



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

October 30, 2009

10 CFR 50.90

TVA-WBN-TS-09-20

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 1
Facility Operating License No. NPF-90
NRC Docket No. 50-390

Subject: **License Amendment Request and Response to Request for
Additional Information Related to Carbon Dioxide Fire
Suppression System (TAC No. ME0876)**

- References:
1. NUREG-0847, Supplement No. 18, "Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Units 1 and 2, Docket Nos. 50-390 and 50-391," dated October 1995
 2. Letter from the NRC to TVA, "Watts Bar Nuclear Plant, Unit 1 – Request for Additional Information Regarding Request for Correction to NUREG-0847, Supplement 18, Related to Carbon Dioxide Fire Suppression System (TAC NO. ME0876)," dated July 15, 2009
 3. Letter from TVA to the NRC, "Withdrawal of Denial of Non-Cited Violation 05000390/2008005-04, 'Carbon Dioxide System in Fire Area 48 Failed to Meet Design Criterion'," dated August 25, 2009
 4. Letter from TVA to the NRC, "Request for Extension Regarding License Amendment Request Submission Date and Response to Request for Additional Information Related to Carbon Dioxide Fire Suppression System (TAC No. ME0876)", dated September 30, 2009

In accordance with 10 CFR 50.90, the Tennessee Valley Authority (TVA) is submitting a license amendment request (WBN-TS-09-20) to Facility Operating License No. NPF-90 for Watts Bar Nuclear Plant (WBN). The proposed amendment will

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modify the WBN Operating License by adding an exception to Operating License Condition 2.F regarding the provisions of the Fire Protection Program. This change is necessary to resolve a discrepancy between WBN's Fire Protection Report and NUREG-0847, Supplement 18, "Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Units 1 and 2, Docket Nos. 50-390 and 50-391," (Reference 1) related to the carbon dioxide fire suppression system in the Unit 1 Auxiliary Instrument Room.

Enclosed is TVA's evaluation of the proposed change. Included as part of the technical justification for the change is TVA's response to NRC's request for additional information documented in Reference 2 as previously agreed upon by letters dated August 25, 2009 (Reference 3) and September 30, 2009 (Reference 4).

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the license amendment qualifies for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosure to the Tennessee State Department of Public Health.

TVA requests approval of this license amendment by October 30, 2010. Implementation of the amendment will be completed within 30 days of NRC approval. There are no regulatory commitments contained in this letter or its enclosure. Please direct any questions concerning this matter to Kevin Casey at (423) 751-8523.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on this 30 day of October, 2009.

Respectfully,



R. M. Krich
Vice President
Nuclear Licensing

Enclosure

cc: (Enclosure)

NRC Regional Administrator – Region II
NRC Senior Resident Inspector – Watts Bar Nuclear Plant
TN Department of Environment & Conservation – Division of Radiological Health

ENCLOSURE

Watts Bar Nuclear Plant, Unit 1
Facility Operating License No. NPF-90
NRC Docket No. 50-390

License Amendment Request and Response to
Request for Additional Information Related to
Carbon Dioxide Fire Suppression Systems

EVALUATION OF THE PROPOSED CHANGE

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Subject: License Amendment Request and Response to Request for
Additional Information Related to Carbon Dioxide Fire
Suppression System (TAC No. ME0876)

1.0 SUMMARY DESCRIPTION

This evaluation supports a license amendment request (LAR) to amend Facility Operating License No. NPF-90 (Reference 1) for Watts Bar Nuclear Plant (WBN), Unit 1.

The proposed change would revise WBN's Unit 1 license by adding an exception to Operating License Condition 2.F regarding the provisions of the Fire Protection Program. This change is necessary to resolve a discrepancy between WBN's Fire Protection Report (FPR) (Ref. 2) and the NRC's Supplemental Safety Evaluation Report (SSER) No. 18 (NUREG-0847), "Safety Evaluation Report related to the operation of Watts Bar Nuclear Plant, Units 1 and 2, Docket Nos. 50-390 and 50-391," (Ref. 3) related to the carbon dioxide (CO₂) fire suppression system in the Unit 1 Auxiliary Instrument Room.

The Tennessee Valley Authority (TVA) requests approval of this license amendment by October 30, 2010. Implementation of the amendment will be completed within 30 days of NRC approval.

2.0 DETAILED DESCRIPTION

The automatic fire suppression systems at WBN Unit 1, are designed to extinguish a fire or control and minimize the effects of a fire until the fire brigade can respond and extinguish it. For the automatic total-flooding CO₂ suppression systems, a signal from either the fire detection system or a push button station activates the area alarms, CO₂ discharge timer which actuates the master control valve and the area selector valve permitting the CO₂ to be discharged into the selected area. In addition, the system can be manually operated via the electro-manual pilot valve for each hazard protected and the electro-manual valve at the storage tank. Personnel safety is considered by providing the pre-discharge alarm to notify anyone in the area that CO₂ is going to be discharged and by the addition of an odorizer to the CO₂ to warn personnel that CO₂ has been discharged.

Actuation of the CO₂ system causes selective closure of dampers. This prevents spread of the fire and ensures that the minimum concentration of CO₂ is maintained. Full discharge tests for representative rooms in conjunction with door fan pressurization tests have been conducted to validate CO₂ concentration and soak times. The duration of the discharge is determined by the area requirements and is controlled by the discharge timer.

The WBN Unit 1 Auxiliary Instrument Room contains the Reactor Protection System (RPS) for Unit 1. The Auxiliary Instrument Room is located in the Control Building at elevation 708.0. Alternative safe shutdown was selected for the Auxiliary Instrument Room and a CO₂ suppression system was installed to meet the requirements of 10 CFR 50, Appendix R, Section III.G.3. The CO₂ suppression system was required to be designed in accordance with National Fire Protection Association (NFPA) Standard 12, "Standard for Carbon Dioxide Extinguishing Systems," 1973 Edition (NFPA 12 - 1973) (Ref. 4); and the Watts Bar FPR as approved in NUREG-0847, Supplement 18.

WBN's FPR describes the design basis for the automatic total-flooding CO₂ suppression systems protecting the Auxiliary Instrument Rooms as follows:

"Auxiliary Instrument Rooms – Deep seated fires. Must achieve 30% concentration with 2 minutes, 50% concentration within 7 minutes, and maintain at least 45% concentration for at least 15 minutes."

However, NUREG-0847, Supplement 18, describes the design basis for the CO₂ suppression systems protecting the Auxiliary Instrument Rooms as follows:

"Auxiliary Instrument Rooms – the primary fire hazard is cables and is considered a deep-seated fire source; therefore, the system must achieve a 30-percent concentration within 2 minutes and 50-percent concentration within 7 minutes after system discharge. In addition, the leakage from the room must be limited and the system must maintain at least a 50-percent concentration for 15 minutes;"

NFPA 12 -1973 (the code of record for WBN), does not specify a definite hold time, or soak time, for CO₂ concentration, but states:

"For deep seated fires, the required extinguishing concentration shall be maintained for a sufficient period of time to allow the smoldering to be extinguished and the material to cool to a point at which reignition will not occur when the inert atmosphere is dissipated."

By letter dated May 10, 1995 (Ref. 5), the NRC requested additional information regarding the CO₂ fire suppression system design after Inspection Report (IR) 50-390/95-16 (Ref. 6) had identified discrepancies in the design and testing of the system. By letter dated May 26, 1995 (Ref. 7), TVA replied to the NRC's request and provided a detailed justification regarding the adequacy of the WBN CO₂ fire suppression systems in the Auxiliary Instrument Rooms. As part of this justification, TVA agreed to:

"...revise the design description for the CO₂ system supplying the auxiliary instrument rooms (Units 1 and 2) to include a minimum soak time. The soak time will be to maintain CO₂ concentration greater than 45% for at least 15 minutes."

When published in October of 1995, NUREG-0847, Supplement 18, approved the WBN FPR and correctly stated the performance requirements for the CO₂ fire suppression system provided for the Auxiliary Instrument Rooms – except that it specified that the system would maintain a 50% CO₂ concentration for 15 minutes. This discrepancy between the SSER and the WBN FPR was not recognized by TVA until July of 2007, when IR 07-07 (Ref. 8) identified Unresolved Item (URI) 05000390/2007007-01, "CO₂ System in FA [Fire Area] 48 Appears to Deviate From Design Criterion in SSER." In February of 2009, the NRC identified Non-Cited Violation (NCV) 05000390/2008005-04 (Ref. 9) regarding this issue because the CO₂ fire suppression system did not meet the SSER approved concentration for the entire Auxiliary Instrument Room. WBN test records indicate that while a 50% CO₂ concentration is maintained for 15 minutes in the lower half of the room, at three quarters of the room's height, only a 45% CO₂ concentration is maintained for 15 minutes. Although the performance of the WBN Unit 1 Auxiliary Instrument Room CO₂ suppression system meets the requirements of the WBN FPR and NFPA 12 -1973, the system does not provide a 50% CO₂ concentration for the entire room for 15 minutes as specified in Supplement 18 to NUREG-0847.

In order to resolve the discrepancy between the WBN FPR, NUREG-0847, and the system performance characteristics, TVA proposes to revise WBN Unit 1 Operating License Condition 2.F to reflect the design bases for the CO₂ suppression system provided for the Unit 1 Auxiliary Instrument Room, which is as follows:

Auxiliary Instrument Room – The primary fire hazard is considered a deep-seated fire source; therefore, the system must achieve a 30% concentration within 2 minutes and 50% concentration within 7 minutes after system discharge. In addition, the leakage from the room must be limited and the system must maintain at least a 45% concentration for 15 minutes.

As a result of the incorporation by reference of Supplement 18 of the SER, License Condition 2.F currently requires the CO₂ system to maintain a 50% concentration for 15 minutes. License Condition 2.F currently states:

“TVA shall implement and maintain in effect all provisions of the approved fire protection program as described in the Fire Protection Report for the facility, as approved in Supplements 18 and 19 of the SER (NUREG-0847) subject to the following provision:

TVA may make changes to the approved fire protection program without prior approval of the Commission, only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.”

TVA proposes that License Condition 2.F be modified to read as follows:

TVA shall implement and maintain in effect all provisions of the approved fire protection program as described in the Fire Protection Report for the facility, as approved in Supplements 18 and 19 of the SER (NUREG-0847), except for carbon dioxide concentration requirements for the low-pressure total-flooding carbon dioxide system provided for the Unit 1 Auxiliary Instrument Room which are as approved in Safety Evaluation [##], dated [MONTH] [##], 20[##], subject to the following provision:

TVA may make changes to the approved fire protection program without prior approval of the Commission, only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

Attachments 1 and 2 provide the marked up Facility Operating License pages and the final, clean Facility Operating License pages, respectively. As indicated in the description of the above proposed license condition, the requested change for a 45% concentration will only be applicable to the Unit 1 Auxiliary Instrument Room. The discussion in SSER 18 addressed both the Unit 1 and Unit 2 Auxiliary Instrument Rooms and the Unit 2 room does contain equipment required for Unit 1 operation. However, the results of Special Performance Test (SPT) SPT-039-02, “CO₂ Fire Protection for Unit 1 and Unit 2 Aux Instrument Rooms,” (Attachment 3), which was performed in July 1995, indicates that the Unit 2 Auxiliary Instrument Room will maintain a concentration of ≥ 50% for 15 minutes. Therefore, the concentration level stated in SSER 18 remains applicable to the Unit 2 Auxiliary Instrument Room.

3.0 TECHNICAL EVALUATION

NUREG-1805, "Fire Dynamics Tools (FDTs): Quantitative Fire Hazard Analysis Methods for the U.S. Nuclear Regulatory Commission Fire Protection Inspection Program," (Ref. 13) states that "...most surface burning and open flame will stop when the concentration of CO₂ in the air reaches about 20-percent or less by volume." NUREG-1805 also notes that considerable margin is built into the 50% CO₂ design concentration required in NFPA 12-1973 (Ref. 4). Testing in the WBN Unit 1 Auxiliary Instrument Room has demonstrated that the CO₂ suppression system provides a 45% CO₂ concentration in the upper portion of the room for an extended period of time (25 minutes per test data). In the lower portion of the room, where the majority of the combustible loading is located, testing has shown that a 50% CO₂ concentration is maintained for 25 minutes. TVA has also reviewed CO₂ suppression system test data from Sandia National Laboratory and concluded that Sandia National Laboratory's test data is consistent with TVA's determination that a 45% CO₂ concentration for 15 minutes is adequate to extinguish a deep-seated fire.

The following subsections provide the detailed technical basis for the proposed change, as well as TVA's response to the NRC's Request for Additional Information (RAI) documented in a letter from the NRC to TVA dated July 15, 2009 (Ref. 10).

3.1 Adequacy of 45% CO₂ Concentration

Information Notice (IN) 92-28 (Ref. 11) cites Sandia National Laboratory's determination that, for deep seated cable fires, it is necessary to retain a 50% concentration of CO₂ for a minimum soak time of 15 minutes to extinguish fully developed fires. The results of Sandia's testing was documented in NUREG/CR-3656, "Evaluation of Suppression Methods for Electrical Cable Fires," dated October 1986. (Ref. 12) Although neither of these documents are part of the WBN Unit 1 design or licensing basis, an examination of the Sandia test methodologies and a comparison of the Sandia tests to the CO₂ suppression system for the WBN Unit 1 Auxiliary Instrument Room, substantiate TVA's position that a 45% CO₂ concentration for 15 minutes in the WBN Unit 1 Auxiliary Instrument Room, is adequate to provide extinguishment of a deep seated fire. This section also responds to NRC RAI 1.

NRC RAI 1:

TVA letter, dated March 24, 2009 (ML090840302), Enclosure 1, page E1-1, states that,

"Contrary to the above, since receipt of the operating license on February 7, 1996, until the present, the CO₂ system for the auxiliary instrumentation room was not designed in accordance with the 1973 Edition of the NFPA [National Fire Protection Association] 12 and SSER No. 18, in that, the CO₂ system was unable to deliver and maintain a minimum gas concentration of 50 percent in the upper portion of the room for 15 minutes..."

The NFPA 12 Standard on "Carbon Dioxide Extinguishment Systems," 1973 Edition, the Code of Record (COR) for WBN Unit 1 installation, Section 2421 specifies 50 percent design concentration for deep seated fire. Section 2232 states, "For deep seated fires, the required extinguishing concentration shall be maintained for a sufficient period of

time to allow the smoldering to be extinguished and material to cool to a point at which re-ignition will not occur when the inert atmosphere is dissipated..."

Provide a basis for why you believe it is adequate for the total flooding automatic CO₂ fire suppression system installed in the Auxiliary Instrument Room to achieve a concentration of only 45 percent (rather than at least 50 percent) for 15 minutes in the upper portion.

TVA Response:

On July 16, 1995, TVA initiated Special Performance Test (SPT) SPT-039-02, "CO₂ Fire Protection for Unit 1 and Unit 2 Aux Instrument Rooms," in order to confirm that the 45% CO₂ concentration could be sustained for greater than 15 minutes in the Unit 1 and Unit 2 Auxiliary Instrument Rooms as specified in the CO₂ system design basis. SPT-039-02 (Attachment 3) was completed on July 23, 1995, and confirmed that 45% could in fact be sustained for 15 minutes as agreed upon by letter dated May 26, 1995 (Ref. 7).

Sandia National Laboratory's testing of CO₂ fire suppression systems included the 5 tests summarized in TVA Table 1 (Sandia Table 14), below.

Carbon Dioxide Fire Suppression Tests, NFPA-12						
Test Number	Number of Trays	Orientation of Trays	Type of Cable	Duration ^a of Initiation Fire Exposure	Soak ^b Time (min)	Test Outcome
83	5	H	Q	1 18-min burn	10	Reignited when ventilated
84	5	H	Q	1 16-min burn	15	No reignition, trays smoking
85	5	H	U	1 5.5-min burn	10	No reignition after ventilation
88	5	V	Q	1 17-min burn	15	No reignition, trays smoking
91	5	V	U	1 5-min burn	10	No reignition after ventilation

Legend: H - Horizontal cable trays
V - Vertical cable trays
Q - Qualified IEEE-383 cable
U - Unqualified cable

^aLength of time that propane burners were on.

^bLength of time that the ventilation system was turned off and the stack cover closed.

Table 1 – Sandia CO₂ Fire Suppression Tests

Based upon review and comparison of the SPT-039-02 test data and the Sandia National Laboratory's test data, TVA concludes that the extinguishing concentration of 45% for 15 minutes in the Unit 1 Auxiliary Instrument Room is sufficient for the total flooding automatic CO₂ fire suppression system for the following reasons:

- A. *The results of Sandia Tests #83 and # 85 demonstrate that concentrations lower than 50% are effective in providing extinguishment for deep-seated cable tray fires.*

TVA Figures 1 and 2 (Sandia Figures 36 and 37, respectively) show CO₂ concentration as a function of time for Sandia Tests #83 and #85. In Sandia Test #83 (Qualified Cables), the total time that CO₂ concentration was at or

above 50% was approximately 7 minutes – for approximately 3 minutes following the initial discharge and for approximately 4 minutes following the second discharge. The concentration was below 50% for almost 2 minutes before the second discharge returned the concentration to above 50%. For Sandia Test #85 (Unqualified Cables), the total time that the CO₂ concentration was at or above 50% was approximately 8 minutes – for approximately 6 minutes following the initial discharge and for approximately 2 minutes following the second discharge. The concentration was below 50% for slightly less than one minute before the second discharge returned the concentration to above 50%.

