "verifying the alarm [is] as much of an 'Immediate Action' as 'Sounding the Containment Evacuation Alarm', and that any and all corrective actions would be performed upon verification of the alarms." *Id.* Finally, he states that

he would inform the ANPS/NPS of the alarms and any corrective actions taken, and would record the incident in the logs as required by 3-ARP-097.CR. *Id.* at 2.

29. Mr. Tetrick's statements in response to this set of questions essentially recites the position he expressed previously. These statements suggest that he continues to fail to recognize the significance of receiving these two mutually supportive and confirmatory indicators, as opposed to receiving a single annunciator signal -- and that he thus may not understand the basics of indicators and verification, and when "immediate actions" are required. We consider Question 63 to be a very basic and clear-cut question, that a competent senior reactor operator should have been able to answer correctly without hesitation or deliberation. Simply stated, a senior reactor operator should have recognized that the conditions stated in this question require the operator to take an ONOP "immediate action." Thus, when an SRO receives these two indicators together during the plant conditions specified in Question 63, he is <u>not</u> to take the time to verify the annunciators, but is required instead to take the "immediate action" of sounding the containment evacuation alarm.

30. Under the Commission's regulations, senior reactor operators occupy the highest NRC-licensed position among plant personnel on shift at a nuclear power plant. Further, senior reactor operators are "responsible for directing the licensed activities of licensed operators." 10 C.F.R. § 50.54(l). A competent senior reactor operator is required to interpret control room indications correctly and efficiently. He or she also must demonstrate an ability to use procedures correctly, to take timely and decisive action when problems occur, and to demonstrate appropriate concern for the safety of the plant

personnel. Accordingly, a licensee must ensure that persons responsible for safety-related activities and activities affecting quality are trained to recognize such emergency conditions. Unfortunately, Mr. Tetrick's answer to Question 63, and his response to the Presiding Officer's questions, suggest to us that he failed to recognize the emergency conditions specified in this question, and that he is not yet competent or qualified to be licensed as a senior reactor operator at Turkey Point.

31. The principle described herein and in FP&L's ONOP procedures -- that where these mutually supportive and confirmatory annunciators sound together, they should not be verified prior to taking the "immediate actions" specified in the ONOPs -- is a simple one, and may be compared to the general maxim, "better safe than sorry." It is not unusual for commercial nuclear power plants to receive a false alarm which may cause a spurious indication of high radiation. When that happens, however, the required immediate action must be and is taken -- *e.g.*, the evacuation of personnel located in containment -- <u>followed by</u> verification of the alarm. This principle is reinforced in the Turkey Point administrative procedures (0-ADM-200), which instruct operators in abnormal or emergency operations to trust their instrument indications "until the indications are proven to be false." As we stated previously, Mr. Tetrick is correct that, eventually, the annunciators should be verified to be correct in accordance with the ARP -- but only after the defined "IMMEDIATE ACTION" is taken, in accordance with 3-ONOP-033.2. *See* Affidavit of January 23, 1997, ¶ 24. Accordingly, verification of the annunciators, prior to taking the "Immediate Action" of sounding the containment evacuation alarm, is not directed by the plant's procedures.

32. Mr. Tetrick did not respond directly to the Presiding Officer's question as to "what evidence might he find that would persuade him not to take the required IMMEDIATE ACTION after he took steps to verify the alarm?" Rather than responding to the obvious focus of the question (*i.e.*, "the [ONOP-] required IMMEDIATE ACTION"), Mr. Tetrick responded, instead, with an assertion that "verifying the alarm is an Immediate Action." (Letter of June 6, 1997, at 1; emphasis added). In fact, any observation in the control room which Mr. Tetrick might make, as he assesses he would do, would fail to provide convincing evidence that the containment should not be evacuated.

33. Mr. Tetrick's belief that he should verify the annunciators prior to taking the ONOP-required IMMEDIATE ACTION is quite problematic from a practical viewpoint. If he had sought to verify the annunciators first (such as by checking the recorder), and received positive confirmation, a short period of time (perhaps no more than the "10 to 20 seconds" postulated by Mr. Tetrick) would have elapsed before taking the required "IMMEDIATE ACTION." While that time period is short, it is nonetheless wasted time. However, if his verification effort produced negative results (*i.e.*, if he found a conflict between the annunciator(s) and the recorder or other instrument referred to for verification), he would still have to find some means to verify the actual condition of the spent fuel pool and/or the containment sump, before he could be sure whether the instruments were correct. For instance, he would have to call into the spent fuel building and be able to find someone who could visually observe whether (and to what extent) the SFP level had dropped -- or, if he could not find someone there who could verify the

condition, he would have to send someone into the spent fuel building, appropriately suited up, to verify the actual SFP level. Similarly, he would have to send someone into the basement of the containment building with a flashlight, to verify the level of the containment sump. This would require ALARA planning, radiation protection, and completion of the required containment access documents. This effort would undoubtedly take much longer than the "10 to 20 seconds" postulated by Mr. Tetrick.

34. Apart from generally applicable conditions such as fires or high radiation alarms, which could occur at various plant locations, there are only a limited number of situations that could arise during operations that may require the sounding of the containment evacuation alarm. Indeed, only two such events readily come to mind -- the loss of the refueling cavity seal (the subject of Question 63), and the dropping of a fuel assembly during refueling operations. The principle followed in the event of a dropped fuel assembly is similar to the principle here -- the personnel in containment are to be evacuated immediately, and only after that should a check for damage be performed.

35. The Presiding Officer inquired, "[i]f [Mr. Tetrick] thought the IMMEDIATE ACTION was not needed, what supervisory approvals, if any, would he seek?" In response, Mr. Tetrick stated that he would notify the ANPS/NPS of the alarms and their status. Letter of June 6, 1997, at 2. If Mr. Tetrick sought to disregard the ONOP procedure, he would have to get another SRO to agree to a procedure change under 10 C.F.R. § 50.54(y). In fact, however, unless he sought a procedure change, as the SRO (*e.g.*, if he failed to recognize that an ONOP IMMEDIATE ACTION was required, as reflected in his answer to Question 63), Mr. Tetrick would be the senior

official authorized to direct plant operations, and he would thus be able to disregard these alarms without seeking any supervisory approval. Only afterwards would Mr. Tetrick have to explain his failure to follow the ONOP-required IMMEDIATE ACTION.

QUESTION THREE

36. In his Memorandum and Order, the Presiding Officer posed a third set of questions, as follows:

> 3. Are there changes needed in order to clarify existing plant procedures with respect to IMMEDIATE ACTIONS? What principles govern whether or not an operator should immediately effectuate "IMMEDIATE ACTIONS"?

Memorandum and Order, at 3.

37. In his response to this set of questions, Mr. Tetrick stated, "as an Operator I do not feel that a procedure change is required, I feel that the conditions of question 63 could apply to several different procedures and therefore both answers A and B are correct." With respect to which principles govern the performance of "Immediate Actions," he stated as follows:

> A NRC Licensed Individual is responsible for taking timely and proper action so as not to create or cause a hazard to "safe operation of the facility" etc. - refer to 0-ADM-101 (Procedure Writers Guide) and 0-ADM-200 (Conduct of Operations) for explanation of timely (ie. Immediate Actions) and proper actions.

Letter of June 6, 1997, at 2. We agree with Mr. Tetrick that changes to the Turkey Point procedures are not required -- because we believe the ONOPs and the IMMEDIATE ACTION specified therein are stated clearly.

38. The Commission has published guidance pertaining to the preparation of and adherence to plant procedures for safety-related activities and activities affecting quality, which is relevant to the issue before the Presiding Officer. *See* NRC Inspection Manual, Part 9900: Technical Guidance (Jan. 14, 1991) (Attachment 2 hereto). Therein, the Commission stated, in pertinent part, as follows:

> The NRC expects licensees to adhere to procedures and to have established policies that effectively control procedural adherence and procedural change processes. . . . If procedural deficiencies are identified, it is expected that changes to the procedure will be effected before continuing with the procedure. Should an emergency situation arise, however, when time for proper safety response does not permit changing a deficient procedure, then deviation from the procedure in the interest of plant safety is considered appropriate.

Id. at 1-2. In addition, the guidance states as follows (*Id.* at 3):

> Licensees should provide procedures which reflect the complexity of the task and the knowledge level of the individual(s) who are expected to perform the task such that personnel performing safety-related activities and those activities affecting quality will, under normal circumstances, consistently accomplish these activities without deviating from procedures. However, as permitted under 50.54(X) and 50.54(Y), exceptional emergency conditions may arise when time for proper safety response does not permit changing a deficient procedure, and deviation from procedures in the interest of plant safety is considered appropriate. Licensees should ensure that those personnel responsible for activities affecting quality are trained to recognize such emergency conditions.

39. The above guidance refers to 10 C.F.R. § 50.54(x) and (y). Those regulations provide as follows:

> (x) A licensee may take reasonable action that departs from a license condition or technical specification . . . in an emergency when this action is immediately needed to protect the public health and safety and no action consistent with license conditions and technical specifications that can provide adequate or equivalent protection is immediately apparent.
>
> (y) Licensee action permitted by paragraph (x) of this section shall be approved, as a minimum, by a licensed senior operator, . . . prior to taking the action.

While these regulations specifically relate to license conditions and technical specifications -- which may not be changed without prior NRC approval -- the underlying philosophy is no less applicable to plant procedures, which are normally subject to revision by a licensee without prior NRC approval (unless the procedure is described in the FSAR and an unreviewed safety question is involved, as specified in 10 C.F.R. § 50.59). In all such instances, the need to protect health and safety in an emergency takes precedence over rigid adherence to written requirements.

40. In our view, Off-Normal Operating Procedure 3-ONOP-033.2, "Refueling Cavity Seal Failure," is not deficient and does not require revision; nor do the other procedures cited and relied upon by Mr. Tetrick require revision. Rather, those procedures simply do not apply under the plant conditions specified in Question 63, when two mutually supportive and confirmatory annunciators sound together, thus triggering an IMMEDIATE ACTION under 3-ONOP-033.2. Under those conditions, the written procedure should be followed, and 10 C.F.R. § 50.54(x) is not applicable.