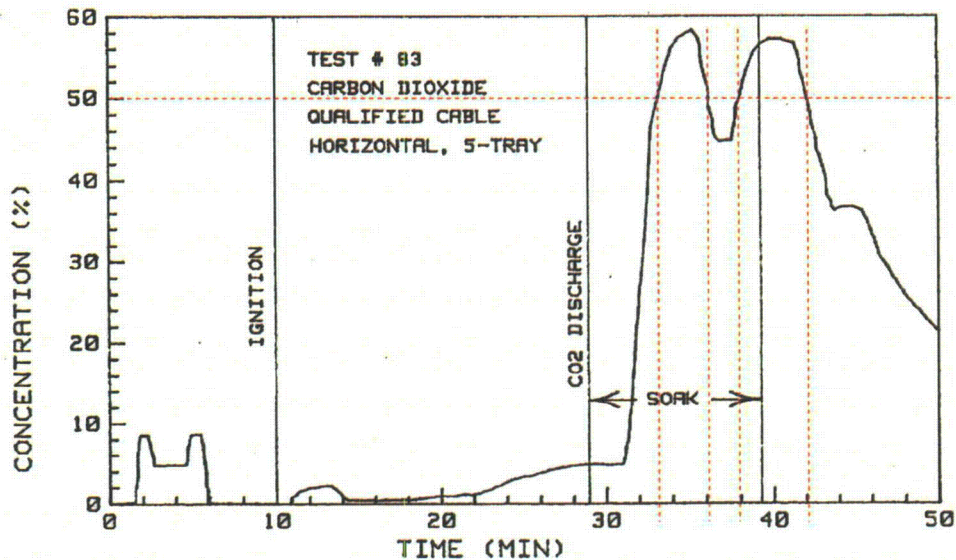


Figure 1 – Sandia Test #83 CO₂ Concentration Results

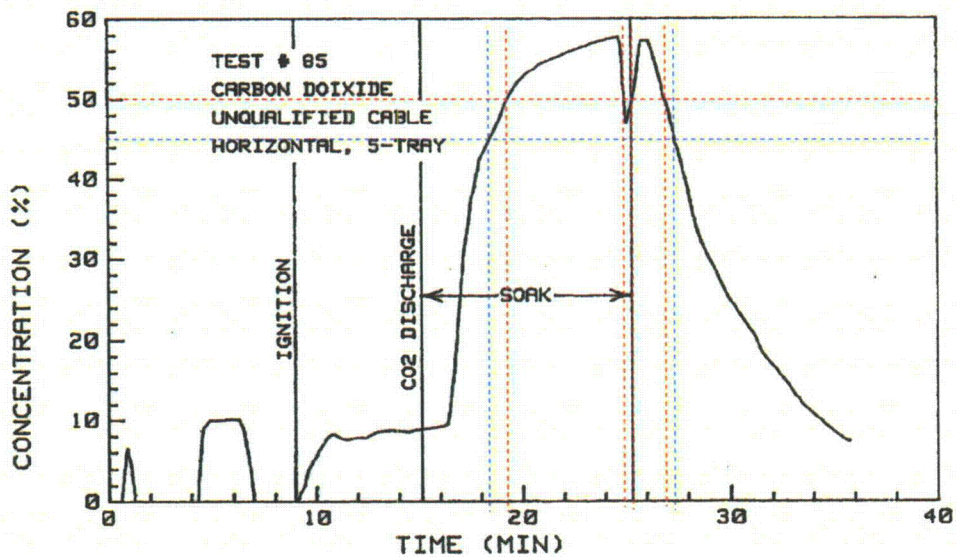


Figure 2 – Sandia Test #85 CO₂ Concentration Results

For qualified cables (Test # 83), re-ignition did occur, but only after ventilation was restored. TVA Figure 3 (Sandia Figure 34) shows the cable tray temperature against time during Test #83. According to the test report, ventilation during this sequence was reestablished at approximately the 39-minute mark, approximately 10 minutes after initiation of the CO₂ discharge, and approximately 8 minutes after the actual discharge began. TVA Figure 3 shows that the cable tray temperatures declined continuously from the time CO₂ was discharged until ventilation was reestablished, and that the rate of decline was not appreciably affected by the reduction in CO₂ concentration to 45% before ventilation was reestablished.

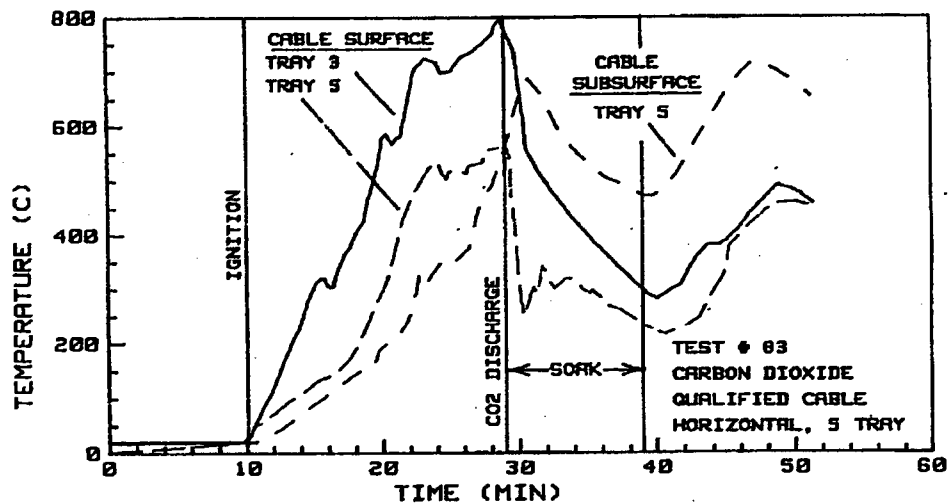


Figure 3 – Sandia Test #83 Cable Temperature Results

For horizontal and vertical fully developed cable tray fires with IEEE 383-qualified cables, NUREG/CR-3656 specifies a required soak time of 15 minutes. While 15 minutes at 50% concentration will clearly be sufficient, as discussed above, the actual test data indicates that lower concentrations for at least part of the time can be effective.

For unqualified cables (Test # 85), no re-ignition occurred when ventilation was restored after 10 minutes, while the CO₂ concentration was only at or above 50% for a total of 8 minutes. The temperature results for Test #85 also support the conclusion that a concentration less than 50% will be effective in extinguishing deep-seated cable tray fires. TVA Figure 4 (Sandia Figure 35) shows cable temperatures for unqualified cables (Test #85) as a function of time.

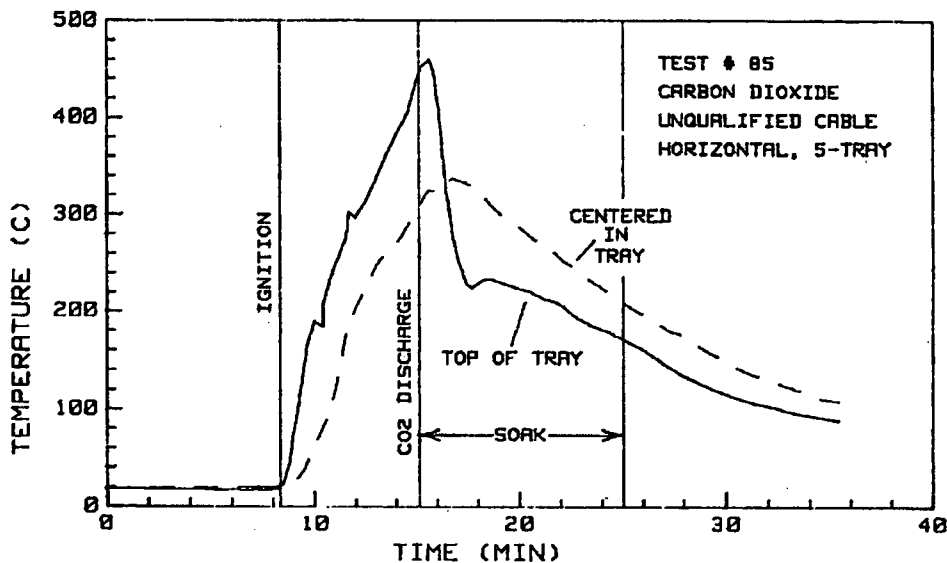


Figure 4 – Sandia Test #85 Cable Temperature Results

Note that temperatures continued to decrease after the 27th minute of the test when ventilation had already been restored and CO₂ concentration was below 50%. CO₂ concentration was below 45% just prior to the 29th minute of the test, and the rate of temperature decline was again not appreciably affected. It can also be seen that the sudden drop in CO₂ concentration, to approximately 47% around the 25th minute of the test, did not appreciably affect the rate of temperature decline.

NFPA 12 -1973 does specify a 50% design concentration for deep seated fires; however, it does not specify an extinguishing concentration nor a soak time for the design concentration. NFPA 12 -1973 specifies that the CO₂ concentration shall reach 30% in 2 minutes and the design concentration of 50% within 7 minutes. SPT-039-02 demonstrated that the CO₂ fire suppression system for the Watts Bar Unit 1 Auxiliary Instrument Room meets and exceeds the requirements of NFPA 12 -1973.

TVA Figure 5 is an enhanced version of the strip chart from SPT-039-02 for the CO₂ concentrations in the upper portion of the Unit 1 Auxiliary Instrument Room (14.75 ft.). Figure 5 and Data Sheet 8.2 of SPT-039-02 (see Attachment 3) show that the CO₂ concentrations in the Unit 1 Auxiliary Instrument Room exceeded the test acceptance criteria of reaching 32% within 2 minutes (reached 44%), 52% within 7 minutes (reached 56%), and holding \geq 47% for 15 minutes (maintained 47% for 15 minutes). (The additional 2% compensated for instrument accuracy of plus or minus 2%.)

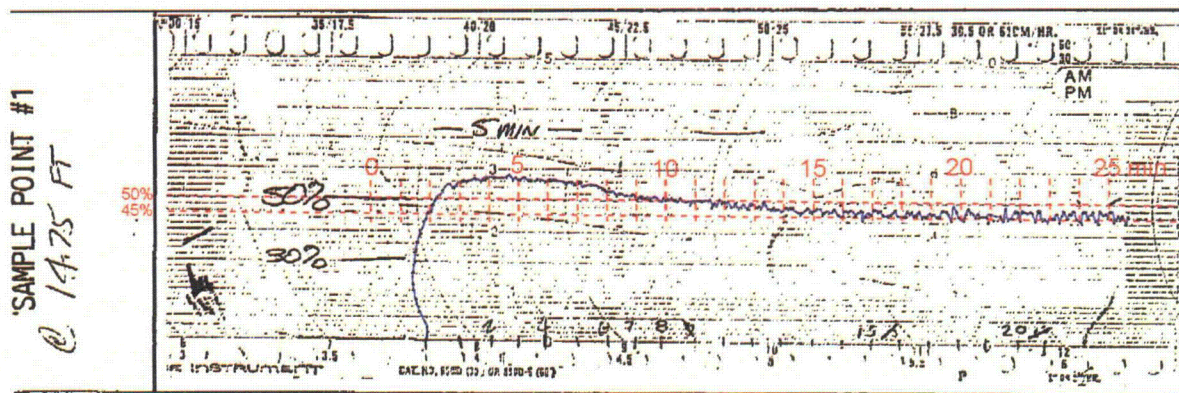


Figure 5 – Enhanced Strip Chart Recording from SPT-039-02

TVA also finds it compelling that while the total time CO₂ concentration remained above 50% for Sandia Tests #83 and #85 was 7 minutes and 8 minutes, respectively, the performance characteristics of the WBN Unit 1 Auxiliary Instrument Room CO₂ suppression system are such that CO₂ concentration is maintained above 50% for almost 9 minutes (from approximately 2.5 minutes to 11.5 minutes after discharge) without a second discharge. It is also important to note that, during SPT-039-02, a 45% CO₂ concentration was maintained for almost 25 minutes in the Unit 1 Auxiliary Instrument Room (see Figure 5).

Furthermore, maintaining a CO₂ concentration greater than 45% in the upper portion of the Unit 1 Auxiliary Instrument Room means that the overall volumetric room concentration is higher than 45%, since CO₂ is approximately 50% heavier than air. The strip charts from SPT-039-02 for the CO₂ concentrations at 2 ft. and 8.67 ft. above the floor show that the CO₂ concentrations at these heights remained greater than 50% for the duration of the test (approximately 25 minutes).

- B. *The WBN Unit 1 Auxiliary Instrument Room is tighter than those in Sandia Tests #83 and #85.*

NFPA 12 -1973, Section 222, "Leakage and Ventilation," states:

"Since the efficiency of carbon dioxide systems depends upon the maintenance of an extinguishing concentration of carbon dioxide, leakage of gas from the space shall be kept to a minimum and compensated for by applying extra gas."

NUREG-1805 (Ref. 13) also notes the significance of the room tightness and states, "The integrity of the enclosure is a very important part of total flooding, particularly if the hazard has a potential for deep-seated fire." However, it can be seen from the rapid decay of CO₂ concentration shown in TVA Figures 1 and 2 that the Sandia test room was not an airtight room. For Sandia Test #83, the CO₂ concentration decreased approximately 13% in 2 minutes (from an initial peak of 58% to approximately 45%); and for Sandia Test #85, the CO₂ concentration decrease approximately 10% in less than 1 minute (from an initial

peak of 58% to approximately 48%). Note that these decreases did occur before ventilation was restored in both Sandia tests. In comparison, the WBN CO₂ concentration tests demonstrated the tightness of the Unit 1 Auxiliary Instrument Room since the concentration only decreased approximately 10% in 11 minutes (from an initial peak of 57% at the 4-minute mark to 47% at the 15-minute mark). WBN door fan pressurization tests (Attachment 4) have also demonstrated that the Unit 1 Auxiliary Instrument Room is capable of maintaining tightness for an extended period of time.

- C. *The WBN Unit 1 Auxiliary Instrument Room ventilation is restored later than in Sandia Tests #83 and #85; and, actual soak times for the WBN Auxiliary Instrument Room are calculated differently and more conservatively.*

In Sandia Tests #83 and #85, ventilation was restored to the test room after 10 minutes. Only the cables in Test #83 reignited after ventilation was restored. The 10 minutes of soak time for the test, and the recommended 15 minutes of soak time, began when the demand for CO₂ was initiated and the ventilation system was turned off – approximately 2 minutes before the actual CO₂ discharge. The soak time ended when ventilation was restored.

Ventilation for the WBN Unit 1 Auxiliary Instrument Room is restored by site personnel manually resetting the CO₂ blow-off clips for each damper. These actions do not occur until the fire has been determined to be extinguished. Because of this process, the cables in the WBN Auxiliary Instrument Room will have more time to cool than those in the Sandia tests. Delaying ventilation restoration also contributes to the tightness of the room and the ability to maintain higher concentration levels of CO₂.

The initial discharge of CO₂ for the WBN Unit 1 Auxiliary Instrument Room begins 20-30 seconds after one detector from each detection zone has activated. Further discussion of the detection system is provided in TVA's response to NRC RAI 10. In Sandia Tests #83 and #85, the fire was fully developed and had been allowed to burn for another minute before the suppression system was actuated. Again, although the soak time had begun, the actual CO₂ discharge did not occur for another 2 minutes. In comparison, the CO₂ system for the WBN Auxiliary Instrument Room discharges 20-30 seconds after actuation. This results in significant CO₂ concentration levels in the room for a greater portion of what NUREG/CR-3656 considers "soak time."

Moreover, NUREG-1805 (Ref. 13) provides additional guidance regarding the capabilities of CO₂ suppression systems. Section B.14.3, "Carbon Dioxide Fire Extinguishing Systems," states:

"For deep-seated hazards, the minimum concentration is 50-percent of CO₂ by volume. This 50-percent design concentration is used for hazards involving electrical gear, wiring insulation, motors, and the like[...] It should be noted that *most surface burning and open flaming will stop when the concentration of CO₂ in the air reaches about 20-percent or less by volume. Thus, it should be apparent that a considerable margin of safety is built into these minimum CO₂ concentrations*

required by the standard [NFPA 12]. This is because those who developed the CO₂ standard never considered it sufficient to extinguish the flame. By contrast, the guidelines given in some of the standards for other gaseous extinguishing agents merely mandate concentrations that are sufficient to extinguish open flame but will not produce a truly inert atmosphere." ***[emphasis added]***

TVA's establishment of an extinguishing concentration of 45% is greater than double the 20% concentration for surface fires indicated in NUREG-1805. Extinguishing surface flames will also contribute to removal of heat from the fire.

Considering all these factors, TVA has concluded that the 1978 designed automatic total-flooding CO₂ suppression system provided for the Unit 1 Auxiliary Instrument Room at WBN is adequately designed (with upgrades and as verified by tests in 1995) to extinguish a deep seated fire.

Although TVA has considered the Sandia test results that were promulgated in NUREG/CR-3656, that NUREG is not part of TVA's design or licensing basis. Similarly, TVA evaluated IN 92-28, and concluded that it need not be incorporated into the WBN design or licensing basis.

3.2 Safe Shutdown Implications

NRC RAI 2:

TVA letter, dated March 24, 2009, Enclosure 1, page E1-1, states that,

"This section of Appendix R requires a fixed fire suppression system for the auxiliary instrumentation room area since it contains safe shutdown equipment and alternative safe shutdown was selected for this area..."

TVA evaluation in a letter, dated March 24, 2009, did not discuss effects of fire damage on equipment required for safe-shutdown. Discuss the effects that fire damage would have on the equipment that is associated with cables likely to sustain damage, and provide a basis for adequacy of damage (i.e., provide a basis for determining that, in spite of damage, adequate safe-shutdown will be maintained).

TVA Response:

The Unit 1 and Unit 2 Auxiliary Instrument Rooms are located in the Control Building at elevation 708.0. An Appendix R fire in WBN's Control Building may require that the Control Building, including the Main Control Room (MCR), be abandoned. When this occurs, the plant will be shutdown from the Auxiliary Control Room (ACR). The Control Building is separated from the ACR and adjacent plant areas by 3-hour fire-rated barriers. WBN's Abnormal Operating Instructions (AOIs) direct the operator actions to isolate the ACR from the MCR, abandon the MCR, and implement the Fire Safe Shutdown actions once the MCR is abandoned.

Additional information regarding the functions of the ACR may be found in Part IV, "Alternate Shutdown Capability," of the FPR. Provided below is information contained in

Section 2.0, "Discussion," from Part IV of the FPR which summarizes the compliance of the design with applicable regulations and independence of the ACR (both physically and electrically) from the Control Building.

"In order to address situations requiring main control room abandonment, WBN's original design provided for an auxiliary control system. This system is located outside of the control building and is physically independent of the control building (control room, auxiliary instrument rooms, cable spreading room, etc.). The design provides appropriate means to isolate the necessary safe shutdown equipment and control features from the control building. The system is provided to satisfy General Design Criteria (GDC) 19 in Appendix A to 10CFR50 and 10CFR50 Appendix R Section III.G.3 and III.L criteria.

In order to meet GDC 19 requirements, the auxiliary control system instrumentation and controls are physically remote from, and their circuits are electrically separated from, their counterparts in the main control room. In order to meet Appendix R requirements, the auxiliary control system is both physically and electrically independent of the control building. Redundant auxiliary control system capability is not required to meet either GDC 19 or Appendix R requirements."

Based on the preceding, fire damage may occur to the equipment and cables located in the Auxiliary Instrument Room. However, the design of the plant separates the Control Building and therefore, the Auxiliary Instrument Room, from the ACR both physically and electrically. Consequently, a fire in the Auxiliary Instrument Room will not affect the capability to safely shutdown WBN Unit 1.

3.3 Previous NRC Review of 45% CO₂ Concentration

NRC RAI 3:

TVA letter, dated March 24, 2009, Enclosure 1, page E1-2, states that,

"TVA will revise the system design description for the CO₂ system supplying the Auxiliary Instrument Rooms (Units 1 and 2) to include a minimum soak time. The soak time will be to maintain CO₂ concentration greater than 45% for at least 15 minutes. The revision will be completed by June 30, 1995...."

If the above commitment was incorporated in the WBN Unit 1 Fire Protection Report (FPR), the NRC staff requests that the TVA to provide copy of revised FPR pages with docketed date and revision number.

TVA Response:

Revision 3 of the FPR was approved on June 15, 1995. This revision revised Section 12.3.3, "Carbon Dioxide Suppression Systems," to add the following statement:

"The design basis for the areas protected by CO₂ are as follows:

Auxiliary Instrument Rooms - Deep seated fires. Must achieve 30% concentration within 2 minutes, 50% concentration within 7 minutes, and maintain at least 45% concentration for at least 15 minutes..."

Revision 3 also revised Part X, "NFPA Code Evaluation," of the FPR to add the following statement:

"2232	Comply	Deep seated fire extinguishment does not specify the soak time and concentration levels required to be maintained. Where required, soak time of 15 minutes at 45% concentration is maintained."
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TVA's letter dated June 15, 1995 (Ref. 14), submitted Revision 3 of the FPR to NRC. This letter is listed in the Introduction Section of Appendix FF, "Safety Evaluation Watts Bar Nuclear Plant Fire Protection Program, Docket Nos. 50-390/391," of SSER 18. TVA's letter dated June 15, 1995, and the sections of Revision 3 of the FPR discussed above are provided in Attachment 5 to this enclosure.

3.4 Modifications and Inspections

NRC RAI 4:

TVA letter, dated March 24, 2009, Enclosure 1, page E1-2, states that,

"The fact remains, however, that WBN's CO₂ gas suppression system was designed for and can achieve a 50% concentration after discharge in accordance with NFPA 12, 1973 Edition. It will also, as committed, maintain a concentration greater than 45% for at least 15 minutes..."

Have any CO₂ system or other plant modifications, subsequent to the original discharge tests of the CO₂ fire suppression system, been made in the Auxiliary Instrument Room that could potentially affect CO₂ concentrations, such as CO₂ piping changes or timer adjustments or new room dampers or penetrations that might leak? If such modifications have been made, what subsequent testing or evaluation was performed to ensure that proper concentrations were maintained for the required soak time? If concentration decreased due to leakage, where does the CO₂ gas migrate and describe your evaluation on the effects to plant operation and operator actions.

TVA Response:

The configuration of the CO₂ piping and discharge outlets have not been modified since the discharge test discussed in TVA's response to NRC RAI 1 above was performed in July 1995. In addition, the detection system has not been modified from the tested configuration. In order to address the overall impact design changes and plant modifications made to equipment located in the Auxiliary Instrument Room may have had on the ability of the CO₂ system to suppress a deep seated fire, the following factors should be considered:

- A. As stated previously in Section 2.0, "Detailed Description," WBN's test records indicate that a 50% CO₂ concentration is maintained for 15 minutes in the lower half of the room.
- B. The following factors were discussed in Inspection Report 05000390/2008005 (Ref. 9) regarding the low safety significance of the Non-Cited Violation for this CO₂ concentration issue:
- Most of the ignition sources were located in the lower portion of the room where the required concentration was maintained.
 - The only ignition sources in the upper portion of the room were thermoplastic cables capable of self-igniting. However, their failure would not affect the credited SSD strategy of alternative shutdown which used equipment powered by other cables not located in this room.

Based on the preceding, the key ignition sources are in the lower portion of the room which will receive a 50% concentration for 15 minutes. This and the lack of potential for a fire to the spread into the higher regions of the room, minimize the impact of plant modifications on the CO₂ systems ability to suppress a fire.

Identification of all design changes that have affected the Auxiliary Instrument Room will be an extensive effort. A review of this type will require a review of all design changes initiated since the performance of the last discharge test (July 1995) until the present. However, the design changes were controlled by WBN's design change process under Standard Programs and Processes (SPP) 9.3, "Plant Modifications and Engineering Change Control." Maintenance activities at WBN are controlled by Standard Department Procedure MMDP-1, "Maintenance Management System." Both of these processes contain controls to ensure that work involving the breaching of any penetration returns the penetration to its revised design configuration or the as-found configuration.

Figure II-33 of the FPR is provided in Attachment 6 to this enclosure and depicts the layout of the Auxiliary Instrument Room. This figure is annotated and provided with notes to clarify which walls are considered regulatory fire barriers. Based on Figure II-33, the walls of the Auxiliary Instrument Room that are regulatory fire barriers are inspected once every 5 years in accordance with 0-FOR-304-1, "Fire Barrier/Mechanical, Conduit, Cable Tray, and Fire Damper (External) Penetration Visual Inspection-Auxiliary, Control, Diesel Generator Buildings and Intake Pumping Station" include:

- North wall
- South wall
- East wall
- West wall
- Labyrinth ceiling

The north and east walls of the stairs in the Auxiliary Instrument Room along with the floor and ceiling are non-regulatory fire barriers. These areas are inspected once every 5 years in accordance with TI- 304.001, "Non-Regulatory Fire Barriers."

The physical CO₂ barriers (e.g., walls, floor, and ceiling) of the Auxiliary Instrument Room are also inspected in accordance with 0-FOR-39-2, "18 Month CO₂ Fire Protection Inspection and Test for Powerhouse Areas." This inspection is conducted every 18 months and verifies that there are no cracked, missing or degraded seals (including floor seals), or other penetrations that may allow CO₂ to escape. TVA reviewed the documentation from inspections conducted between 2001 and 2009 and did not identify any issues with the physical CO₂ barriers.

TVA's response to NRC RAI 1 contained a discussion on tightness of the Unit 1 Auxiliary Instrument Room and the time periods the concentration levels in the room were maintained. Leakage from the room will principally be from door seals or through the seals for the various room penetrations. The CO₂ will migrate to Elevation 692, the elevation below the Auxiliary Instrument Room. Each CO₂ system on Elevation 708 has a remote alarm installed on Elevation 692 that provides a pre-discharge alarm to alert the personnel that occupy Elevation 692 to evacuate should there be a CO₂ discharge. The discharge of CO₂ will require the use Self-Contained Breathing Apparatus (SCBA) by Operations or Fire Operations personnel responding to the fire.

3.5 Fire Brigade Response and Training

NRC RAI 5:

TVA letter, dated March 24, 2009, Enclosure 2, page E2-1, states that,

"The primary function of the automatic CO₂ fire suppression systems is to extinguish a fire or control and minimize the effects of a fire until the fire brigade can respond and extinguish it..."

Manual fire-fighting of large amounts of burning cables is a considerable challenge even to the most well-trained and equipped fire brigade. Further, many rooms of this nature have cable trays located high above the floor which may be inaccessible to the fire brigade personnel. Describe how the facility fire brigade personnel have been instructed about the potential for deep-seated fire hazards associated with cable re-ignition. Further, discuss the methods to manually extinguish or control and minimize the effects of a deep-seated fire located high above the floor in inaccessible locations (if WBN Unit 1 Auxiliary Instrument Room has any inaccessible locations).

TVA Response:

WBN's Fire Brigade personnel are periodically trained in accordance with FPT-304.000, "Fires Involving Energized Equipment." The brigade also receives practical training and fire drills are conducted which are directly related to the potential for deep seated fire hazards associated with cable tray fires.

During the Fire Brigade's training and exercises, emphasis is placed on fighting an energized equipment (e.g., cable) fire using the rules for "Fires Involving Energized Equipment" which includes the use of a fog pattern when applying water, staying out of the water runoff, and maintaining the minimum distance for energized equipment. Once the cables are deenergized the fire is considered a normal Class A fire and a straight stream water pattern can be applied.

For a fire suppressed by CO₂, the fire brigade will enter affected area wearing self-contained breathing apparatus (SCBA). A key objective of the brigade is to identify any remaining hot spots and apply the appropriate agent to ensure complete extinguishment. To aid in this effort, the fire brigade is provided with a thermal imaging camera for identification of the hot spots. Any remaining hot spots will be individually extinguished using an appropriate agent, such as water applied by a fire hose, instead of a general agent application such as a second CO₂ discharge. However, if deemed necessary, an additional discharge of CO₂ may be initiated manually. Ventilation for the WBN Unit 1 Auxiliary Instrument Room is restored by site personnel manually resetting the CO₂ blow-off clips for each damper. These actions do not occur until the fire brigade has determined that the fire is completely extinguished.

There are no inaccessible areas in the Unit 1 and 2 Auxiliary Instrument Rooms. The access to high locations (e.g., cable trays) shall be by mechanical means in which the fire brigade is trained. For the required access, the Fire Brigade will use ladders and lifts which can be safely used to investigate and apply extinguishing agents if required.

3.6 Full Discharge Test Results

NRC RAI 6:

TVA letter, dated March 24, 2009, Enclosure 2, page E2-1, states that,

"Full discharge tests for representative rooms in conjunction with door fan pressurization tests have been conducted to validate CO₂ concentration and soak times. The duration of the discharge is determined by the area requirements and is controlled by the discharge timer..."

Provide the most recent full discharge test results of the CO₂ fire suppression system installed in the Auxiliary Instrument Room, including the following:

- Concentration levels
- Soak time
- Number, location, and height of sensors in room

Also, provide copies of the original discharge test results for review.

TVA Response:

The most recent full discharge test of the CO₂ fire suppression system installed in the Unit 1 and Unit 2 Auxiliary Instrument Rooms was conducted by and documented in Revision 0 of Special Performance Test, SPT-039-02. This test was initiated on July 16, 1995, and completed on July 23, 1995. A copy of the test is provided in Attachment 3.

The data in TVA Table 2 was taken from Data Sheet 8.2 of SPT-039-02, "U1 Aux Instrument Room CO₂ Concentration," and provides the concentration levels for the Unit 1 Auxiliary Instrument Room at specified time intervals after CO₂ discharge. The acceptance criteria in Table 2 account for instrument accuracy of plus or minus 2%. In

each case, the CO₂ suppression system for the Unit 1 Auxiliary Instrument Room met or exceeded the acceptance criteria.

Elapsed Time (min)	2	4	6	7	8	15
CO ₂ Concentration (%)	44	57	56	56	52	47
Acceptance Criteria (%)	≥ 32	N/A	N/A	≥ 52	N/A	≥ 47

Table 2 – Unit 1 Auxiliary Instrument Room CO₂ Concentrations for SPT-039-02

There were three sample points in the Unit 1 Auxiliary Instrument Room at which CO₂ concentration levels were recorded:

- Sample Point #1 was located at 14.75 ft. above the finished floor
- Sample Point #2 was located at 8.67 ft. above the finished floor
- Sample Point #3 was located at 2.0 ft. above the finished floor

The horizontal location of the sensor pickups (sample points) inside the room was not recorded. The horizontal location would have not been of any consequence to the test results as the ventilation to the room was isolated; no stirring of the CO₂ (which is approximately 50% heavier than air) would result in relatively uniform CO₂ concentration layers in the room. Section 6.1.3 of SPT-039-02 provided the steps for installing the CO₂ concentration meters and specified that the highest recorder probe be installed "...at 75% of the room height or the top of the protected equipment (excluding cable trays) whichever is higher...."

The total soak time for SPT-039-02 as shown in TVA Figure 5 was approximately 25 minutes. As discussed in TVA's response to NRC RAI 1, this soak time starts when the CO₂ system actually discharges and is defined differently than the soak times as specified in NUREG/CR-3656. At 14.75 ft. (Sample Point #1), the CO₂ concentration after 25 minutes was approximately 45%. For Sample Points #2 and #3, the CO₂ concentration remained above 50% after 25 minutes. The strip charts from the test are provided in Attachment 3 and show the CO₂ concentration versus time for each of the 3 sample points.

3.7 Area Ignition Sources

NRC RAI 7:

TVA letter, dated March 24, 2009, Enclosure 2, page E2-3, states that,

"TVA calculation WBN-IPE-004, "Zone of Influence" determined that the only ignition source is two air handling units in the Corridor on Elevation 708.0..."

"TVA calculation EPM-DOM-012990, "Combustible Loading Data (CLD)" establishes the Fire Severity Index for..."

"TVA calculation WBN-IPE-004, "Zone of Influence," determine that the only ignition source..."

"Based upon this evaluation, all these areas were screened out from the detail review, and were screened out due to a lack of significant fire ignition source and/or the presence of automatic detection and suppression ability..." "

Confirm that there are no ignition sources other than two air handling units in this fire area. Provide a summary and the results of the "Zone of Influence" calculations.

TVA Response:

As stated previously, Figure II-33 is provided as Attachment 6 to this enclosure. The figure has been annotated to clearly designate the following rooms:

- 708.0-C1 – Unit 1 Auxiliary Instrument Room
- 708.0-C2 – Corridor
- 708.0-C4 – Unit 2 Auxiliary Instrument Room

An evaluation of the Unit 1 Auxiliary Instrument Room on Elevation 708.0-C1 and the surrounding rooms, 708.0-C2 and 708.0-C4, was conducted on July 16, 2009 by WBN's Engineering staff to confirm there are no other ignition sources other than the two air handling units located in the Corridor (708.0-C2). The evaluation confirmed the two air handling units in the Corridor remain the only ignition sources for the Auxiliary Instrument Room. WBN's design includes a two hour Regulatory Fire Barrier that separates Unit 1 Auxiliary Instrument Room from the Corridor.

Revision 0 of Calculation WBN-IPE-004, "Zone of Influence" is the calculation that determines the Zone of Influence (ZOI) for credible fire sources in compartments that were not previously screened by calculations WBN-IPE-001, 002, and 003. This calculation also documents the area walkdowns to identify the fire ignition sources or targets within the ZOI that could be impacted by the fire source. For the Auxiliary Instrument Room area, the walkdown conducted on July 16, 2009, re-verified the conclusions of Calculation WBN-IPE-004.

3.8 Auxiliary Instrument Room Cabling

NRC RAI 8:

TVA letter, dated March 24, 2009, Enclosure 2, page E2-3, states that,

"TVA detection and suppression systems would detect and suppress any fire with the potential of severity needed to include a deep seated fire..."

TVA evaluation did not specify cable construction information (i.e., insulation and jacket material, such as cross-linked polyethylene (XLPE)/polyvinyl chloride (PVC) for all

cables installed in cable trays and conduits or exposed (such as air drops). Identify the types of cable insulation and jacket materials within the Auxiliary Instrument Room.

TVA Response:

Several different cable materials are used within the Unit 1 Auxiliary Instrument Room. Greater than 96% of the qualified cables within the Unit 1 Auxiliary Instrument Room have a thermosetting polymer jacket. Tabulated below is a list of the insulation and jacket materials of qualified cables used within the Unit 1 Auxiliary Instrument Room:

Unit 1 Auxiliary Instrument Room	
Insulation Material	Jacket Material
Cross Linked Polyethylene (XLPE)	Chlorinated Polyethylene (CPE)
Ethylene Propylene Rubber (EPR)	Chlorosulfonated Polyethylene (CSPE)
Flame-Retardant Cross Linked Polyethylene (FRXLPE)	Cross Linked Polyethylene (XLPE)
Fluorinated Ethylene Propylene (FEP)	Flame-Retardant Cross Linked Polyethylene (FRXLPE)
Polyolefin	Fluorinated Ethylene Propylene (FEP)
Polyvinyl Chloride (PVC)	Nylon
Thermoplastic Polyethylene	Polyethylene (PE)
	Polyvinyl Chloride (PVC)

Table 3 – Cable Insulation and Jacket Material

The installation of non-qualified cables in the Unit 1 Auxiliary Instrument Room conform to the following statement made in Section 8.3.1.4.3, "Sharing of Cable Trays and Routing of Non-Safety Related Cables," of the Updated Final Safety Analysis Report:

"In all cable coating applications, up to 10 cables not qualified to the IEEE 383 flame test or equivalent may remain uncoated on cable trays, unless small gaps or cracks in the coating exist in the tray segment. In such cases, up to 9 cables not qualified to the IEEE 383 flame test or equivalent may remain uncoated."

To maintain compliance with the above statement, a fire-retardant such as Vimasco® is applied where required. Approximately 0.5% of the cables located within the Unit 1 Auxiliary Instrument Room are of unknown material composition. Cables of this type include cables supplied by vendors of the components installed in the instrument room.

3.9 Defense-in-Depth

NRC RAI 9:

TVA letter, dated March 24, 2009, Enclosure 2, page E2-3, states that,

"The defense in depth fire protection at Watts Bar ensures that the fire protection provided for the Unit 1 Auxiliary Instrument Room is in

compliance with the applicable sections of NFPA 12-1973 and therefore meet the regulatory requirements found in Branch Technical Position (BTP) 9-5.1, Appendix A, paragraph F.6 and 10 CFR 50, Appendix R, paragraph III.G.3..."

The NRC staff requests that the TVA provide a description of the defense-in-depth features in the Unit 1 Auxiliary Instrument Room.

TVA Response:

The defense-in-depth features provided for the Unit 1 Auxiliary Instrument Room (EL. 708.0-C.1) are as follows:

1. Transient combustibles are controlled by site procedures.
2. Ignition source work is controlled by site procedures.
3. Access to vital areas of the plant, including the Auxiliary Instrument Room, is restricted to authorized personnel.
4. Ionization smoke detectors cross zoned with thermal detectors. More information on the detection system is provided in TVA's response to NRC RAI 10.
5. The Main Control Room (MCR) dispatch of personnel to investigate upon the annunciation of one zone of a cross-zone.
6. Automatic CO₂ suppression system which actuates upon a cross-zoned signal from the detection system or may be manually actuated.
7. Abandonment of the MCR in the event of a fire in the Control Building (previously discussed in TVA's response to NRC RAI 2).
8. Isolation of the Auxiliary Control Room (ACR) from the Control Building so that safe shutdown is achieved (previously discussed in TVA's response to NRC RAI 2).
9. The onsite fire brigade previously discussed in TVA's response to NRC RAI 5. The CO₂ system for the Auxiliary Instrument Room is designed to mitigate the consequences of a fire until it can be extinguished by WBN's Fire Brigade. The fire brigade may also initiate a second discharge to ensure complete extinguishment of the fire. Such actions are consistent with the second sentence of Section 2232 of NFPA 12 -1973:

"In any event, it is necessary to inspect the hazard immediately thereafter to make certain that extinguishment is complete and to remove any material involved in the fire."

This philosophy is also consistent with the discussion provided below from Section 12.3, "Automatic Fire Suppression Systems" of the FPR:

"The automatic fire suppression systems are designed to extinguish a fire or control and minimize the effects of a fire until the fire brigade can respond and extinguish it."

10. The volume of CO₂ maintained available for suppression of a fire in the Auxiliary Instrument Room is large enough for an initial discharge and a second discharge of equal volume if needed.

One other defense-in-depth factor regarding the abandonment of the MCR was previously discussed in TVA's response to NRC RAI 2. This discussion indicated that an Appendix R fire in WBN's Control Building may require that the Control Building, including the Main Control Room (MCR), be abandoned. The Unit 1 and Unit 2 Auxiliary Instrument Rooms are located in the Control Building at elevation 708.0. When the MCR is abandoned, the plant will be shut down from the Auxiliary Control Room (ACR). The Control Building is separated from the ACR and adjacent plant areas by 3-hour fire-rated barriers. WBN's Abnormal Operating Instructions (AOIs) direct the operator actions to isolate the ACR from the MCR, abandon the MCR, and implement the Fire Safe Shutdown actions once the MCR is abandoned. This element and the other defense-in-depth aspects of WBN's FPR provide confidence that the proper action will be taken to ensure a fire in the Auxiliary Instrument Room is mitigated.