41. We hereby certify that the foregoing is true and correct to the best of our knowledge, information and belief.

Brian Hughes

Subscribed and sworn to before me
this 13th day of June, 1997.

CIRCE E. MARTIN
NOTARY PUBLIC
MONTGOMERY CO., MD.

Circe E. Martin
Notary Public

My commission expires: CIRCE E. MARTIN
NOTARY PUBLIC STATE OF MARYLAND
My Commission Expires March 29, 1999

Thomas A. Peebles

Subscribed and sworn to before me
this 13th day of June, 1997.

Notary Public

My commission expires: _____

Brian Hughes

Subscribed and sworn to before me
this 13th day of June, 1997.

Notary Public

My commission expires: _____

Thomas A. Peebles

Subscribed and sworn to before me
this 13th day of June, 1997.

Notary Public

My commission expires: _____

Notary Public, DeKalb County, Georgia
My Commission Expires January 4, 1998

BRIAN HUGHES

General

Brian Hughes has over twenty years nuclear experience. He recently completed a rotational assignment as a Senior Staff Engineer to the Nuclear Reactors Branch of the Advisory Committee on Reactor Safeguards (ACRS). He is a former licensed Senior Reactor Operator on a 3000 MWT commercial PWR (Indian Point Unit 3) and has extensive experience in commercial and non-power reactors. Mr. Hughes has either worked, inspected or administered operator license examinations at over 40 reactors in the United States. Mr. Hughes served as an Engineering Watch Supervisor with nuclear-related duties on the attack submarine USS Sturgeon SS(N)-637. Mr. Hughes received a Bachelors Degree in Business Administration from Iona College in 1981. A brief summary of Mr. Hughes' work experience is provided below.

NRR 1992-Present

Mr. Hughes has served as a Reactor Engineer in the Operator Licensing Branch of the Office of Nuclear Reactor Regulation (NRR). He prepares exemptions, reviews waivers, is the lead panel member for operator licensing appeals, and is the technical monitor for contract operator license examiners. He was an original member of the Cost Beneficial Licensing Action (CBLA) task force.

NRC Region I 1988-1992

Mr. Hughes served as both a regional inspector and an operator license examiner. He received the Region I "Employee of the Month" award for determining that a facility could not meet its FSAR commitment for accident mitigation. Mr. Hughes acted as site resident inspector at several facilities when needed.

Prior to NRC Employment

Prior to joining the NRC, Mr. Hughes worked for Consolidated Edison of NY at Indian Point (1973-1981). He served as an auxiliary operator and rose through the ranks to become a Licensed Senior Reactor Operator on Indian Point Unit 3 (IP3). At IP3, he loaded the first fuel assembly into the reactor. He also obtained first-hand knowledge of various upset conditions including loss of electrical grid, loss of instrument air, turbine blade failure, S/G tube failure, MSIV failure, intersystem LOCA and various reactor trips.

From 1981 to 1988, Mr. Hughes served as a consultant to numerous electric utilities. In this capacity, he served as an on-shift advisor in the control room at the Byron Nuclear Plant. This included all activities from initial core load to 100 percent power.

Thomas A. Peebles
Chief, Operator Licensing and Human Performance Branch
REGION II
U.S. Nuclear Regulatory Commission
Atlanta, Georgia 30323

Education: Bachelor of Electrical Engineering, Ohio State Univ., 1969
Senior Reactor Operator License, Surry Nuclear Plant, 1976

Experience:

1989-pres. Chief, Operations Branch, DRS, Region II, NRC

Manages implementation of NRC programs for operational inspections and reactor operator licensing. Assists HQ with modification of Operator Licensing policy. Represents NRC to public and industry officials.

1986-1989 Section Chief, Division of Reactor Projects, Region II, NRC

Managed and implemented routine and reactive inspection programs at three operating reactor sites. Evaluated licensee performance and safety significance of plant events. Recommended NRC followup.

1982-1986 Senior Resident Inspector, Region III and Region II, NRC

Managed and conducted safety inspection program at sites in both Regions. Represented the NRC to public and utility officials.

1980-1982 Project Engineer and Resident Inspector, Region II, NRC

Assisted in managing the inspection and licensing program for Farley Nuclear Plant in Region. At the Farley site, was Resident Inspector.

1978-1980 Supt. Tech. Svcs., Surry Nuclear Plt., VA. ELECT.& POWER CO.(VEPCO)

During the first commercial steam generator replacement project, managed the disciplines of Chemistry, Site Engineering, Health Physics, Inst. & Control maintenance, and Non-destructive Testing.

1973-1978 Design Control Engineer, Licensing Eng., Proj. Mgr. (VEPCO)

Reviewed design changes for Code compliance; managed Operating License changes for Surry NP with NRC and vendors; managed construction of Surry $26 million construction addition.

1972-1973 Electrical Engineer, Newport News Shipbuilding & DD Co.

Coordinated system design interfaces for a Navy reactor prototype. Electrical Test Engineer for two nuclear submarine overhauls.

1969-1972 Design-Test Engineer, McDonnell Douglas Corp.