3.10 CO₂ System Actuation

NRC RAI 10:

TVA letter, dated March 24, 2009, Enclosure 2, page E2-4, states that,

"The automatic CO₂ suppression system provided for the Unit 1 Auxiliary Instrument Room is adequately designed for a deep seated fire. The detection system and suppression system would detect and suppress any fire with the potential of the severity needed to induce a deep seated fire..."

Provide a description of the detection system currently installed in the Auxiliary Instrument Room. Discuss how the CO₂ fire suppression system actuation occurs in the Auxiliary Instrument Room.

TVA Response:

Fire detection is installed to provide for prompt detection of a fire in its incipient stage and provide early warning capability. The fire detection systems at WBN are designed to be operable with or without offsite power. The Auxiliary Instrument Room is equipped with Ionization Smoke Detectors and Thermal Detectors. Provided below are excerpts from two sections of System Description N3-13-4002, "Fire Detection System," that describe the Ionization Smoke Detectors and Thermal Detectors.

"3.2.1.1 Ionization Smoke Detectors

These units are Pyrotronics model DI series surface-mounted low voltage ionization smoke detectors manufactured by Pyrotronics, Incorporated. They operate on a patented ionization principle and are actuated by a trace of visible smoke or invisible products of combustion present during the early stages of a fire. The detectors operate at a line voltage of nominal 24V dc which is provided from the LDP [local detection panel]. Visual flame is not required to operate the detector.

The detector contains a radioactive source, two ionization chambers and a semiconductor amplifier-switching circuit. The radioactive source ionizes air in the two chambers allowing a small current to flow through the two chambers. The sensing chamber is open to the atmosphere and detects the presence of combustion products. The reference chamber is effectively closed to the atmosphere and serves as a reference to stabilize the detectors sensitivity for changes in environmental temperature, humidity, and pressure.

When smoke particles enter the sensing chamber, it causes a reduction in the sensing chamber's current relative to the reference chamber. This change in current causes the amplifier switching circuit to trigger an alarm. Upon actuation, the detector will lock into an alarm state."

"3.2.1.3 Thermal Detectors

The thermal detectors are of the rate compensation/fixed temperature type. The detector element is self-restoring.

The detectors are supplied in temperature ratings of 135° F, 200° F and 225° F.

The detector consists of tubular metal shell containing two curved expansion struts under compression fitted with a pair of normally open, opposed contact points which are insulated from the shell. The tubular shell and struts have a different coefficient of expansion. When subjected to a rapid heat rise, the tubular shell expands and lengthens slightly. At the same time, the interior struts lengthen but at a slower rate than the shell. The rapid lengthening of the shell causes the struts to come together and thus initiate an alarm.

When subject to a very slow heat rise, the tubular shell and the interior struts lengthen at approximately the same rate. At the detector's set point, the interior struts are fully extended, thereby closing the contact points and initiating the alarm signal."

The temperature rating of the thermal detectors installed in the Unit 1 Auxiliary Instrument Room is 135° F.

System Description N3-39-4002, "CO₂ Storage, Fire Protection, and Purging," provides a general description for the actuation of the CO₂ suppression system and is applicable to the suppression system in the Auxiliary Instrument Room. The following is stated in Section 3.1.1, "CO₂ Fire Protection System" of N3-39-4002:

"Upon occurrence of a fire, a signal from the fire detection system activates area alarms and starts the CO₂ discharge timer motor. The timer can also be activated from a manual push-button station. The timer actuates the predischage alarms (warns personnel to clear the area) and subsequently actuates the pilot valve. The master pilot valve which is nearest to the storage tank serves to open the MCV [master control valve]. As soon as the signal activates this master pilot valve, upstream pressure from the CO₂ in the pilot line which is connected to the tank, is transmitted to the piston operator on the MCV. At this time the MCV opens letting CO₂ flow through the header to the ASV [area selector valve] valve. At the same time that the signal activates the MCV, the particular area pilot valve is also activated. This area pilot valve receives the pressure from the CO₂ in the header and transmits it to the piston operator on the ASV which opens and lets the CO₂ flow through the header into the affected hazard area pipe network and discharge through open nozzles to extinguish the fire. At the same time, the pressure activates the odorizer which releases its chemical to the discharge piping to allow personnel to detect the CO₂ discharge."

The Auxiliary Instrument Room's smoke detectors compose one zone of fire detection and the thermal detectors compose the other zone of fire detection. When a single detector in either zone activates, an annunciation is sent to a constantly attended location (e.g., the Main Control Room) alerting site personnel of the zone's alarm condition. When a single detector of the other zone activates, the CO₂ discharge timer motor starts and an annunciation is sent to the constantly attended location of the second zone's alarm condition. When the CO₂ discharges to the Auxiliary Instrument Room, a pressure switch is activated which annunciates the CO₂ discharge to the constantly attended location.

3.11 NFPA 12, 1973 Edition, Code Compliance

NRC RAI 11:

Part X -NFPA Code Evaluation of the Fire Protection Report, Revision 29 (ML052780278), September 30, 2005, provides point-by-point comparison of the conformance with NFPA codes. Page X-19 cross-references the applicable section of NFPA 12, 1973 Edition and provides additional information for compliance with code.

NFPA 12-1973 "Carbon Dioxide Systems"
TVA System 39 Compliance Summary Matrix

Code Section	Summary	Topic/Remarks
2421	Comply	Flooding factor for specific hazards (50% for deep seated fire locations such as board rooms, instrument rooms, etc.)

However, TVA letters, dated March 13, and 24, 2009, are not consistent with the above code compliance evaluation documented in Unit 1 WBN FPR. Discuss and provide a basis for this discrepancy.

TVA Response:

Section 2421 of NFPA 12 -1973 specifies that the design concentration for general dry electrical, wiring insulation hazards is 50% for CO₂ suppression systems. As specified in Revision 29 of the Fire Protection Report referenced in NRC RAI 11 above, TVA complies with Section 2421 of NFPA 12 -1973. The CO₂ suppression system in the WBN Unit 1 Auxiliary Instrument Room provides a 50% concentration as designed and as required by NFPA 12 -1973. Furthermore, TVA maintains that the TVA letters dated March 13, 2009 (Ref. 15) and March 24, 2009 (Ref. 16) are consistent with the point-by-point comparison as provided in Part X, "NFPA Code Evaluation," of the WBN FPR.

Section 2232 of NFPA 12 -1973 states the following:

"For deep seated fires, the required extinguishing concentration shall be maintained for a sufficient period of time to allow the smoldering to be extinguished and the material to cool to a point at which re-ignition will not occur when the inert atmosphere is dissipated."

For systems designed to suppress deep-seated fires, Section 2523 of NFPA 12 -1973 states the following:

"For deep-seated fires the design concentration shall be achieved within seven minutes but the rate shall no be less than that required to develop a concentration of 30 percent in 2 minutes."

NFPA 12 -1973 does not specify a required soak time, but states that,

"...the required extinguishing concentration shall be maintained for a sufficient period of time to allow the smoldering to be extinguished and the material to cool to a point at which re-ignition will not occur when the inert atmosphere is dissipated."

The distinction is made between "design concentration" and "extinguishing concentration." The CO₂ suppression system provided for the WBN Unit 1 Auxiliary Instrument Room meets the requirements of NFPA 12 -1973, Section 2523, by achieving 30% CO₂ concentration in 2 minutes and 50% CO₂ concentration (the design concentration as provided in NFPA 12 -1973, Section 2421) in 7 minutes. The WBN CO₂ suppression system provided for the Auxiliary Instrument Room also meets the requirements of NFPA 12 -1973, Section 2232, by maintaining a 45% CO₂ concentration (the extinguishing concentration) for 15 minutes. TVA's response to NRC RAI 1 provides the justification for the sufficiency of 45% CO₂ concentration as the extinguishing concentration for the WBN Unit 1 Auxiliary Instrument Room as well as data from SPT-039-02 which demonstrated the CO₂ suppression system's capabilities.

The TVA letters dated March 13, 2009 and March 24, 2009 echoed the NUREG-0847, Supplement 18, conclusion which stated in Section 9.5.1, "Fire Protection," that,

"On the basis of its review of the applicant's Fire Protection Report through Revision 4, and the applicant's supplemental information as referenced by this safety evaluation, the staff concludes that the fire protection program for Watts Bar Nuclear Plant conforms to the requirements of 10 CFR 50.48 and, except for (1) fire barrier penetration seal program (refer to Appendix FF, Section 3.1.4) and (2) emergency lighting inside the reactor building (refer to Appendix FF, Section 6.7), is acceptable."

TVA submitted Revision 3 of the Fire Protection Report by letter dated June 15, 1995 (Ref. 14) (prior to the issuance of NUREG-0847, Supplement 18, in October 1995) which indicated TVA's compliance with NFPA 12 -1973, Section 2421 using the 50% concentration requirement and Section 2232 using the agreed upon 45% concentration for 15 minutes (see Attachment 5). Adequacy of the 45% concentration had been previously addressed at length in TVA's May 26, 1995 response (Ref. 7) to the NRC's May 10, 1995 request for additional information (Ref. 5). By incorporation in the NUREG supplement, the 45% CO₂ concentration as specified in Revision 3 of the FPR regarding the Auxiliary Instrument Room appeared to have received NRC approval.

For these reasons, TVA concludes there is not a discrepancy in the code compliance evaluation. The CO₂ suppression system provided for the WBN Unit 1 Auxiliary Instrument Room continues to comply with the requirements of NFPA 12 -1973 as specified in the WBN FPR.

3.12 Conclusions

Based on the considerations discussed above, TVA concludes that a 45% CO₂ concentration for 15 minutes is sufficient to extinguish a deep-seated fire in the WBN Unit 1 Auxiliary Instrument Room. In the event of a fire in the WBN Unit 1 Auxiliary Instrument Room, the CO₂ suppression system and other defense-in-depth features ensure the ability to achieve and maintain safe shutdown.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

The applicable regulations and requirements are as follows:

- 10 CFR 50.48, "Fire Protection," requires that Watts Bar Nuclear Plant have a Fire Protection Plan that satisfies 10 CFR Part 50, Appendix A, Criterion 3.
- 10 CFR 50, Appendix A, General Design Criterion (GDC) 3, "Fire Protection," specifies that structures, systems, and components important to safety shall be designed and located to minimize the probability and effect of fires and explosions.

- 10 CFR 50, Appendix R, Section II.C.4 requires that fire barriers or automatic suppression systems or both shall be installed as necessary to protect redundant systems or components necessary for safe shutdown.
- 10 CFR Part 50, Appendix R, Section III.G, describes the requirements for the protection of safe shutdown capability.
- 10 CFR Part 50, Appendix R, Section III.L, describes the requirements for alternative and dedicated shutdown capability.
- NFPA 12, "Carbon Dioxide Extinguishing Systems," 1973 Edition, provides guidance for purchasing, designing, installing, testing, inspecting, approving, listing, operating, and maintaining carbon dioxide fire extinguishing systems.
- NFPA 72E, "Automatic Fire Detectors," 1974 Edition, provides the minimum requirements via a consensus code for the performance of automatic fire detectors to ensure the timely warning of a fire for the protection of personnel and property.
- Branch Technical Position (Auxiliary Power and Control Systems Branch) 9.5-1, Appendix A, provides guidelines on the preferred and acceptable alternatives to fire protection design for nuclear power plants for which applications for construction permits were docketed prior to July 1, 1976.
- NRC Generic Letter 77-02, dated August 29, 1977, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," which provides supplementary guidance on fire protection defense in depth features of fire protection organization, fire brigade training, control of combustibles, control of ignition sources, and fire fighting procedures.

With the implementation of the proposed change, Watts Bar Nuclear Plant continues to meet the applicable design criteria, regulatory requirements, and commitments.

4.2 Precedent

No previous precedent was identified for a similar license amendment request. A search was conducted using the NRC's Agencywide Documents Access and Management System (ADAMS) database and other similar industry databases.

4.3 Significant Hazards Consideration

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

- A. *Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?*

Response: No.

The proposed change does not affect the design of the automatic total-flooding CO₂ suppression system, the operational characteristics or function of the CO₂ suppression system, the interfaces between the CO₂ suppression system and other plant systems, or the reliability of the CO₂ suppression system. The CO₂ suppression system is not considered an initiator of any Updated Final Safety Analysis Report (UFSAR) accident or transient previously evaluated. The CO₂ suppression system is designed to extinguish a fire or control and minimize the effects of a fire until the fire brigade can respond and extinguish it.

The consequences of previously evaluated accidents and transients will not be significantly affected by the revised requirements for CO₂ concentration in the Auxiliary Instrument Room because the CO₂ suppression system is not credited in the accident analyses. Although the function of the system is to extinguish a fire or control and minimize the effects of a fire until the fire brigade can respond and extinguish it, this function does not mitigate accidents or transients. Thus, the consequences of accidents or transients previously evaluated are not affected by the proposed change in the required CO₂ concentration for the Auxiliary Instrument Room.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

- B. *Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?*

Response: No.

The proposed change does not involve a change in the design, configuration, or method of operation of the plant. The proposed change will not alter the manner in which equipment operation is initiated, nor will the functional demands on credited equipment be changed. The capability for fire suppression and extinguishment will not be changed. The proposed change does not affect the interaction of the CO₂ suppression system with any system whose failure or malfunction can initiate an accident. As such, no new failure modes are being introduced.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

- C. *Does the proposed amendment involve a significant reduction in a margin of safety?*

Response: No.

The proposed change does not alter the plant design, including instrument setpoints, nor does it alter the assumptions contained in the safety analyses. The CO₂ suppression system is designed for fire suppression and extinguishment and is not assumed or credited for accident mitigation. Although the change does reduce a parameter (CO₂ concentration) specified in the

license, the proposed change does not impact the redundancy or availability of equipment required for accident mitigation, or the ability of the plant to cope with design basis accident events.

Therefore, the change does not involve a significant reduction in a margin of safety.

Based on the above, TVA concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.4 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (1) a significant hazards consideration, (2) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (3) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. Facility Operating License No. NPF-90, Watts Bar Nuclear Plant, Unit 1
2. "Fire Protection Report," Revision 38, Watts Bar Nuclear Plant
3. NUREG-0847, Supplement No. 18, "Safety Evaluation Report related to the operation of Watts Bar Nuclear Plant, Units 1 and 2, Docket Nos. 50-390 and 50-391," dated October 1995.
4. National Fire Protection Association Standard 12, "Standard for Carbon Dioxide Extinguishing Systems," 1973 Edition.

5. Letter from NRC to TVA, "Watts Bar Unit 1 – Request for Additional Information (RAI) Regarding Carbon Dioxide Automatic Fire Suppression Systems (TAC No. M63648)," dated May 10, 1995.
6. Inspection Report 50000390/1995-16, dated April 6, 1995.
7. Letter from TVA to NRC, "Watts Bar Nuclear Plant (WBN) – Reply to Request for Additional Information Regarding Carbon Dioxide Automatic Fire Suppression Systems (TAC No. M63648)," dated May 26, 1995.
8. Inspection Report 05000390/2007007 and 05000391/2007007, "Watts Bar Nuclear Plant – NRC Triennial Fire Protection," dated July 30, 2007.
9. Integrated Inspection Report 05000390/2008005, 05000391/2008005, and 05000390/2008501, "Watts Bar Nuclear Plant – Exercise of Enforcement Discretion," dated February 12, 2009.
10. Letter from NRC to TVA, "Watts Bar Nuclear Plant, Unit 1 – Request for Additional Information Regarding Request for Correction to NUREG-0847, Supplement 18, Related to Carbon Dioxide Fire Suppression System (TAC No. ME0876)," dated July 15, 2009.
11. NRC Information Notice 92-28, "Inadequate Fire Suppression System Testing," dated April 8, 1992.
12. NUREG/CR-3656, "Evaluation of Suppression Methods for Electrical Cable Fires," dated October 1986.
13. NUREG-1805, "Fire Dynamics Tools (FDTs): Quantitative Fire Hazard Analysis Methods for the U.S. Nuclear Regulatory Commission Fire Protection Inspection Program," dated December 2004.
14. Letter from TVA to NRC, "Watts Bar Nuclear Plant (WBN) – Fire Protection Report (FPR) Revision (TAC M63648)," dated June 15, 1995.
15. Letter from TVA to NRC, "Watts Bar Nuclear Plant (WBN) Unit 1 – Request for Correction to NUREG-0847, Supplement 18, Related to WBN Carbon Dioxide Fire Suppression System," dated March 13, 2009.
16. Letter from TVA to NRC, "Watts Bar Nuclear Plant (WBN) Unit 1 – Denial of Non-Cited Violation (NCV) 05000390/2008005-04, Carbon Dioxide System in Fire Area 48 Failed to Meet Design Criterion," dated March 24, 2009.

7.0 ATTACHMENTS

1. Mark-up of Affected License Pages
2. Final Copy of Affected License Pages
3. Special Performance Test SPT-039-02, "CO₂ Fire Protection for Unit 1 and Unit 2 Aux Instrument Rooms," Revision 0.
4. Special Performance Test Procedure SPT -039-01, "CO₂ Enclosure Door Fan Testing," Revision 1 (selected sections).
5. Letter from TVA to NRC dated June 15, 1995 and selected sections from the WBN Fire Protection Report, Revision 3.
6. WBN Fire Protection Report, Figure II-33, TVA DWG No. 47W240-6 R8.

ATTACHMENT 1

Watts Bar Nuclear Plant, Unit 1
Facility Operating License No. NPF-90
NRC Docket No. 50-390

Mark-Up of Affected License Pages

- (2) The facility was previously granted an exemption from the criticality monitoring requirements of 10 CFR 70.24 (see Special Nuclear Material License No. SNM-1861 dated September 5, 1979). The technical justification is contained in Section 9.1 of Supplement 5 to the Safety Evaluation Report, and the staff's environmental assessment was published on April 18, 1985 (50 FR 15516). The facility is hereby exempted from the criticality alarm system provisions of 10 CFR 70.24 so far as this section applies to the storage of fuel assemblies held under this license.
- (3) The facility requires an exemption from 10 CFR 73.55(c)(10). The justification for this exemption is contained in Section 13.6.9 of Supplement 15 and 20 to the Safety Evaluation Report. The staff's environmental assessment was published on April 25, 1995 (60 FR 20291). Pursuant to 10 CFR 73.5, the facility is exempted from the stated implementation schedule of the surface vehicle bomb rule, and may implement the same as late as February 17, 1996.
- (4) The facility was previously granted an exemption from certain requirements of 10 CFR 73.55(d)(5) relating to the returning of picture badges upon exit from the protected areas, such that individuals not employed by TVA who are authorized unescorted access into protected areas can take their badges offsite (see 59 FR 66061, December 22, 1994). The granting of this exemption is hereby affirmed.
- (5) The facility was previously granted an exemption from certain requirements of 10 CFR 50, Appendix E, such that the State of Tennessee, which is within the ingestion exposure pathway emergency planning zone, need not participate in the November 1995 full-participation exercise (see 60 FR 54526, October 24, 1995). The granting of this exemption is hereby affirmed.