Designed and supervised the building, maintenance and use of aircraft simulators for man-machine interface studies.

Professional Association: Reg. Professional Engineer, VA and FL;
Certified NRC Inspector and Operator Licensing Examiner

ATTACHMENT 1

NUREG/CR-4525
PARAMETER IE-155

Closeout of IE Bulletin 84-03: Refueling Cavity Water Seal

Final Report

Manuscript Completed: May 1990
Date Published: June 1990

Prepared by
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Prepared for
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555
NRC FIN B8729

ABSTRACT

Documentation is provided in this report to close IE Bulletin 84-03 on the subject of refueling cavity water seals. The bulletin was issued on August 24, 1984, to all power reactor facilities except Fort St. Vrain. Because the excluded plant is gas-cooled and graphite-moderated, the subject of the bulletin does not apply to that plant. The event causing the safety concern was failure of the pneumatic seals containing water in the refueling cavity at Haddam Neck on August 21, 1984. The cavity had been flooded in preparation for refueling, but when the seals failed, water level decreased from full level just below the operating floor down to the level of the reactor vessel flange. On May 17, 1988, another refueling cavity seal leakage (about three feet in water level) occurred at Surry 1, which was in the middle of a refueling and maintenance outage. Evaluation of utility responses and NRC/Region inspection reports in accordance with a specific criterion shows that the bulletin is closed for 114 (97%) of the 118 affected facilities. It is concluded that the concerns of the bulletin have been resolved through design and procedure reviews and corrective actions taken by licensees. Follow-up items are proposed for use by NRC Region II in closing the bulletin for the four (4) remaining facilities with open bulletin status. NRC Region II verifies that the bulletin will not be closed for these four TVA facilities until construction is completed. Background information is supplied in the Introduction and Appendix A.

CLOSEOUT OF IE BULLETIN 84-03: REFUELING CAVITY WATER SEAL

INTRODUCTION

In accordance with the Statement of Work in Task Order 008 under NRC Contract 05-85-157-02, this report provides documentation for the closeout of IE Bulletin (IEB) 84-03. This task was transferred to Task 037, under the same contract, for administrative purposes only. Documentation is based on the records obtained from the NRC Document Control System.

IE Bulletin 84-03 was issued on August 24, 1984, because of failure of the refueling cavity water seal at Haddam Neck. At the time of failure, the cavity was flooded in preparation for refueling. Within 20 minutes of seal failure, water level decreased 23 feet to the level of the reactor vessel flange. If fuel had been in transfer at the time, it could have been partially or completely uncovered. Possible results would have been high radiation levels, fuel cladding failure, and release of radioactivity. If the fuel transfer tube had been open, the spent fuel pool could have drained enough to uncover the tops of the fuel assemblies, but not to uncover the active fuel. Except for Fort St. Vrain, all licensees and construction permit holders of power reactors were required to evaluate the potential for and consequences of a refueling cavity water seal failure and to provide a summary report of these actions. Because Fort St. Vrain is gas-cooled and graphite-moderated, the subject of the bulletin does not apply to that plant.

IE Information Notice (IEIN) 84-93 was issued on December 17, 1984, to all recipients of the bulletin. Discovery of two failed pneumatic seals during installation at San Onofre 2 and correction before flooding were reported. Also discussed were results of the Electric Power Research Institute (EPRI) reactor cavity seal development testing and the possibilities of draining the refueling cavity accidentally through drains or through misaligned valves of the residual heat removal (RHR) system.

Temporary Instruction (TI) 2515/66 was issued to the NRC regions on December 17, 1984, to provide guidance for performing near-term inspection follow-up of utility responses to IEB 84-03. This TI was to be used until permanent criteria for evaluating refueling cavity water seals were developed and issued by the Office of Nuclear Reactor Regulation (NRR).

On May 17, 1988, a refueling cavity water seal leak event occurred at Surry 1 in refueling shutdown with all fuel removed

from the reactor vessel and no fuel in transit. The loss of water level was about three feet from the full level.

For background information, IE Bulletin 84-03, a chronology, and sketches and descriptions of the Haddam Neck and Surry seals are included in Appendix A along with other pertinent items. Sketches of the failed Haddam Neck and Surry seals are shown on pages A-37 and A-42. Sketches of the modified Haddam Neck and Surry seals are shown on pages A-39 and A-44. The permanent (welded) Haddam Neck modified seal is described on page A-40. Evaluation of utility responses and NRC/Region inspection reports is documented in Appendix B as the basis for bulletin closeout. As an aid to evaluation, types of refueling cavity water seals at power facilities are grouped and described in Appendix B. Follow-up items are proposed in Appendix C for use by NRC Region II in assuring satisfactory completion of required responses. Abbreviations used in this report and associated documents are presented in Appendix D.

SUMMARY

1. The bulletin has been closed for the following 114 facilities for which responses and NRC/Region inspection reports indicate compliance with required actions. The documentary basis is given in Table B.1.

Arkansas 1,2	Grand Gulf 1	Quad Cities 1,2
Beaver Valley 1,2	*Haddam Neck	Rancho Seco 1
Big Rock Point 1	Harris 1	River Bend 1
*Braidwood 1,2	Hatch 1,2	*Robinson 2
Browns Ferry 1,2,3	Hope Creek 1	*Salem 1,2
Brunswick 1,2	*Indian Point 2,3	San Onofre 1
*Byron 1,2	*Kewaunee	*San Onofre 2,3
*Callaway 1	LaSalle 1,2	Seabrook 1
Calvert Cliffs 1,2	*Limerick 1,2	*Sequoyah 1,2
*Catawba 1,2	Maine Yankee	Shoreham
Clinton 1	*McGuire 1,2	South Texas 1,2
Comanche Peak 1,2	Millstone 1,2,3	*St. Lucie 1,2
*Cook 1,2	Monticello	Summer 1
Cooper Station	Nine Mile Point 1	*Surry 1,2
Crystal River 3	*Nine Mile Point 2	*Susquehanna 1,2
Davis-Besse 1	North Anna 1,2	TMI 1
Diablo Canyon 1,2	Oconee 1,2,3	*Trojan
Dresden 2,3	Oyster Creek 1	*Turkey Point 3,4
Duane Arnold	Palisades	Vermont Yankee 1
Farley 1,2	*Palo Verde 1,2,3	Vogtle 1,2
Fermi 2	Peach Bottom 2,3	Waterford 3
FitzPatrick	Perry 1	WNP 2
Fort Calhoun 1	Pilgrim 1	*Wolf Creek 1
*Ginna	Point Beach 1,2	*Yankee-Rowe 1
	*Prairie Island 1,2	*Zion 1,2

*Pneumatic seal(s) at time of bulletin issuance.

2. The bulletin is called open for the following four (4) facilities. Follow-up items for these facilities are proposed in Appendix C for use by NRC/Region II.

   +Bellefonte 1,2 +*Watts Bar 1,2

   *Pneumatic seal at time of bulletin issuance.
   +The bulletin will not be closed until construction of these facilities is completed.

3. The following facilities which have been shut down indefinitely or permanently (SDI), or have had construction halted indefinitely (CHI) are not included in this evaluation of closeout status:

Dresden 1	SDI	Perry 2	CHI
Humboldt Bay 3	SDI	Seabrook 2	CHI
Indian Point 1	SDI	TMI 2	SDI
La Crosse	SDI	WNP 1,3	CHI

4. TI 2515/66 was issued to the NRC regions for guidance only in performance of near-term inspection followup, even though its essential elements were considered to be in IEB 84-03. Refer to Item 5, page A-2.

5. Permanent criteria for evaluating refueling cavity water seals were to be developed and issued by the NRC, within the scope of Generic Issue 82 (refer to Item 6, page A-2). However, such acceptance criteria were determined to not be warranted (refer to items 15-17, pages A-4 and A-5).

6. The various designs of refueling cavity seals are categorized and tabulated in Appendix B, Table B.2. There are 11 different basic categories. These include pneumatic (active) seals, solid (passive) seals, plus metal bellows and welded components, with various combinations of two or more of these types. Of the 118 facilities either operating or under construction and required to respond to the bulletin, 47 used pneumatic seals alone or in combination with other types, 32 used metal bellows exclusively (BWRs), 32 used the passive solid seal types only, and 7 used the welded component type of seal arrangement.

CONCLUSIONS

1. The concerns of the bulletin have been resolved through design and procedure reviews and corrective actions taken by licensees. Verification has been established through inspection follow-up and review by the NRC.

2. The two cavity seal major leak events at Haddam Neck and Surry 1 were due to design and testing deficiencies unique to each plant.

3. At Haddam Neck, the lack of a positive means of centering the sealing plate to ensure uniform gaps of the two pneumatic seals appears to have been one of the main contributing factors which allowed a portion of one seal to be pushed through the gap and resulted in draining of the cavity. Other factors also contributed, such as the unique softness of the seal material, the effect of high bulb pressure, and an error in the test fixture for push through. These deficiencies were all resolved by changes in design, specification, procedures, and testing. Refer to the sketches and descriptions of these seals in Appendix A.

4. At Surry 1 (the same design is used for Surry 2) the J-type passive seals, which are the backup to the pneumatic seals, were never tested independently to assure that they would seal the cavity effectively. See the sketches and descriptions on pages A-41 and A-42. They failed to do so when the gas pressure supply was not sufficient. The backup seals were redesigned, tested independently, and found to perform properly. The licensee response of January 9, 1989, indicates that the procedural deficiencies that also were found have been resolved, as verified by Inspection Report 89-08 of 05-02-89.

5. Most applications of pneumatic seals other than those at Surry incorporate the Presray design which uses the solid wedge portion as the primary seal, and the inflated portion as the backup seal. The inflated portion acts as the initial sealing means until sufficient head builds up from filling the cavity to produce effective sealing by the solid wedge portion of the seal. The success of this wedge sealing without the pneumatic backup has been demonstrated adequately.

6. In the few plants with pneumatic seals where the solid wedge design is not used, some other backup means is provided which is either obviously adequate or has been tested and shown to be adequate.