RE-ALIGN
SUBSECTIONS
"E" AND "F"

E. TVA shall fully implement and maintain in effect all provisions of the Commission approved physical security, training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.54(p). The combined set of plans, which contains Safeguards Information protected under 10 CFR 73.21, is entitled: "Watts Bar Nuclear Plant Security Plan, Training and Qualification Plan, and Safeguards Contingency Plan, Revision 3," submitted by letter dated May 16, 2006.

F. TVA shall implement and maintain in effect all provisions of the approved fire protection program as described in the Fire Protection Report for the facility, as approved in Supplements 18 and 19 of the SER (NUREG-0847) subject to the following provision:

TVA may make changes to the approved fire protection program without prior approval of the Commission, only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

, except for carbon dioxide concentration requirements for the low-pressure total-flooding carbon dioxide system provided for the Unit 1 Auxiliary Instrument Room as approved in Safety Evaluation [##] dated [MONTH] [##], 20[##],

MOVE TO NEXT PAGE

- G. Except as otherwise provided in the Technical Specifications (Appendix A to this license) or Environmental Protection Plan (Appendix B to this license), TVA shall report any violations of the requirements contained in Section 2.C of this license in the following manner: initial notification shall be made within twenty-four (24) hours to the NRC Operations Center via the Emergency Notification System with written follow-up within 30 days in accordance with the procedures described in 10 CFR 50.73 (b), (c), and (e).
- H. The licensee shall have and maintain financial protection of such types and in such amounts as the Commission shall require in accordance with Section 170 of the Atomic Energy Act of 1954, as amended, to cover public liability claims.

ATTACHMENT 2

Watts Bar Nuclear Plant, Unit 1
Facility Operating License No. NPF-90
NRC Docket No. 50-390

Final Copy of Affected License Pages

- (2) The facility was previously granted an exemption from the criticality monitoring requirements of 10 CFR 70.24 (see Special Nuclear Material License No. SNM-1861 dated September 5, 1979). The technical justification is contained in Section 9.1 of Supplement 5 to the Safety Evaluation Report, and the staff's environmental assessment was published on April 18, 1985 (50 FR 15516). The facility is hereby exempted from the criticality alarm system provisions of 10 CFR 70.24 so far as this section applies to the storage of fuel assemblies held under this license.
 - (3) The facility requires an exemption from 10 CFR 73.55(c)(10). The justification for this exemption is contained in Section 13.6.9 of Supplement 15 and 20 to the Safety Evaluation Report. The staff's environmental assessment was published on April 25, 1995 (60 FR 20291). Pursuant to 10 CFR 73.5, the facility is exempted from the stated implementation schedule of the surface vehicle bomb rule, and may implement the same as late as February 17, 1996.
 - (4) The facility was previously granted an exemption from certain requirements of 10 CFR 73.55(d)(5) relating to the returning of picture badges upon exit from the protected areas, such that individuals not employed by TVA who are authorized unescorted access into protected areas can take their badges offsite (see 59 FR 66061, December 22, 1994). The granting of this exemption is hereby affirmed.
 - (5) The facility was previously granted an exemption from certain requirements of 10 CFR 50, Appendix E, such that the State of Tennessee, which is within the ingestion exposure pathway emergency planning zone, need not participate in the November 1995 full-participation exercise (see 60 FR 54526, October 24, 1995). The granting of this exemption is hereby affirmed.
- E. TVA shall fully implement and maintain in effect all provisions of the Commission approved physical security, training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.54(p). The combined set of plans, which contains Safeguards Information protected under 10 CFR 73.21, is entitled: "Watts Bar Nuclear Plant Security Plan, Training and Qualification Plan, and Safeguards Contingency Plan, Revision 3," submitted by letter dated May 16, 2006.

- F. TVA shall implement and maintain in effect all provisions of the approved fire protection program as described in the Fire Protection Report for the facility, as approved in Supplements 18 and 19 of the SER (NUREG-0847), except for carbon dioxide concentration requirements for the low-pressure total-flooding carbon dioxide system provided for the Unit 1 Auxiliary Instrument Room which are as approved in Safety Evaluation [##] dated [MONTH] [##], 20[##], subject to the following provision:

TVA may make changes to the approved fire protection program without prior approval of the Commission, only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

- G. Except as otherwise provided in the Technical Specifications (Appendix A to this license) or Environmental Protection Plan (Appendix B to this license), TVA shall report any violations of the requirements contained in Section 2.C of this license in the following manner: initial notification shall be made within twenty-four (24) hours to the NRC Operations Center via the Emergency Notification System with written follow-up within 30 days in accordance with the procedures described in 10 CFR 50.73 (b), (c), and (e).
- H. The licensee shall have and maintain financial protection of such types and in such amounts as the Commission shall require in accordance with Section 170 of the Atomic Energy Act of 1954, as amended, to cover public liability claims.

ATTACHMENT 3

Special Performance Test
"CO₂ Fire Protection for Unit 1 and Unit 2
Aux Instrument Rooms"

SPT-039-02
Revision 0

103

TEST SUMMARY REPORT

Test Number: SPT-039-02, Rev 0
Title: CO₂ Fire Protection for Unit 1 and
Unit 2 Aux Instrument Rooms
Startup Test Engineer: Wayne Bichlmeir

TEST SUMMARY

This Special Performance Test (SPT) was started on 07/16/95 and was field completed on 07/23/95. Three (3) deficiencies and five (5) change notices were written during the performance of this SPT. All TDNs have been addressed and closed.

This test was performed utilizing plant equipment under normal and simulated conditions. This test was performed as a follow-up to PTI-039-01.

OBJECTIVES

- 1.1 The specific objective of this Special Performance Test was as follows:
 - 1.1.1 Demonstrate that discharge of CO₂ into the Unit 1 and Unit 2 Aux Instrument Rooms will provide the required CO₂ concentration for fire control.

TEST DATA COMPARISON

All required acceptance criteria of this test were met as delineated below:

- 2.1 Unit 1 Auxiliary Instrument Room attained $\geq 32\%$ CO₂ concentration within 2 minutes, $\geq 52\%$ CO₂ within 7 minutes and maintained $\geq 47\%$ CO₂ after 15 minutes (includes +/- 2% M&TE accuracy).
- 2.2 Unit 2 Auxiliary Instrument Room attained $\geq 32\%$ CO₂ concentration within 2 minutes, $\geq 52\%$ CO₂ within 7 minutes and maintained $\geq 47\%$ CO₂ after 15 minutes (includes +/- 2% M&TE accuracy).

TEST DEFICIENCY NOTICES

TDN #95-0778
Status: Closed

This TDN was written at Step 6.1.15 due to Unit 1 Aux Instrument Room pressure rising toward the maximum allowable limit of 27" w.c. Due to terminating the test earlier than anticipated, Restoration Steps 6.1.15 through 6.1.31 could not be performed as written. The CO₂ System was subsequently safely restored. Since the CO₂ concentrations were acceptable, 1-IC-39-14 will be reset by WO 95-17680-00 to a lower time setting noted during the discharge test and specified in DCN S37610. No retesting was required.

TDN #95-0779
Status: Closed

This TDN was written due to two occurrences noted during the Unit 1 Aux Instrument Room discharge test.

Item 1 - Multiple alarms occurred in the Main Control Room. During the Unit 2 Aux Instrument Room CO₂ Discharge Test, temperature in the Aux Instrument Room reached -23 degrees F. Electronic equipment such as Eagle-21 and the Solid State Protection System (SSPS) are designed to operate at temperatures between 40 and 120 degrees F.

A review of the Annunciator System alarm printout during the Unit 1 Aux Instrument Room CO₂ Discharge Test showed only one Eagle-21 trouble alarm (Rack 3) and no Eagle-21 failure alarms. The trouble alarm was attributed to an input out-of-range, a condition probably not caused by the CO₂ test. Therefore, even though the Eagle-21 equipment was subjected to environmental conditions outside its design limits, the equipment continued to function as designed.

A review of the Annunciator alarm printout did show that one train of SSPS was affected by the CO₂ test. The affect was limited to multiplexer functions as no ESF actuations occurred. Therefore, even though the SSPS equipment was subjected to environmental conditions outside its design limits the equipment continued to function as designed.

No retesting was required.

Item 2 - Wintergreen odor was detected in the Main Control Room. The Site Engineering evaluation is as follows:

During the recent CO₂ test in the Control Building Unit 1 Auxiliary Instrument Room, the wintergreen odor was detected in the Main Control Room (MCR). This is evidence that CO₂ leaked into the room. Since there was no indication of leakage into the MCR during the testing of the Unit 2 Auxiliary Instrument Room, the primary leak path appears to be the Battery Room exhaust duct which passes through the Main Control Room Habitability Zone (MCRHZ). A pressure relief damper was previously added in this duct where it passes through the Unit 1 Auxiliary Instrument Room, on DCN W-35595-A. This damper opens at 8-inches w.c. to allow air in the room to escape and let the CO₂ concentration build up to the proper level and protects the walls from overpressurization. The Battery Room duct in the MCRHZ was recently tested for leakage at 2.0 inches w.c. Most of the duct is welded and the primary source of leakage is around the isolation damper shafts in the portion of the duct near the roof. The measured leakage was 1.835 cfm at 2.0 inches w.c. At 25-inches w.c. the leakage can be estimated as follows:

$$\text{leakage @ 25-inches w.c.} = \text{leakage at 2.0 inches w.c.} \times \left[\frac{25}{2.0} \right]^4 = 1.835 \times 3.536 = 6.49 \text{ cfm}$$

This estimate is conservative because the compressibility factor will be lower at the higher pressure, the reynolds number will be higher, and the actual pressure in the duct will be lower than 25 inches w.c. This quantity of CO₂ is not high enough to create an unsuitable environment in the MCRHZ.

Another possible source of leakage would be through the floor drains in the Unit 1 Auxiliary Instrument Room which are connected to the floor and equipment drains in the MCRHZ. These drains are trapped and refilled periodically. There is a possibility that CO₂ could leak past the water seals, but the leakage would be small with respect to the volume of the MCRHZ and the normal ventilation air (approximately 3200 cfm), so that an unacceptable concentration of CO₂ would not occur in the MCRHZ.

The CO₂ air mixture, exhausted through the Battery Room duct, is released on the roof approximately 50 feet from the fresh air intake. Even if the prevailing wind carried the mixture into the intake it would be diluted with approximately 3200 cfm outside air being drawn into the intake for exhaust makeup and for MCRHZ pressurization.

CO₂ which leaks into the stairway near the Unit 1 Auxiliary Instrument Room and the lower floors of the Control Building will not enter the MCRHZ because these areas are maintained at a negative 1/8-inch w.c. with respect to the MCRHZ. Alarms will activate if the pressure in one of these areas becomes too high.

Based on this system evaluation, sufficient levels of CO₂ will not leak into the MCRHZ during a CO₂ release to have an adverse affect on the MCRHZ environment.

No retesting was required.

B. F. Crossin B.F. CROSSIN / 2/3/95
SITE ENGINEERING DATE

TDN #95-0791
Status: Closed

This TDN was written at Step 6.2.15 due to Unit 2 Aux Instrument Room pressure rising toward the maximum allowable limit of 27" w.c. Due to terminating the test earlier than anticipated, Restoration Steps 6.2.15 through 6.2.26 could not be performed as written. The CO₂ System was subsequently safely restored. Since the CO₂ concentrations were acceptable, 2-IC-39-16 will be reset by WO 95-17680-00 to a lower time setting noted during the discharge test and specified in DCN S37610. No retesting was required.

CHANGE NOTICES

- CN-01
Type: Non-Intent Changes incorporated NRC comments to ensure puff test was completed as a prerequisite and timers have been reset. Also, added details of maximum allowable room pressure, a step to monitor and record room pressure, and personnel are positioned to monitor pressure with a digital pressure gauge. Changed PM frequency from monthly to quarterly and deleted requirement for CO₂ cal gas certification papers.
- CN-02
Type: Non-Intent Change added Note that intent of test is to determine time of discharge of CO₂.
- CN-03
Type: Non-Intent Change incorporated steps to prevent overpressurization of CO₂ header by opening area selector valve after discharge is completed.
- CN-04
Type: Non-Intent Change made to measure CO₂ discharge time by chart recorder and change sequence of removing CO₂ from header after concentration testing is completed.
- CN-05
Type: Non-Intent Change made to close Valve 0-ISV-39-522 due to Operations' preference.

JUSTIFICATION FOR ACCEPTANCE

All components within the scope of this test successfully operated per design and all acceptance criteria were met.

CONCLUSIONS

Based on the successful completion of testing on all components contained within this Special Performance Test, SPT-039-02, Rev 0, is recommended for approval.

Wayne Bichler
Startup and Test Engineer

8-3-95
Date

Stanley Coulter
Test Group Supervisor

8/3/95
Date



SPT-039-02 /R0

WATTS BAR NUCLEAR PLANT
UNIT 1 STARTUP

TITLE: CO2 FIRE PROTECTION FOR UNIT 1
& UNIT 2 AUX INSTRUMENT ROOMS

Procedure No: SPT-039-02
Revision No: 0

PREPARED BY: Wayne Bichlmeir

REVIEWED BY:

Pf

DATE: 7.11.95

PROCEDURE APPROVAL

JTG MEETING NO: NA

JTG CHAIRMAN: NA DATE: NA

APPROVED BY: [Signature] FOR STARTUP MANAGER DATE: 7-11-95

TEST RESULTS APPROVAL

JTG MEETING NO: N/A

JTG CHAIRMAN: N/A DATE: N/A

APPROVED BY: M. B. [Signature] MB 8/3/95 DATE: 8/2/95
STARTUP MANAGER

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1.0 TEST OBJECTIVES

- 1.1 Demonstrate that discharge of CO₂ into the Unit 1 and Unit 2 Aux Instrument Rooms will provide the required CO₂ concentration for fire control.

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2.0 REFERENCES

2.1 Final Safety Analysis Report - Amendment 89

- 2.1.1 Table 14.2-1, Sheets 13 and 14 of 90
Fire Protection System Test Summary

2.2 Drawings

2.2.1 Flow Diagrams

- 2.2.1.1 1-45W600-39-1, (CC)
Wiring Diagram
CO₂ Fire Protection System Schematic Diagrams
- 2.2.1.2 1-47W843-1, (CC)
Flow Diagram
CO₂ Storage, Fire Protection & Purging System

2.3 Vendor Manuals

- 2.3.1 WBN-VTM-AS06-0300, Vendor Technical Manual for ASCOA
Fire Systems Chemetron 24-Ton CO₂ Fire Protection
System, TVA Contract No. 76K71-83208, Rev 3

2.4 Documents

- 2.4.1 FPI-0102, Fire Protection Instruction,
Administrative Controls, Rev 4
- 2.4.2 TVA Nuclear Power Safety and Health Manual, Section
VI, Part B, Confined Space Entry Requirements,
Rev 10
- 2.4.3 N3-39-4002, System Description for CO₂ Storage, Fire
Protection and Purging
- 2.4.4 SOI-39.01, Powerhouse CO₂ System

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3.0 PRECAUTIONS AND NOTES

- 3.1 Portions of this test will be conducted in or around electrically energized equipment.
- 3.2 TVA prescribed safety practices regarding working in or around electrically energized equipment shall be followed for protection of personnel and equipment.
- 3.3 Maintain communications between an Operator stationed at the CO₂ Tank Shutoff Valve (when person is stationed at valve), the Control Room and the Test Director.
- 3.4 Do not activate Fire Protection System alarms without the On-Duty Shift Operation's Supervisor's (SOS's) prior knowledge. This is to avoid confusion in case there is a valid fire alarm.
- 3.5 All fire doors without CO₂ release devices must be closed, and associated latches and flush bolts must be functional and securely engaged or fastened prior to CO₂ discharge in a hazard area.
- 3.6 The CO₂ Storage Tank level shall be maintained above 25 inches H₂O, as read on 0-LI-39-2, and 300 ±15 psig, as read on 0-PI-39-3A, with the refrigeration unit in service at all times. If CO₂ Tank level drops below 43 inches H₂O, notify the SOS.
- 3.7 Pipe walls should be allowed to warm to ambient temperatures between pressurization and discharges during CO₂ concentration test.
- 3.8 Sufficient Ventilation System fans and dampers must be operable and available to ensure CO₂ can be removed from the CO₂ test areas. Temporary fans and ventilation equipment should be available to aid in purging CO₂ from tested areas, as necessary.
- 3.9 A minimum of two SCBA qualified persons are required to enter a hazard area prior to verification that oxygen levels are ≥19.5% after CO₂ has been discharged. Additionally, two (2) extra SCBA units are to be stationed near the hazard area. Personnel must wear air breathing apparatus when entering a hazard area where CO₂ has been discharged.

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- 3.10 This test should be performed with ambient temperatures between 32°F and 120°F. There are no special environmental conditions necessary.
- 3.11 A Confined Space Entry Permit will be required to access the Cardox CO₂ Central Unit, 0-TANK-39-3, located in the Yard area vault.
- 3.12 Equipment tested in this procedure is connected to a refrigerated pressure vessel containing carbon dioxide. The agent container is under pressure and presents physical and health hazards. Valves may be under pressure. Bodily injury and/or property damage could occur if testing is performed improperly.
- 3.13 When discharged, carbon dioxide is at a very low temperature and may cause frostbite. Avoid skin and eye contact.
- 3.14 Inhalation of carbon dioxide, upon a discharge that results in low concentrations, may produce increased respiration, headache, nausea, and vomiting leading to unconsciousness.
- 3.15 Inhalation of carbon dioxide, upon a discharge that results in high concentrations, may produce rapid circulation, insufficiency and paralysis of breathing, leading to coma and death.
- 3.16 Prior to discharging CO₂, personnel shall be evacuated from the areas being tested and signs posted to prevent unauthorized entry into the test area.
- 3.17 If closure of any valve does not stop discharge of CO₂, 0-ISV-39-522 is to be closed.
- 3.18 Test personnel should remain clear of doors subjected to CO₂ discharge testing as door failure can occur.

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4.0 PREREQUISITE ACTIONS

4.1 Test Equipment

4.1.1 The following M&TE or equivalent is available:

- A. 0-25% O₂ Oxygen Monitor/Indicator ($\pm 12\%$ STD. Gas)
- B. 0-100% CO₂ Carbon Dioxide Concentration Meter with three (3) sensor points minimum ($\pm 2\%$ F.S.)
- C. 0-120°F Hand Held Thermometer ($\pm 2\%$)
- D. 0-50" H₂O DIGITAL PRESSURE GAGE ($\pm 2\%$)
WLB 7-13-95

5-13-95
7-13-95

4.1.2 The following are available:

- A. Key to Cardox relay and timer compartments (same key as System 13 Field Panels)
- B. Extension Ladder(s) or equivalent
- C. CO₂ Odorizer Cartridges
- D. Temporary fans and air moving equipment
- E. SCBA Units (4 required)

4.1.3 Additional CO₂ is available to refill the Storage Tank, as necessary.

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4.2 Preliminary Actions

- 4.2.1 Communications have been established in areas where testing is to be conducted: Aux Instr Rooms area, Control Room, and CO₂ Tank Outlet Isolation Valve (when FPU Operator is stationed there).

WLB 17-16-95
INITIAL DATE

- 4.2.2 Plant instruments required for test performance, have been verified to be filled, vented, (as required) placed in service, and within their calibration interval as shown on Data Sheet 8.4.

WLB 17-13-95
INITIAL DATE

- 4.2.3 Measuring and Test Equipment (M&TE) required for test performance has been filled, vented, (as required) placed in service, and recorded on Measuring and Test Equipment (M&TE Log), Attachment 9.2.

WLB 17-15-95
INITIAL DATE

- 4.2.4 CONDUCT a pretest briefing with Test and Operations personnel.

WLB 17-15-95
INITIAL DATE

- 4.2.5 PERFORM a pretest walkdown to verify that interferences such as Work Requests, Hold Orders, and scaffolding will not adversely affect this test.

WLB 17-15-95
INITIAL DATE

- 4.2.6 POST warning signs to prevent entry into the test areas as necessary, and EVACUATE all non-essential personnel.

WLB 17-16-95
INITIAL DATE

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- 4.2.7 Outstanding TACFs do not adversely impact testing.

WLB / 7-13-95
INITIAL DATE

- 4.2.8 ENSURE blowout panels are installed by DCN W-35595 in Battery Room exhaust duct to prevent overpressurization.

WLB / 7-13-95
INITIAL DATE

- 4.2.9 ENSURE 0-TANK-39-3, CO2 CENTRAL UNIT STORAGE TANK, is filled to at least 43" H₂O level, as read from 0-LI-39-2, at 0-L-83, in Yard.

WLB / 7-14-95
INITIAL DATE

- 4.2.10 ENSURE a Confined Space Entry Permit and qualified personnel are available for entry into the Cardox CO₂ Central Unit Vault.

WLB / 7-16-95
INITIAL DATE

- 4.2.11 ENSURE that ^{WLB 7-13-95} ~~monthly~~ ^{quarterly} PM WBN-0-PKG-39-3 (PMUG 1097F) was performed by Maintenance within ~~30~~ ^{WLB 7-11-95 90} days of date test is performed.

WLB 7-13-95

WLB / 7-13-95
INITIAL DATE

- 4.2.12 ENSURE a Fire Protection Impairment Form (FPI-0102 Appendix C) is in place for valve 0-ISV-39-522, CO₂ STOR TANK OUT ISOL, if valve is to be in the closed position for periods greater than 1 hour.

WLB / 7-15-95
INITIAL DATE

- 4.2.13 ENSURE proper alignment of SOI-39.01 has been performed to support this test.

WLB / 7-16-95
INITIAL DATE

OFFICIAL TEST COPY
A3-14

14

- 4.2.14 ENSURE DIXIE FIRE PROTECTION (or other Company) representative is available to support CO₂ concentration testing.

WLB / 17-15-95
INITIAL DATE

- 4.2.15 ENSURE the odorizer cartridges 1-PURF-39-14, U1 AUX INSTR RM CO₂ LEAK DET, and 2-PURF-39-16, U2 AUX INSTR RM CO₂ LEAK DET, are installed.

WLB / 17-15-95
INITIAL DATE

- 4.2.16 VERIFY ambient temperature is between 32° and 120°F in the Unit 1 and Unit 2 Aux Instrument Rooms, as read from thermometer (M&TE), and RECORD temperatures.

M&TE ID# E19502 U1 81.8 °F

M&TE ID# E19502 U2 80.2 °F

WLB / 17-15-95
INITIAL DATE

- 4.2.17 PERFORM a field calibration check of the vendor's CO₂ concentration recorder/recorders with samples of ambient air and 100% (±2%) CO₂ test gas. ATTACH reference calibration strip charts to this test package.

M&TE ID# 23176

M&TE ID# N/A
(N/A if only one recorder used)

WLB / 17-15-95
INITIAL DATE

OFFICIAL TEST COPY

~~4.2.18 ATTACH copies of CO₂ Test Gas certification sheet
(100%) to the test data package.~~

~~DELETE WLB 7-13-95~~

~~INITIAL / DATE~~

816-9-10-13-95

4.2.19 System 55, Annunciator and Sequential Events
Recording System, FTA switch (in Panel 1-M-21)
associated with the following annunciator window
inputs has been verified to be in the ON position:

A. 1-XA-55-15B/172E

WLB / 17-14-95
INITIAL DATE

4.2.20 ENSURE Operations is aware that alarms on 0-M-29
will be energized during this test.

WLB / 17-15-95
INITIAL DATE

4.3 Approvals and Notifications

4.3.1 Prior to the start of the test, OBTAIN the Shift
Operations Supervisor's (SOS) authorization.

SOS / 7-16-95
SOS DATE

4.3.2 Prior to the start of the test, OBTAIN the Startup
and Test Manager's authorization.

TELECON APPROVAL
PER SUT MGR. M. BAJESTANI / 7-24-95
MASOUD BAJESTANI / WLB / 7-15-95
STARTUP & TEST MANAGER DATE

4.2.21 ENSURE TESTING IN 0-FOR-39-2 (PUFF TEST) IS
COMPLETE.

WLB 7-13-95

WLB / 17-15-95
INITIAL DATE

4.2.22 ENSURE TIMERS HAVE BEEN RESET PER W.O. 95-
17680-00. (TIME OF DISCHARGE OF
CO₂). WLB 7-26-95

WLB / 17-15-95
INITIAL DATE

CN-01 WLB 7-13-95

816-9-10-13-95

OFFICIAL TEST COPY

5.0 ACCEPTANCE CRITERIA

- 5.1 Unit 1 Auxiliary Instrument Room attains $\geq 32\%$ CO₂ concentration within 2 minutes, $\geq 52\%$ CO₂ within 7 minutes and maintains $\geq 47\%$ CO₂ after 15 minutes (includes +/-2% M&TE accuracy). (Steps 6.1.14.1, 6.1.14.2, 6.1.14.3)
- 5.2 Unit 2 Auxiliary Instrument Room attains $\geq 32\%$ CO₂ concentration within 2 minutes, $\geq 52\%$ CO₂ within 7 minutes and maintains $\geq 47\%$ CO₂ after 15 minutes (includes +/-2% M&TE accuracy). (Steps 6.2.14.1, 6.2.14.2, 6.2.14.3)

OFFICIAL TEST COPY

6.0 TEST INSTRUCTIONS

6.1 Unit 1 Auxiliary Instrument Room CO₂ Concentration Test

NOTE

A CO₂ Concentration Test will be performed during this section, with a full duration CO₂ discharge.

- 6.1.1 VERIFY prerequisites listed in Section 4.0 for Subsection 6.1 have been completed.

WLB 17-16-95
INITIAL DATE

- 6.1.2 ENSURE a CO₂ Concentration Meter has been calibrated, and has a M&TE No. assigned (if meter is supplied by Vendor).

M&TE ID# 23176

WLB 17-16-95
INITIAL DATE

- 6.1.3 INSTALL a CO₂ Concentration Meter to measure CO₂ concentration in the Unit 1 Auxiliary Instrument Room with the highest recorder probe installed at 75% of room height or the top of the protected equipment (excluding cable trays) whichever is higher, and RECORD elevation above the floor on the associated recorder channel strip chart.

M&TE ID# 23176

WLB 17-16-95
INITIAL DATE

- 6.1.4 RECORD CO₂ Storage Tank level at 0-LIS-39-2, CO₂ STOR TANK LEVEL, and pressure at 0-PI-39-3, CO₂ STR VAULT TANK PRESS.

0-LIS-39-2 100 %

0-PI-39-3 300 psig

WLB 17-16-95
INITIAL DATE

- 6.1.4.1 INSTALL THE MANOMETER (OR ΔP MEASURING DEVICE) NEAR THE UNIT 1 AUX INSTRUMENT ROOM TO MEASURE PRESSURE DIFFERENTIAL (WITH HI SIDE INSIDE ROOM)

M+TE ID# 518478

WLB
7-13-95

WLB 17-16-95
INITIAL DATE

856-31-20
20-10-95

- 6.1.5 VERIFY/RESET 1-ISD-31-3958, 1-ISD-31-3959, and
1-ISD-31-3961, AUX INSTR ROOM EXHAUST ISOL.

WLB / 17-16-95
INITIAL DATE

- 6.1.6 VERIFY/RESET 1-ISD-31-3960, AUX INSTR ROOM SUPPLY
ISOL.

WLB / 17-16-95
INITIAL DATE

- 6.1.7 VERIFY/RESET Pressure Switch 1-PS-39-65, U1 AUX
INSTR RM CO2 DISCH PRESS, by pushing up on the
plunger on the bottom of the switch housing.

WLB / 17-16-95
INITIAL DATE

- 6.1.8 VERIFY Zone 279, AUX INSTR RM U1 CO2 INITIATED
Alarm, on Fire Detector Panel 0-M-29, is CLEAR (not
IN).

WLB / 17-16-95
INITIAL DATE

- 6.1.9 ENSURE the following Unit 1 Aux Instrument Room
doors are CLOSED and LATCHED:

A. Door C22 to Main Corridor

WLB / 17-16-95
INITIAL DATE

B. Door C21 to Stairwell

WLB / 17-16-95
INITIAL DATE

C. Door at C20 Airlock

WLB / 17-16-95
INITIAL DATE

OFFICIAL TEST COPY

- 6.1.10 VERIFY the Red Light at 1-IC-39-14, U1 AUX INSTR RM CO2 TIME, is ON.

WLB / 17-16-95
INITIAL DATE

- 6.1.11 VERIFY/OPEN 0-ISV-39-522, CO2 STOR TANK OUT ISOL, and ENSURE a FPU Operator is stationed at 0-ISV-39-522.

WLB / 17-16-95
INITIAL DATE

CAUTION

CO₂ will be discharged in subsequent steps. Personnel shall be evacuated from areas being tested and adjacent areas (Control Bldg 692', 708', and 729', as appropriate) and prohibited from unauthorized entry to test area.

- 6.1.12 REQUEST Control Room to announce that the CO₂ System is about to be tested and all personnel should stay clear of the test areas.

WLB / 17-16-95
INITIAL DATE

- 6.1.12.1 ENSURE PERSONNEL ARE POSITIONED TO OBSERVE PRESSURE DIFFERENTIAL IN AUX INSTRUMENT ROOM.

WLB
7-13-95

WLB / 17-16-95
INITIAL DATE

6-13-95
7-13-95

CAUTION

The following emergency action will be taken to discontinue CO₂ discharge, if necessary, TO PREVENT AUX INSTRUMENT ROOM FROM EXCEEDING THE MAXIMUM ALLOWABLE DIFFERENTIAL PRESSURE OF 27" H₂O. Switch 1-SW-39-14, U1 AUX INSTR RM CO2 DISC, located inside 0-ARB-39-14 (708/C3N), is to be placed to OFF, then close 0-ISV-39-522, CO2 STOR TANK OUT ISOL.

WLB
7-13-95

6-13-95
7-13-95

- 6.1.13 REMOVE cover (using screwdriver) on 1-IC-39-14, U1 AUX INSTR RM CO2 TIMER, then MOMENTARILY DEPRESS the pushbutton 1-HS-39-14A, U1 AUX INSTR RM CO2 MAN TRIP.

WLB / 17-16-95
INITIAL DATE

OFFICIAL TEST COPY

NOTE

The acceptance criteria values in the following two (2) steps have been corrected for $\pm 2.0\%$ M&TE inaccuracy.

- 6.1.14 RECORD the CO₂ concentration in the Unit 1 Aux Instrument Room, at timed intervals, for a minimum of 15 minutes on Data Sheet 8.2.

WLB / 7-16-95
INITIAL DATE

- 6.1.14.1 VERIFY Unit 1 Aux Instrument Room atmosphere reaches $\geq 32\%$ CO₂ concentration within 2 minutes.

[AC] WLB / 7-16-95
INITIAL DATE

- 6.1.14.2 VERIFY Unit 1 Aux Instrument Room atmosphere reaches $\geq 52\%$ CO₂ concentration within 7 minutes.

[AC] WLB / 7-16-95
INITIAL DATE

- 6.1.14.3 VERIFY Unit 1 Aux Instr Rm atmosphere maintains $\geq 47\%$ CO₂ concentration after 15 minutes.

[AC] WLB / 7-16-95
INITIAL DATE

- 6.1.15 VERIFY the Red Light at 1-IC-39-14 has illuminated.

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

- 6.1.16 REPLACE cover on 1-IC-39-14, U1 AUX INSTR RM CO2 TIME.

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

TDN 95-0778 / WLB 7-26-95
2ND PARTY DATE

- 6.1.14.4 RECORD MAXIMUM PRESSURE OBSERVED DURING TESTING OF UNIT 1 AUX INSTRUMENT ROOM.

WLB
7-13-95

25.5 "H₂O

WLB / 7-16-95
INITIAL DATE

TDN 95-0778
WLB 7-17-95

TDN 95-0778
WLB 7-13-95

OFFICIAL TEST COPY

- 6.1.17 DEPRESS the RESET Pushbutton 1-HS-39-14R, U1 AUX INSTR RM CO2 RESET in 0-ARB-39-14, U1 AUX INSTR RM CO2 RELAY CAB.

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

- 6.1.18 VERIFY that the alarm horns are SILENT.

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

- 6.1.19 VERIFY that 1-PURF-39-14, U1 AUX INSTR RM CO2 LEAK DET, odorizer is broken by the presence of wintergreen odor.

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

- 6.1.20 ENSURE that the Oxygen content is $\geq 19.5\%$ in all Control Bldg Elevation 692', 708', and 729' Rooms adjacent to and including test area, before allowing personnel to enter without the use of SCBA.

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

- 6.1.21 VERIFY the Unit 1 Aux Instrument Room Dampers are CLOSED:

- A. 1-ISD-31-3958, AUX INSTR ROOM EXHAUST ISOL

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

- B. 1-ISD-31-3959, AUX INSTR ROOM EXHAUST ISOL

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

- C. 1-ISD-31-3961, AUX INSTR ROOM EXHAUST ISOL

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

- D. 1-ISD-31-3960 AUX INSTR ROOM SUPPLY ISOL

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

TDN 95-0778 WLB 7-17-95

OFFICIAL TEST COPY

A3-22

22

- 6.1.22 RESET Pressure Switch 1-PS-39-65, U1 AUX INSTR RM CO2 DISCH PRESS, by pushing the plunger back into the switch housing.

TDN 95-0778/WLB 7-26-95
INITIAL DATE

- 6.1.23 RESET and VERIFY Zone 279, AUX INSTR RM U1 CO2 INITIATED Alarm, on 0-M-29, is OUT.

TDN 95-0778/WLB 7-26-95
INITIAL DATE

- 6.1.24 RESET the following dampers:

- A. 1-1SD-31-3958, AUX INSTR ROOM EXHAUST ISOL

TDN 95-0778/WLB 7-26-95
INITIAL DATE

TDN 95-0778/WLB 7-26-95
2ND PARTY DATE

- B. 1-1SD-31-3959, AUX INSTR ROOM EXHAUST ISOL

TDN 95-0778/WLB 7-26-95
INITIAL DATE

TDN 95-0778/WLB 7-26-95
2ND PARTY DATE

- C. 1-1SD-31-3961, AUX INSTR ROOM EXHAUST ISOL

TDN 95-0778/WLB 7-26-95
INITIAL DATE

TDN 95-0778/WLB 7-26-95
2ND PARTY DATE

- D. 1-1SD-31-3960 AUX INSTR ROOM SUPPLY ISOL

TDN 95-0778/WLB 7-26-95
INITIAL DATE

TDN 95-0778/WLB 7-26-95
2ND PARTY DATE

TDN 95-0778 WLB 7-17-95

OFFICIAL TEST COPY

6.1.25 REMOVE the CO₂ Concentration meter and associated sensing lines from the Unit 1 Aux Instrument Room.

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

TDN 95-0778 / WLB 7-26-95
2ND PARTY DATE

6.1.26 RECORD CO₂ Tank level at 0-LIS-39-2, CO₂ STOR TANK LEVEL, and pressure at 0-PI-39-3, CO₂ STR VAULT TANK PRESS.

TDN 95-0778
0-LIS-39-2 WLB 8-3-95 %
TDN 95-0778
0-PI-39-3 WLB 8-3-95 psig

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

^{WLB 8-3-95}
6.1.27 ~~UNLOCK and CLOSE 0 ISV-39-522, CO₂ STOR TANK OUT ISOL.~~ REMOVE GLASS COVER FOR 1-FSV-39-14
^{WLB 7-26-95}

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

^{WLB 8-3-95}
6.1.28 ~~ENSURE 0 BYV-39-523, CO₂ STOR TANK OUT BYPASS, is~~
⁻⁹⁵ ~~CLOSED. OPEN 1-FSV-39-14 UNTIL GAS DISCHARGE CAN NO LONGER BE HEARD.~~
^{WLB 7-26-95}

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

^{WLB 8-3-95}
6.1.29 ~~OPEN 0 ISV-39-555, CO₂ STOR TANK OUT HDR DRAIN, to~~
⁻⁹⁵ ~~allow bleeding of CO₂ from Header. CLOSE~~
1-FSV-39-14
^{WLB 7-26-95}

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

^{WLB 8-3-95}
6.1.30 ~~CLOSE 0 ISV-39-555, CO₂ STOR TANK OUT HDR DRAIN.~~
REPLACE GLASS COVER FOR 1-FSV-39-14.
^{WLB 7-26-95}

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

^{WLB 8-3-95}
6.1.31 ~~OPEN 0 ISV-39-522, CO₂ STOR TANK OUT ISOL.~~
ENSURE 1-FSV-39-14 IS CLOSED
^{WLB 7-26-95}

TDN 95-0778 / WLB 7-26-95
INITIAL DATE

^{WLB 7-26-95}
INDEPENDENT
DELETE / DELETE
2ND PARTY DATE

CN-03 WLB 7-16-95
TDN 95-0778 WLB 7-17-95

OFFICIAL TEST COPY

6.2 Unit 2 Auxiliary Instrument Room CO₂ Concentration Test

NOTE

A CO₂ Concentration Test will be performed during this section, with a full duration CO₂ discharge.

- 6.2.1 VERIFY prerequisites listed in Section 4.0 for Subsection 6.2 have been completed.

WLB / 17-22-95
INITIAL DATE

- 6.2.2 ENSURE a CO₂ Concentration Meter has been calibrated, and has a M&TE No. assigned (if meter is supplied by Vendor).