7. The designs using solid seals are built such that gross seal failure is not a credible event. Loss of a seal from the joint is unlikely, but if it were to occur, it would result in the seal plate being pressure loaded onto the support surfaces. This would restrict leakage to a low enough rate to allow ample time for operator action to move fuel to safe locations. In some cases, waviness of the outer sealing face causes low rates of leakage which are directed into troughs and pipes.

8. The metal bellows seals used exclusively in BWRs are permanently installed members with a leak-before-break characteristic. Adequate leak detection systems are provided to ensure against a major leak event.

9. Permanently welded components forming the refueling cavity seal have access and vent ports which are sealed with bolted covers before flooding the cavity. Dislocation of covers and sealing components is unlikely. The leak-before-break characteristic with adequate leak detection systems also applies to these designs.

10. As indicated by the Chronology (pages A-1 through A-5), Generic Issues 82 and 137 were investigated for application to the bulletin. Generic Issue 82 is resolved without further action by the memorandum of April 24, 1989 from E. S. Beckjord to V. Stello, Jr. (Item 16, page A-5). Proposed Generic Issue 137 about the refueling cavity water seal is dropped, according to Item 17 (page A-5). A copy of accepted and resolved Generic Issue 82 appears on page A-23.

SSINS NO.: 6820
OMB No.: 3150-0011
Expiration Date: 04/30/85
IEB 84-03

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

August 24, 1984

IE BULLETIN NO. 84-03: REFUELING CAVITY WATER SEAL

Addressees:

All power reactor facilities holding an Operating License (OL) or Construction Permit (CP) except Fort St. Vrain.

Purpose:

The purposes of this bulletin are to: (1) notify addressees of an incident in which the refueling cavity water seal failed and rapidly drained the refueling cavity, and (2) request certain actions to assure that fuel uncovery during refueling remains an unlikely event.

Description of Circumstances:

On August 21, 1984, the Haddam Neck plant experienced a failure of the refueling cavity water seal with the refueling cavity flooded in preparation for refueling. The refueling cavity water level (23 feet) decreased to the level of the reactor vessel flange within 20 minutes which flooded the containment with approximately 200,000 gallons of water. The seal assembly consists of an annular plate with two pneumatic seals (Figure 1). The assembly was recently redesigned by the licensee and had been used once previously. The seal was manufactured by Presray, Inc. The seal assembly was subject to a gross failure due to lack of an interference between the width of the seal annulus and the width of the opening, which allowed the seal to be significantly displaced. No fuel was being transferred at the time of this seal failure. If, however, fuel had been in transfer at the time, it could have been partially or completely uncovered with possible high radiation levels, fuel cladding failure and release of radioactivity. In addition, if the fuel transfer tube had been open, the spent fuel pool could have drained to a level which would have uncovered the top of the fuel.

Action to be Taken by Plants Currently in Refueling:

1. Evaluate the potential for and consequences of a refueling cavity water seal failure and provide a summary report of these actions by August 31, 1984.

Action To Be Taken By Plants Prior To Beginning Refueling Or Within 90 Days Of Receipt Of This Bulletin, Whichever Is Sooner:

2. Evaluate the potential for and consequences of a refueling cavity water seal failure and provide a summary report of these actions.

Such evaluations should include consideration of: gross seal failure; maximum leak rate due to failure of active components such as inflated seals; makeup capacity; time to cladding damage without operator action; potential effect on stored fuel and fuel in transfer; and emergency operating procedures.

Written reports describing the above actions shall be submitted to the appropriate Regional Administrator under oath or affirmation under provisions of Section 182a, Atomic Energy Act of 1954, as amended. Also, the original copy of the cover letter and a copy of the report shall be transmitted to the U.S. Nuclear Regulatory Commission, Document Control Desk, Washington, D.C. 20555 for reproduction and distribution.

This request for information was approved by the Office of Management and Budget under a blanket clearance number 3150-0011 which expires April 30, 1985. Comments on burden and duplication may be directed to the Office of Management and Budget, Reports Management, Room 3208, New Executive Office Building, Washington, D.C. 20503.

If you have any questions regarding this matter, please contact the Regional Administrator of the appropriate NRC Regional Office or the technical contact listed below.

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Technical Contact: H. Bailey, IE
(301) 492-7078

Attachments:
1. Figure 1
2. List of Recently Issued IE Bulletins

ATTACHMENT 2

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

NRC INSPECTION MANUAL

LHFB

PART 9900: TECHNICAL GUIDANCE

PROCAD.TG

OPERATIONS - PROCEDURAL ADHERENCE

A. PURPOSE

To provide the NRC position concerning the evaluation of licensees' use of, and adherence to, procedures for the performance of all activities affecting quality as covered under Criterion V and VI of Appendix B to 10 CFR Part 50, and defined as safety-related in Regulatory Guide 1.33.

B. DEFINITION

Procedures. Documents established by designated licensee personnel that provide a prescribed written and controlled method for plant personnel to operate and maintain reactor facilities in a safe, pre-determined, and consistent manner. The level of detail, clarity, format, and logical arrangement of steps within procedures should enable newly qualified individuals following a procedure to consistently achieve the desired result. Procedures, as defined here, apply to both text and flow-chart formatted guidance and work instructions.