M&TE ID# 490470

WLB / 17-22-95
INITIAL DATE

- 6.2.3 INSTALL a CO₂ Concentration Meter to measure CO₂ concentration in the Unit 2 Auxiliary Instrument Room with the highest recorder probe installed at 75% of room height or the top of the protected equipment (excluding cable trays) whichever is higher, and RECORD elevation above the floor on the associated recorder channel strip chart.

M&TE ID# 490470

WLB / 17-22-95
INITIAL DATE

- 6.2.4 RECORD CO₂ Storage Tank level at 0-LIS-39-2, CO₂ STOR TANK LEVEL, and pressure at 0-PI-39-3, CO₂ STR VAULT TANK PRESS.

0-LIS-39-2 100 %

0-PI-39-3 300 psig

WLB / 17-22-95
INITIAL DATE

- 6.2.4.1 INSTALL THE MANOMETER (OR ΔP MEASURING DEVICE) NEAR THE UNIT 2 AUX INSTRUMENT ROOM TO MEASURE PRESSURE DIFFERENTIAL (WITH HI SIDE INSIDE ROOM)

M&TE ID# 518477
WLB 7-13-95

WLB / 17-22-95
INITIAL DATE

- 6.2.4.2 ENSURE / INSTALL STRIP CHART RECORDER ON 2-IC-39-16 AS DETAILED IN 0-FOR-13-602

WLB 7-21-95

WLB / 17-22-95
INITIAL DATE

OFFICIAL TEST COPY

6.2.5 VERIFY/RESET 2-ISD-31-2058, AUX INSTRUMENT ROOM 2
EXHAUST ISOL.

WCB / 17-22-95
INITIAL DATE

6.2.6 VERIFY/RESET 2-ISD-31-3955, AUX INST RM 2 SUP.

WCB / 17-22-95
INITIAL DATE

6.2.7 VERIFY/RESET Pressure Switch 2-PS-39-71, U2 AUX
INSTR RM CO2 DISCH PRESS, by pushing up on the
plunger on the bottom of the switch housing.

WCB / 17-22-95
INITIAL DATE

6.2.8 VERIFY Zone 281, AUX INSTR RM U1 CO2 INITIATED
Alarm, on Fire Detector Panel 0-M-29, is CLEAR (not
IN).

WCB / 17-22-95
INITIAL DATE

6.2.9 ENSURE the following Unit 2 Aux Instrument Room
doors are CLOSED:

A. Door C24 at Main Corridor

WCB / 17-22-95
INITIAL DATE

B. Door C25 at Stairwell

WCB / 17-22-95
INITIAL DATE

OFFICIAL TEST COPY

- 6.2.10 VERIFY the Red Light at 2-IC-39-16, U2 AUX INSTR RM CO2 TIMER, is ON.

WLB / 17-22-95
INITIAL DATE

- 6.2.11 VERIFY/OPEN 0-ISV-39-522, CO2 STOR TANK OUT ISOL, and ENSURE a FPU Operator is stationed at 0-ISV-39-522.

WLB / 17-22-95
INITIAL DATE

CAUTION

CO₂ will be discharged in subsequent steps. Personnel shall be evacuated from areas being tested and adjacent areas (Control Bldg 692', 708', and 729', as appropriate) and prohibited from unauthorized entry to test area.

- 6.2.12 REQUEST Control Room to announce that the CO₂ System is about to be tested and all personnel should stay clear of the test areas.

WLB / 17-22-95
INITIAL DATE

- 6.2.12.1 ENSURE PERSONNEL ARE POSITIONED TO OBSERVE PRESSURE DIFFERENTIAL IN AUX INSTRUMENT ROOM

WLB
7-13-95

WLB / 17-22-95
INITIAL DATE

WLB
7-13-95

CAUTION

The following emergency action will be taken to discontinue CO₂ discharge, if necessary, to PREVENT AUX INSTRUMENT ROOM FROM EXCEEDING THE MAXIMUM ALLOWABLE DIFFERENTIAL PRESSURE OF 27" H₂O. Switch 2-SW-39-16, U2 AUX INSTR RM CO2 DISC, located inside 0-ARB-39-16 (708/C3N), is to be placed to OFF, then close 0-ISV-39-522, CO2 STOR TANK OUT ISOL.

WLB
7-13-95

WLB
7-13-95

- 6.2.13 ENSURE/ REMOVE cover (using screwdriver) on 2-IC-39-16, U2 AUX INSTR RM CO2 TIMER, then MOMENTARILY DEPRESS the pushbutton 2-HS-39-16A, U2 AUX INSTR RM CO2 MAN TRIP.

WLB
7-21-95

WLB / 17-22-95
INITIAL DATE

OFFICIAL TEST COPY

NOTE

The acceptance criteria values in the following two (2) steps have been corrected for $\pm 2.0\%$ M&TE inaccuracy.

- 6.2.14 RECORD the CO₂ concentration in the Unit 2 Aux Instrument Room, at timed intervals, for a minimum of 15 minutes on Data Sheet 8.3.

WLB / 7-23-95
INITIAL DATE

- 6.2.14.1 VERIFY Unit 2 Aux Instrument Room atmosphere reaches $\geq 32\%$ CO₂ concentration within 2 minutes.

[AC] WLB / 7-23-95
INITIAL DATE

- 6.2.14.2 VERIFY Unit 2 Aux Instrument Room atmosphere reaches $\geq 52\%$ CO₂ concentration within 7 minutes.

[AC] WLB / 7-23-95
INITIAL DATE

- 6.2.14.3 VERIFY Unit 2 Aux Instr Rm atmosphere maintains $\geq 47\%$ CO₂ concentration after 15 minutes.

[AC] WLB / 7-23-95
INITIAL DATE

- 6.2.15 VERIFY the Red Light at 2-IC-39-16 has illuminated.

TDN 95-0791 / WLB 7-26-95
INITIAL DATE

WLB 7-21-95

- 6.2.16 REMOVE STRIP CHART RECORDER ON 2-IC-39-16 AND REPLACE cover on 2-IC-39-16, U2 AUX INSTR RM CO₂ TIMER.

TDN 95-0791 / WLB 7-26-95
INITIAL DATE

WLB
7-21-95

NOTE: GO TO STEP 6.2.16.1
ON PAGE 26

TDN 95-0791 / WLB 7-26-95
2ND PARTY DATE

- 6.2.14.4 RECORD MAXIMUM PRESSURE OBSERVED DURING TESTING OF UNIT 2 AUX INSTRUMENT ROOM.

WLB
7-13-95

22 " H₂O

WLB / 7-23-95
INITIAL DATE

OFFICIAL TEST COPY

- 6.2.17 DEPRESS the RESET Pushbutton 2-HS-39-16R, U2 AUX INSTR RM CO2 RESET in 0-ARB-39-16, U2 AUX INSTR RM CO2 RELAY CAB.

TDN 95-0791 / WLB 7-26-95
INITIAL DATE

- 6.2.18 VERIFY that the alarm horns are SILENT.

TDN 95-0791 / WLB 7-26-95
INITIAL DATE

- 6.2.19 VERIFY that 2-PURF-39-16, U2 AUX INSTR RM CO2 LEAK DET, odorizer is broken by the presence of wintergreen odor.

TDN 95-0791 / WLB 7-26-95
INITIAL DATE

- 6.2.20 ENSURE that the Oxygen content is $\geq 19.5\%$ in all Control Bldg Elevation 692', 708', and 729' Rooms adjacent to and including test area, before allowing personnel to enter without the use of SCBA.

TDN 95-0791 / WLB 7-26-95
INITIAL DATE

- 6.2.21 VERIFY the Unit 2 Aux Instrument Room Dampers are CLOSED:

- A. 2-ISD-31-2058, AUX INSTRUMENT ROOM 2 EXHAUST

TDN 95-0791 / WLB 7-26-95
INITIAL DATE

- B. 2-ISD-31-3955, AUX INST RM 2 SUP ISOL

TDN 95-0791 / WLB 7-26-95
INITIAL DATE

- 6.2.22 RESET Pressure Switch 2-PS-39-71, U2 AUX INSTR RM CO2 DISCH PRESS, by pushing the plunger back into the switch housing.

TDN 95-0791 / WLB 7-26-95
INITIAL DATE

TDN 95-0791 WLB 7-23-95

OFFICIAL TEST COPY

6.2.23 RESET and VERIFY Zone 281, AUX INSTR RM U2 CO2 INITIATED Alarm, on 0-M-29, is OUT.

TDN 95-0791/WLB 7-26-95
INITIAL DATE

6.2.24 RESET the following dampers:

A. 2-ISD-31-2058, AUX INSTRUMENT ROOM 2 EXHAUST

TDN 95-0791/WLB 7-26-95
INITIAL DATE

TDN 95-0791/WLB 7-26-95
2ND PARTY DATE

B. 2-ISD-31-3955, AUX INST RM 2 SUP ISOL

TDN 95-0791/WLB 7-26-95
INITIAL DATE

TDN 95-0791/WLB 7-26-95
2ND PARTY DATE

6.2.25 REMOVE the CO₂ Concentration meter and associated sensing lines from the Unit 2 Aux Instrument Room.

TDN 95-0791/WLB 7-26-95
INITIAL DATE

TDN 95-0791/WLB 7-26-95
2ND PARTY DATE

6.2.26 RECORD CO₂ Tank level at 0-LIS-39-2, CO2 STOR TANK LEVEL, and pressure at 0-PI-39-3, CO2 STR VAULT TANK PRESS.

0-LIS-39-2 TDN 95-0791
WLB 8-3-95 %

0-PI-39-3 TDN 95-0791
WLB 8-3-95 psig

TDN 95-0791/WLB 7-26-95
INITIAL DATE

TDN 95-0791 WLB 7-23-95

OFFICIAL TEST COPY

16.1	WLB 8-3-95		
6.2.27	UNLOCK and CLOSE 0 ISV 39 522, CO₂ STOR TANK OUT ISOL. REMOVE GLASS COVER FOR 2-FSV-39-16	WLB 7-16-95	TDN 95-0791 / WLB 7-26-95
			INITIAL DATE
16.2	WLB 8-3-95		
6.2.28	ENSURE 0 BYV 39 523, CO₂ STOR TANK OUT BYPASS, is CLOSED. OPEN 2-FSV-39-16 UNTIL GAS DISCHARGE CAN NO LONGER BE HEARD.	WLB 7-16-95	TDN 95-0791 / WLB 7-26-95
			INITIAL DATE
16.3	WLB 8-3-95		
6.2.29	OPEN 0 ISV 39 555, CO₂ STOR TANK OUT HDR DRAIN, to allow bleeding of CO₂ from Header. CLOSE 2-FSV-39-16.	WLB 7-16-95	TDN 95-0791 / WLB 7-26-95
			INITIAL DATE
16.4	WLB 8-3-95		
6.2.30	CLOSE 0 ISV 39 555, CO₂ STOR TANK OUT HDR DRAIN. CHANGE REPLACE GLASS COVER FOR 2-FSV-39-16	WLB 7-16-95	TDN 95-0791 / WLB 7-26-95
			INITIAL DATE
16.5	WLB 8-3-95		
6.2.31	OPEN 0 ISV 39 522, CO₂ STOR TANK OUT ISOL. ENSURE 2-FSV-39-16 IS CLOSED	WLB 7-16-95	TDN 95-0791 / WLB 7-26-95
			INITIAL DATE
			INDEPENDENT
	WLB 7-16-95		DELETE / DELETE
			2ND PARTY DATE

54-12-4-824 WLB 7-21-95
CN-04
7-16-95
WLB 7-23-95
CN-03
WLB 7-23-95
TDN 95-0791 1640-56NN

OFFICIAL TEST COPY

7.0 POST-PERFORMANCE ACTIVITIES

CAUTION

Oxygen concentrations in CO₂ dump areas must be checked to be greater than 20% before personnel are allowed to enter without SCBA.

- 7.1 REMOVE barricades and/or signs restricting access to test areas.

WLB / 7-23-95
INITIAL DATE

- 7.2 NOTIFY SOS to ANNOUNCE over PA System that CO₂ System testing is complete.

WLB / 7-23-95
INITIAL DATE

- 7.3 REQUEST the calibration of the M&TE used to verify quantitative acceptance criteria, and RECORD the results on Measuring and Test Equipment Log (M&TE), Attachment 9.2. (Post-test calibration check of vendor supplied CO₂ concentration recorders is completed by Step 7.7)

WLB / 7-23-95
INITIAL DATE

- 7.4 ENSURE the CO₂ Central Unit 0-TANK-039-3 is filled, per SOI-39.01, to a level greater than 40" H₂O as read on 0-LI-39-2, CO₂ STOR TANK LEVEL, at 0-L-83, in Yard near CO₂ Vault.

WLB / 7-22-95
INITIAL DATE

- 7.4.1 ENSURE 0-ISV-39-522 is ^{CLOSED.} ~~OPEN and LOCK~~ 0-ISV-39-522.
_{WLB 7-24-95}

WLB / 7-24-95
INITIAL DATE

DELETE / DELETE
2ND PARTY DATE
_{WLB 7-24-95}

EN-05 WLB 7-24-95

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- 7.5 ENSURE all Fire Protection System Impairment forms (FPI-0102, Attachment C) have been returned to FPU for closure.

WLB / 7-24-95
INITIAL DATE

- 7.6 VERIFY the following odorizers have been REPLACED:

A. 1-PURF-39-14, U1 AUX INSTR RM CO2 LEAK DET

WLB / 7-22-95
INITIAL DATE

Rf / 7-22-95
2ND PARTY DATE

B. 2-PURF-39-16, U2 AUX INSTR RM CO2 LEAK DET

WLB / 7-22-95
INITIAL DATE

Mon / 7/22/95
2ND PARTY DATE

- 7.7 PERFORM a post-test calibration check of the vendor's CO₂ concentration recorder/recorders with samples of ambient air and 100% ($\pm 2\%$) CO₂ test gas.

M&TE ID# 23176

M&TE ID# ^{WLB}~~7-24-NA~~ 490470
(N/A if only one recorder used)

WLB / 7-26-95
INITIAL DATE

- 7.8 NOTIFY SOS of the test completion and system alignment.

WLB / 7-24-95
INITIAL DATE

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- 8.0 SUPPORTING MATERIAL
- 8.1 Test Procedure Reference Review (1 sheet)
- 8.2 Data Sheet 8.2, U1 Aux Instrument Room CO₂ Concentration (1 sheet)
- 8.3 Data Sheet 8.3, U2 Aux Instrument Room CO₂ Concentration (1 sheet)
- 8.4 Data Sheet 8.4, Permanent Plant Instrumentation Log (1 sheet)

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Table 8.1
TEST PROCEDURE REFERENCE REVIEW
Sheet 1 of 1

[illegible]

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DATA SHEET 8.2
U1 AUX INSTRUMENT ROOM CO₂ CONCENTRATION
Page 1 of 1

CO₂ FIRE PROTECTION SYSTEM 39

(Step 6.1.14)

Elapsed Time (min)	CO ₂ Concentration (%)	Initial/Date (Performer and 2nd Party)
2	(ACC CRIT $\geq 32\%$) WLB 7-16-95 44 36 %	WLB 7-16-95
		DRB 7-18-95
4	57 %	WLB 7-16-95
		DRB 7-18-95
6	56 %	WLB 7-16-95
		DRB 7-18-95
7	(ACC CRIT $\geq 52\%$) 56 %	WLB 7-16-95
		DRB 7-18-95
8	52 %	WLB 7-16-95
		DRB 7-18-95
15	(ACC CRIT $\geq 47\%$) 47 WLB 7-16-95 48 %	WLB 7-16-95
		DRB 7-18-95

CO₂ Concentration Meter - M&TE ID# 23176

OFFICIAL TEST COPY

DATA SHEET 8.3
U2 AUX INSTRUMENT ROOM CO₂ CONCENTRATION
Page 1 of 1

CO₂ FIRE PROTECTION SYSTEM 39

(Step 6.2.14)

Elapsed Time (min)	CO ₂ Concentration (%)	Initial/Date (Performer and 2nd Party)
2	(ACC CRIT ≥32%) <u>41</u> %	WLB 7-23-95
		DRB 7.24.95
4	<u>56</u> %	WLB 7-23-95
		DRB 7.24.95
6	<u>57</u> %	WLB 7-23-95
		DRB 7.24.95
7	(ACC CRIT ≥52%) <u>57</u> %	WLB 7-23-95
		DRB 7.24.95
8	<u>57</u> %	WLB 7-23-95
		DRB 7.24.95
15	(ACC CRIT ≥47%) <u>53</u> %	WLB 7-23-95
		DRB 7.24.95

CO₂ Concentration Meter - M&TE ID# 490470

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SPT-039-02
Unit 1
Revision 0
Page 33 of 33

DATA SHEET 8.4
PERMANENT PLANT INSTRUMENTATION LOG
Sheet 1 of 1

INSTRUMENT OR INSTRUMENT LOOP #	CAL DUE DATE	FILLED * AND VENTED	PLACED IN SERVICE *	USED FOR QUANTITATIVE ACC CRIT		POST-TEST** CAL DATE	POST-TEST** CALIBRATION ACCEPTABLE INITIAL/DATE
		INIT/DATE	INIT/DATE	YES	NO		
0-LI-39-0002	4-29-96	WLB / 3-31-95	WLB / 3-31-95		X	N/A 7-19-95	N/A 7-19-95
0-LIS-39-0002	4-29-96	WLB / 3-31-95	WLB / 3-31-95		X	N/A 7-19-95	N/A 7-19-95
0-PI-39-0003	2-5-96	N/A	WLB / 12-12-94		X	N/A 7-19-95	N/A 7-19-95
0-PI-39-0003A	2-5-96	N/A	WLB / 12-12-94		X	N/A 7-19-95	N/A 7-19-95
2-PS-39-0071	2-5-96	N/A	WLB / 1-18-95		X	N/A 7-19-95	N/A 7-19-95
1-PS-39-0065	7-22-96	N/A	WLB / 7-8-94		X	N/A 7-19-95	N/A 7-19-95

- * These items may be initialed and dated by personnel performing the task.
Instrumentation not required to be filled and vented may be identified as Not Applicable (NA)
- ** May be identified as Not Applicable (NA) if instrument was not used to verify/record quantitative acceptance criteria data.

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A3-38

TEST CHANGE NOTICE

Page 1 of 2

PROCEDURE TITLE: --

PROCEDURE NO./REV.: --

CN NO.: --

O₂ FOR UNIT 1+2 AUX INSTR. ROOMS

SPT-039-02 / 0

01

REASON FOR CHANGE: ① ADD ADDITIONAL PREREQUISITE STEPS

② ADD STEP TO MONITOR MAXIMUM ALLOWABLE ROOM DIFFERENTIAL PRESSURE

③ DELETE PREREQ STEP 4.2.18 SINCE CONCENTRATION METER IS CALIBRATED BY CENTRAL LABS.