C. BACKGROUND

As a result of the staff's experiences with the evaluation of licensees' activities during the operational phase of nuclear power plants, the NRC has revised its inspection guidance concerning licensees' use of procedures. Frequently, confusion develops regarding NRC inspections of licensee adherence to procedures. The term "verbatim compliance" is part of this confusion. The NRC position on the issue of procedural adherence requires an understanding of the types of scenarios in which procedures are used. Because there are many different scenarios that arise involving procedural adherence issues, some differences in application of procedural adherence requirements have arisen and the term "verbatim compliance" has crept into the regulatory vocabulary of some of the staff. This inspection guidance provides a discussion of the technical basis upon which inspectors should evaluate licensees' use of procedures.

D. DISCUSSION

The NRC expects licensees to adhere to procedures and to have established policies that effectively control procedural adherence and procedural change processes. The NRC expects that the combination of an individual's training, and the proper use of written procedures consistent with the licensee's procedural adherence policy, will be sufficient to successfully complete a task. If

procedural deficiencies are identified, it is expected that changes to the procedure will be effected before continuing with the procedure. Should an emergency situation arise, however, when time for proper safety response does not permit changing a deficient procedure, then deviation from the procedure in the interest of plant safety is considered appropriate.

This expectation is based on the requirements and guidance concerning the use of procedures for all activities affecting quality. These requirements and guidance are primarily found in Criterion V and VI of Appendix B to 10 CFR Part 50 (Appendix B); Regulatory Guide (RG) 1.33, Revision 2, 1978; "Quality Assurance Program Requirements (Operation);" and the American National Standards Institute (ANSI) N18.7-1976/ANS-3.2; "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants."

Criterion V and VI of Appendix B to 10 CFR Part 50 state the requirements by which licensees develop, implement, maintain an control procedures:

Criterion V:

"Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with [emphasis added] these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished."

Criterion VI

"Measures shall be established to control the issuance of documents, such as instructions, procedures, and drawings, including changes thereto, which prescribe all activities affecting quality. These measures shall assure that documents, including changes, are reviewed for adequacy and approved for release by authorized personnel and are distributed to and used at the location where the prescribed activity is performed. Changes to documents shall be reviewed and approved by the same organizations that performed the original review and approval unless the applicant designates another responsible organization."

Guidance concerning licensees' use of procedures during the operations phase of nuclear power plants, is contained in RG 1.33, which endorses, with exceptions, ANSI-N18.7-1976. Section 5.2.2, "Procedural Adherence," of ANSI-N18.7-1976 addresses licensees' use of and adherence to procedures. The ANSI standard provides guidance to identify the manner in which procedures are to be implemented, and provides several examples for accomplishing this. Inspectors should be aware that this guidance is not a regulatory requirement, unless incorporated in the facility license or technical specifications or an enforceable document, such as in an NRC-approved Quality Assurance plan or FSAR.

While ANSI-N18.7-1976 recommends that licensees provide guidance to identify the manner in which procedures are to be implemented, the methods of disseminating such guidance vary widely across the industry. Licensees may have provided this guidance in any of the following types of documents: (1) Final Safety Analysis Report (FSAR) sections on plant procedures and quality assurance programs, (2) technical specification sections on administrative controls, (3) corporate policy statements or conduct of operations charters, (4) quality assurance manuals and department administrative manuals, or (5) individual procedures (e.g. emergency operating procedures).

The terminology and descriptions that are often used in these documents may introduce questions with regard to licensee philosophy on procedural adherence. Licensees commonly use phrases such as "in accordance with," "shall be followed," "shall be used," "shall adhere to," "should be referenced," and "utilized as necessary," which permit broad interpretation and individual judgement. Therefore, licensees have the responsibility of ensuring that (1) the phrases used to describe procedural adherence are not ambiguous, and (2) plant personnel have been adequately trained to understand the meaning and intent of such phrases. Plant personnel includes licensee and contractor workers responsible for safety-related activities and those activities affecting quality.

Inspectors should ensure that licensees adhere to procedures in accordance with their policies and guidance regarding procedural adherence and procedural changes which should be consistent with the requirements of Appendix B and their licensing commitments. Licensees should have considered the following important factors in establishing policies and guidelines for procedural usage.

1. Licensees should establish documented plant-specific procedural adherence and procedural change policies and guidance which are consistent with regulatory requirements and their licensing commitments. These policies and guidance should be documented in a consistent and unambiguous manner, and should be described in sufficient detail to ensure that individuals responsible for performing activities affecting quality understand these policies and conduct their activities in accordance with these policies.

2. Licensees should implement appropriate controls to ensure that plant personnel are trained, understand, and adhere to their policies regarding procedural adherence and procedural change processes.

3. Licensees' procedural change process and policies/guidance on procedural adherence need to be compatible to promote efficient use of resources to ensure that the change process will be utilized. Licensee personnel, who perform safety-related activities and those activities affecting quality should understand the situations that warrant temporary or permanent procedural changes, should know the methods for implementing these changes, and should conduct activities affecting quality consistent with these processes.

4. Licensees should provide procedures which reflect the complexity of the task and the knowledge level of the individual(s) who are expected to perform the task such that personnel performing safety-related activities and those activities affecting quality will, under normal circumstances, consistently accomplish these activities without deviating from procedures. However, as permitted under 50.54(X) and 50.54(y), exceptional emergency conditions may arise when time for proper safety response does not permit changing a deficient procedure, and deviation from procedures in the interest of plant safety is considered appropriate. Licensees should ensure that those personnel responsible for activities affecting quality are trained to recognize such emergency conditions.

   NRC inspectors should be familiar with the documents listed in Section F, "References," and the additional NRC and industry documents detailed in Section G, "Additional Sources of Procedural Usage Information," which provide guidance on, and descriptions of, quality assurance programs and procedural usage.

E. CONCLUSION

The NRC expects licensees to adhere to procedures and to have established policies that effectively control procedural adherence and procedural change processes. If procedural deficiencies are identified, it is expected that changes to the procedure will be effected before continuing with the procedure. Should an emergency situation arise, however, when time for proper safety response does not permit changing a deficient procedure, then deviation from the procedure in the interest of plant safety is considered appropriate. The concept of "verbatim compliance" is not consistent with the above approach and policies requiring "verbatim compliance" may not be practically achievable for all procedures since it implies that procedures are perfect. Consequently, the term "verbatim compliance" should not be used by NRC inspectors. There may be situations where a licensee has promulgated a procedural adherence policy which uses the words, "verbatim compliance." Inspectors should be aware of the difficulties associated with such a policy. Inspectors should review such a policy to be sure that it is consistent with the NRC Position described above.

Inspection of licensees' use of procedures should (1) continuously focus on licensee's performance and (2) ensure that licensees have processes for effectively controlling procedural adherence and procedural changes as outlined above. In those instances where performance fails to meet a regulatory requirement, the inspector should determine if the licensee's procedures were performed in accordance with the licensee's procedural adherence policies and guidance or if the procedures themselves were inadequate to ensure that regulatory requirements are consistently met. If a procedure was not performed in accordance with the licensee's procedural adherence policies and guidance or was inadequate, then regional management should frame a violation to indicate where the failure in performance occurred.

F. REFERENCES

1. U. S. Code of Federal Regulations, "Instructions, Procedures and Drawings," Criterion V and VI of Appendix B of Part 50 of Title 10.

2. U.S. Code of Federal Regulations, "Conditions of Licenses", Part 50.54(x) and 50.54(y) of Title 10.

3. Regulatory Guide 1.33, Revision 2, "Quality Assurance Program Requirements (Operation)," 1978.

4. ANSI-N18.7-1976/ANS-3.2, "Administrative Controls and Quality Assurance For the Operational Phase of Nuclear Power Plants," Sections 5.2 and 5.3.

G. ADDITIONAL SOURCES OF PROCEDURAL USAGE INFORMATION

1. ANSI/ANS-3.2-1982, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," Section 5.2.2.

2. ANSI/ANS-3.2-1988, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," Section 5.2.2.

3. ANSI 45.2-1971, "Quality Assurance Program Requirements for Nuclear Power Plants," Section 6.

4. ANSI/ASME 45.2-1977, "Quality Assurance Program Requirements for Nuclear Facilities," Section 6.

5. ANSI/ASME NQA-1-1983, "Quality Assurance Program Requirements for Nuclear Facilities," Section 5.

6. ANSI/ASME NQA-2-1983, "Quality Assurance Requirements for Nuclear Power Plants," Section 4.2.

7. Draft Regulatory Guide DG-1001, "Maintenance Programs for Nuclear Power Plants," Section 4.4, 1990.

8. Licensee Technical Specifications Section, "Administrative Controls."

9. NUREG/CR-1369, Revision 1, "Procedures Evaluation Checklist for Maintenance, Test and Calibration Procedures Used in Nuclear Power Plants," 1982.

10. SECY-90-337, "Procedural Adherence Requirements," October 3, 1990.

11. U.S. Code of Federal Regulations, "Completeness Accuracy of Information," Part 50.9 of Title 10.

12. U.S. Code of Federal Regulations, "Inaccurate and Incomplete Information," Criterion VI of Appendix C of Part 2 of Title 10.

END

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

DOCKETED
USNRC

BEFORE THE PRESIDING OFFICER

'97 JUN 13 P4:29

In the Matter of	)	
	)	OFFICE OF SECRETARY DOCKETING & SERVICE BRANCH
RALPH L. TETRICK	)	Docket No. 55-20726-SP
	)	
(Denial of Application for Senior Reactor Operator License)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S RESPONSE TO THE PRESIDING OFFICER'S MEMORANDUM AND ORDER (QUESTIONS RELEVANT TO REMAND)" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, or as indicated by an asterisk through deposit in the Nuclear Regulatory Commission's internal mail system this 13th day of June 1997.

Peter B. Bloch, Presiding Officer*
Administrative Judge
Atomic Safety and Licensing Board
Mail Stop: T-3 F23
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Washington, D. C. 20555

Dr. Peter S. Lam*
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Atomic Safety and Licensing Board
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Mr. Ralph L. Tetrick
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Adjudicatory File* (2)
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Sherwin E. Turk

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