④ MONTHLY PM CHANGED TO QUARTERLY

AFFECTED STEPS: ① 4.2.21, 4.2.22

② 6.1.13, 6.2.13, 6.1.4.1, 6.2.4.1, 6.1.12.1, 6.2.12.1, 6.1.14.4, 6.2.14.4, 4.1.1.D

③ 4.2.18

CHANGE DESCRIPTION: ① ADD STEP 4.2.21 " ENSURE TESTING IN O-FOR-39-2 (PUFF TEST) IS COMPLETE " INITIAL DATE

① ADD STEP 4.2.22 " ENSURE TIMERS HAVE BEEN RESET PER W.O. 95-17680-00 " INITIAL DATE

② ADD TO CAUTION " TO PREVENT AUX INSTRUMENT ROOM FROM EXCEEDING THE MAXIMUM ALLOWABLE DIFFERENTIAL PRESSURE OF 27" H₂O AT STEPS 6.1.13 AND 6.2.13

② ADD STEP 6.1.4.1 " INSTALL THE MANOMETER (OR AP MEASURING DEVICE) NEAR THE UNIT 1 AUX INSTRUMENT ROOM TO MEASURE PRESSURE DIFFERENTIAL (WITH HI SIDE INSIDE ROOM) M+TE ID# INITIAL DATE

② ADD STEP 6.2.4.1 " INSTALL THE MANOMETER (OR AP MEASURING DEVICE) NEAR THE UNIT 2 AUX INSTRUMENT ROOM TO MEASURE PRESSURE DIFFERENTIAL (WITH HI SIDE INSIDE ROOM)

INTENT CHANGE ☐ JTG MEETING NO. NA NON-INTENT CHANGE ☒

PREPARED BY: Wayne Biellman TEST ENGINEER

DATE 7-13-95

REVIEWED BY: [Signature] TEST ENGINEER

DATE 7-13-95

APPROVED BY: [Signature] STARTUP MANAGER

DATE 7-13-95

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PK

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TEST CHANGE NOTICE

Page 7 of 2
WLB 2
7-13-95

EDURE TITLE:

CO₂ For Unit 42 Aux Instr Room

PROCEDURE NO./REV.:

SPT-039-02/0

CN NO.:

01

REASON FOR CHANGE:

N/A

AFFECTED STEPS: ④ 4.2.11

CONT. ②

CHANGE DESCRIPTION: M + TE ID #

INITIAL / DATE

② ADD STEPS 6.1.12.1, 6.2.12.1 "ENSURE PERSONNEL ARE POSITIONED TO OBSERVE PRESSURE DIFFERENTIAL IN AUX INSTRUMENT Room"

INITIAL / DATE

② ADD STEP 6.1.14.4 "RECORD MAXIMUM PRESSURE OBSERVED DURING TESTING OF UNIT 1 AUX INSTRUMENT ROOM."

"H₂O"

INITIAL / DATE

② ADD STEP 6.2.14.4 "RECORD MAXIMUM PRESSURE OBSERVED DURING TESTING OF UNIT 2 AUX INSTRUMENT ROOM."

"H₂O"

INITIAL / DATE

② ADD STEP 4.1.1.D "0-50" H₂O DIGITAL PRESSURE GAGE (± 2%)

③ DELETE STEP 4.2.18

④ AT STEP 4.2.11 CHANGE "MONTHLY" TO "QUARTERLY" AND "30 DAYS" TO "90 DAYS"

INTENT CHANGE ☐ JTG MEETING NO.

NA

NON-INTENT CHANGE ☒

PREPARED BY:

TEST ENGINEER

DATE

VIEWED BY:

TEST ENGINEER

DATE

APPROVED BY:

STARTUP MANAGER

DATE

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TEST CHANGE NOTICE

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PROCEDURE TITLE: --

PROCEDURE NO./REV.: SPT-039-02. 10

CN NO.: 02

CO₂ FOR UNIT 1+2 AUX INSTR ROOMS

SPT-039-02. 10

02

REASON FOR CHANGE: ① INTENT OF TEST IS TO TEST DISCHARGE OF CO₂ TIME.

AFFECTED STEPS: ① 4.2.22

CHANGE DESCRIPTION: ① ADD AT STEP 4.2.22 " (TIME OF DISCHARGE OF CO₂)

INTENT CHANGE ☐ JTG MEETING NO. _____

NON-INTENT CHANGE ☒

PREPARED BY: Wayne Buhlman
TEST ENGINEER

DATE 7-16-95

REVIEWED BY: [Signature]
TEST ENGINEER

DATE 7-16-95

APPROVED BY: [Signature]
STARTUP MANAGER

DATE 7/17/95
7-16-95

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TEST CHANGE NOTICE

Page 1 of 1

PROCEDURE TITLE: --

PROCEDURE NO./REV.: SPT-039-02 / 0

CN NO.: 03

CO₂ FOR UNIT 1+2 AUX INSTR ROOMS

REASON FOR CHANGE: ① POTENTIAL EQUIPMENT FAILURE OF PIPING

DOWNSTREAM OF 0-ISV-39-555

AFFECTED STEPS: ① 6.1.27 THRU 6.1.31 , 6.2.27 THRU 6.2.31

CHANGE DESCRIPTION: ① "CHANGE STEP 6.1.27 TO REMOVE GLASS COVER FOR 1-FSV-39-14" INITIAL DATE

CHANGE STEP 6.1.28 TO "OPEN 1-FSV-39-14 UNTIL GAS

DISCHARGE CAN NO LONGER BE HEARD." INITIAL DATE

CHANGE STEP 6.1.29 TO "CLOSE 1-FSV-39-14" INITIAL DATE

CHANGE STEP 6.1.30 TO "REPLACE GLASS COVER FOR

1-FSV-39-14" INITIAL DATE

CHANGE STEP 6.1.31 TO "ENSURE 1-FSV-39-14 IS CLOSED" INITIAL DATE

CHANGE STEP 6.2.27 TO "REMOVE GLASS COVER FOR 2-FSV-39-16" INITIAL DATE

CHANGE STEP 6.2.28 TO "OPEN 2-FSV-39-16 UNTIL GAS

DISCHARGE CAN NO LONGER BE HEARD" INITIAL DATE

CHANGE STEP 6.2.29 TO "CLOSE 2-FSV-39-16" INITIAL DATE

CHANGE STEP 6.2.30 TO "REPLACE GLASS COVER FOR

2-FSV-39-16" INITIAL DATE

CHANGE STEP 6.2.31 TO "ENSURE 2-FSV-39-16 IS CLOSED" INITIAL DATE

INTENT CHANGE ☐ JTG MEETING NO. _____

NON-INTENT CHANGE ☒

PREPARED BY: Wayne Buhlman TEST ENGINEER

DATE 7-16-95

VIEWED BY: Ron Phillips TEST ENGINEER

DATE 7/16/95

APPROVED BY: Ron Phillips per D. Koehl STARTUP MANAGER

DATE 7/16/95

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TEST CHANGE NOTICE

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PROCEDURE TITLE: ---

PROCEDURE NO./REV.: ---

CN NO.: ---

CO₂ FOR U-1 AND U-2 AUX INSTR ROOMS

SPT-039-02 / 0

04

REASON FOR CHANGE: ① ADD STEPS TO RECORD U-2 AUX INSTR. ROOM PRESSURE. ② STEPS 6.2.27 THRU 6.2.31 CAN BE PERFORMED MORE EFFICIENTLY AFTER 6.2.16 DUE TO RELIEF PIPING NOT YET REPAIRED.

AFFECTED STEPS: ① 6.2.4.2, 6.2.16, 6.2.13

② 6.2.16, 6.2.27, 28, 29, 30, 31, 16.1, 16.2, 16.3, 16.4, 16.5.

CHANGE DESCRIPTION: ① ADD STEP 6.2.4.2 "ENSURE /INSTALL STRIP CHART RECORDER ON 2-IC-39-16 AS DETAILED IN O-FOR-13-602"

INITIAL DATE

① AT STEP 6.2.16 ADD "REMOVE STRIP CHART RECORDER ON 2-IC-39-16 AND..."

① AT STEP 6.2.13 ADD "ENSURE/"

② ADD NOTE AT 6.2.16 "GO TO STEP 6.2.16.1 ON PAGE 26"

② CHANGE STEP 6.2.27 TO "6.2.16.1"

CHANGE STEP "6.2.28" TO "6.2.16.2"

CHANGE STEP "6.2.29" TO "6.2.16.3"

CHANGE STEP "6.2.30" TO "6.2.16.4"

CHANGE STEP "6.2.31" TO "6.2.16.5"

INTENT CHANGE ☐ JTG MEETING NO. _____

NON-INTENT CHANGE ☒

PREPARED BY: Wayne Biehlmeier
TEST ENGINEER

DATE 7-21-95

VIEWED BY: Andy Brown
TEST ENGINEER

DATE 7-21-95

APPROVED BY: M. Bajest
STARTUP MANAGER

DATE 7-21-95

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TEST CHANGE NOTICE

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PROCEDURE TITLE:

CO₂ FIRE PROTECTION - AUX INSTRM

PROCEDURE NO./REV.:

SPT-039-02 / 0

CN NO.:

05

REASON FOR CHANGE: ① OPS PREFERS TO KEEP 0-1SV-39-522 CLOSED AT THIS TIME.

AFFECTED STEPS: ① 7.4.1

CHANGE DESCRIPTION: ① AT STEP 7.4.1, CHANGE STEP TO "ENSURE 0-1SV-39-522 IS CLOSED." AND DELETE 2ND PARTY.

INTENT CHANGE ☐ JTG MEETING NO. _____

NON-INTENT CHANGE ☒

PREPARED BY: Wayne Buhlman TEST ENGINEER

DATE 7-24-95

VIEWED BY: Pf... TEST ENGINEER

DATE 7.24.95

APPROVED BY: M. B... STARTUP MANAGER

DATE 7-24-95

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**ATTACHMENT 9.0
ATTACHMENT INDEX**

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PAGE 1

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ATTACHMENT 9.2
MEASURING AND TEST EQUIPMENT (M&TE) LOG

Procedure No. SPT-039-02

Revision No. 0

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M&TE ID #	DESCRIPTION	CAL DUE DATE	* FILLED & VENTED	* PLACED IN-SERVICE	USED FOR QUANTITATIVE ACC. CRIT.		**POST-TEST CAL DATE	** POST-TEST CAL ACCEPT
	RANGE/ACCURACY		INIT/DATE	INIT/DATE	YES	NO		INIT/DATE
518478	0-50" DIGITAL PRESS. GAGE ($\pm 0.048\%$ OF RANGE)	9-20-95	N/A	N/A		✓	N/A	N/A
E19502	DIGITAL THERMOMETER $\pm 2^{\circ}\text{F}$	7-11-96	N/A	N/A		✓	N/A	N/A
23176	CO ₂ CONCENTRATION METER 0-100% ($\pm 2\%$)	1-10-96	N/A	N/A	✓		WLB 7-18-95	WLB 7-20-95
902498	MANOMETER 0-36" H ₂ O N/A	NONE	N/A	N/A		✓	N/A	N/A
518477	0-50" DIGITAL PRESS GAGE ($\pm 0.048\%$ RANGE)	9-13-95	N/A	N/A		✓	N/A	N/A
E19497	DIGITAL THERMOMETER $\pm 2^{\circ}\text{F}$	1-19-96	N/A	N/A		✓	N/A	N/A
902594	TIMER, DIGITAL $\pm 0.1 \text{ SEC.}$	10-20-95	N/A	N/A		✓	N/A	N/A
903386	STOPWATCH, DIGITAL $\pm 0.1 \text{ SEC.}$	4-20-96	N/A	N/A		✓	N/A	N/A

- * This item may be signed by the person performing the task. This may be N/A'd if M&TE does not require to be filled and vented or placed in-service.
 ** May be identified as not applicable (N/A) if M&TE was not used to verify/record quantitative acceptance criteria.

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PAGE 1

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ATTACHMENT 9.3
CHRONOLOGICAL TEST LOG

Procedure No. SPT-039-02 Revision 0

Page 1 of 7

DATE/TIME

LOGGED BY

7-12-95 / 0730	Signing in as T.E. W. Bicklini WLB	WLB
	Starting to sign prereqs in Sect. 4.0.	
7-12-95 / 0800	WR 330484 is written to remove and re-install	WLB
	at a later date 2 spare electrical penetrations	
	for instrument pass throughs	
7-12-95 / 1600	Signing out as TE	WLB
7-13-95 / 0730	Signing in as TE	WLB
7-13-95 / 0735	Continuing to sign prereq steps	WLB
7-13-95 / 1500	Installing CN-01 into procedure	WLB
7-13-95 / 1600	Signing out as TE	WLB
7-14-95 / 0630	Signing in as TE	WLB
7-14-95 / 0730	Continue to sign prereqs. Also, door seals	WLB
	being installed in Unit 1, spare penetrations	
	opened for instruments, cleanup has started,	
	Pull test performed last night.	
7-14-95 / 1600	Signing out as TE	WLB
7-15-95 / 1630	Signing in as TE	WLB
7-15-95 / 1640	Continuing to sign prereqs.	WLB
7-15-95 / 1700	Per Maple Walsh of ICMS, room seals are adequate	WLB
	to perform concentration test.	
7-15-95 / 1800	Obtained permission from Startup Manager	WLB
	via telecon to start test	
7-15-95 / 1900	Temperature data collected	WLB
7-15-95 / 2050	Performed Pre-test briefing with Rick O'Rear,	WLB
	J.D. Harris, Jake Martin, John Sterchi, Robby	
	Gilbert (NRC), FP - G. Williams, R.L. Hicks,	
	S.D. Ellis, Don Borer, R.A. Blahemore, M.D. Motter,	
	D.A. Sanders, S. Ellis	
7-16-95 / 0330	Writing CN-02 to add note that times are	WLB
	the ones associated with discharge. This is due	

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ATTACHMENT 9.3
CHRONOLOGICAL TEST LOG

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DATE/TIME

LOGGED BY

7-16-95 / ^{CONT} 0320	to the fact that pre-discharge timer cannot be set at 16-24 sec. per O-FOR-39-602.	
7-16-95 / 0400	Timers have been reset to support discharge of CO ₂ .	WLB
7-16-95 / 0545	At this time a potential damaged pipe was found in the CO ₂ vault. CN-03 is written to get rid of CO ₂ post test in another manner, not using the 555 valve but through the FSV's into the Aux. Instr. Rooms.	WLB
7-16-95 / 0630	Signing out as T.E.	WLB
7-16-95 / 1800	Signing in as T.E.	WLB
7-16-95 / 1805	Personnel are on site to support test, will reverify preseq steps before SOS signs to start test. These include steps 4.2.4, 4.2.5, 4.2.6, 4.2.9, 4.2.10, 4.2.13, 4.2.16.	WLB
7-16-95 / 1900	Temperature in U-1 Aux. Instr. Room is 85.0°F	WLB
7-16-95 / 1915	Temperature in U-2 Aux Instr Room is 83.4°F.	WLB
	Continue to perform walkdown to evacuate personnel from Control Bldg.	WLB
7-16-95 / 1950	All preseqs have been verified and re-verified to start test. Have assembled in Main Control Room to do pre-test briefing.	WLB
7-16-95 / 2050	Have completed pre-test briefing with Larry Callahan ASOS, Steve Wretenich, Cliff Caywood, Rolt Blakemore, Don Basner, John Stenchi.	WLB
7-16-95 / 2055	SOS Sheila Baker has given permission to start test.	WLB
7-16-95 / 2100	Fire reported near QA complex, have lost all support to emergency	WLB

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ATTACHMENT 9.3
CHRONOLOGICAL TEST LOG

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DATE/TIME

LOGGED BY

7-16-95/2210	In Section 6.0 signing steps to verify dampers reset and open.	WLB
7-16-95/2320	Announcement made for test by MCR	WLB
7-16-95/2325	Test has started.	WLB
7-16-95/2330	Test is aborted at approximately 2330 due to rapid pressure rising in U-1 Aux. Instr. Room TDN will be written, TDN 95-0778.	WLB
7-17-95/0130	Unit 1 Aux Instr. Room is cleared of CO ₂ and Eagle Rack fans have been turned back on. They were turned off per request of system engineer.	WLB
7-17-95/0135	As a precaution of dumping additional CO ₂ , valve 0-ISV-39-523 will be opened in CO ₂ tank vault. This precaution will prevent overpressurization of CO ₂ header.	WLB
7-17-95/0215	Reset 4 dampers in Unit 1 Aux Instr. Room	WLB
7-17-95/0230	Adjusted time 1-IC-39-14 to just before end of cycle and after end of discharge with help from vendor Don Baer. Returned fanplate and cover to normal on timer.	WLB
7-17-95/0300	Manually unlatched latching relays in 0-ARB-39-14 to prevent horns from coming in.	WLB
7-17-95/0315	Opened FSV-39-13 to open FCV-39-13, ensured valve 522 was closed from above, closed valve 523, and cracked open valve 555 to vent header.	WLB
7-17-95/0440	CO ₂ header vent completed	WLB
7-17-95/0445	Closed valve 555 and FSV-39-13 and replaced glass cover. 2nd party confirmed closure of valves 555, 522, 523, FSV-39-13.	WLB

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ATTACHMENT 9.3
CHRONOLOGICAL TEST LOG

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DATE/TIME

LOGGED BY

7-17-95 / 0445	Returned 1-SW-39-14 to on position; timer completed cycle and red light came on. Ensured no alarms on O-M-29.	WLB
7-17-95 / 0500	Removed access controls to Control Bldg, advised SOS Baker of status.	WLB
7-17-95 / 0530	Sweep of Control Bldg and lower Turbine Bldg has shown no effects from the dump, O ₂ is adequate. Test restoration complete.	WLB
7-17-95 / 0540	Signing out as T.E.	WLB
7-18-95 / 0730	Signing in as T.E.	WLB
7-18-95 / 0735	TDN 95-0779 has been written to address smell of wintergreen odor in Control Room during CO ₂ discharge and Eagle 21 racks instrumentation acting abnormally during discharge. Testing may continue in Unit 2.	WLB
7-18-95 / 1600	CO ₂ level has been refilled to 70" H ₂ O as shown on O-L-83.	WLB
7-18-95 / 1605	Signing out as T.E.	WLB
7-21-95 / 1300	Signing in as T.E.	WLB
7-21-95 / 1330	Installing CN-04 into procedure.	WLB
7-21-95 / 1545	Signing out as T.E.	WLB
7-22-95 / 1730	Signing in as T.E.	WLB
7-22-95 / 1735	War Room says test is on for tonight.	WLB
7-22-95 / 1745	Called NRC: Rocky Gilbert to announce what test will be performed tonight.	WLB
7-22-95 / 1800	Started evacuating personnel from Control Bldg.	WLB
7-22-95 / 2030	Have secured building below 755 elevation. Started pre-test brief with R. Dohls ASOS, Jim Cassell OPS and Marilyn Zimmerman OPS, John Storch, Dorin Reed, R. Frigate, S. Dohson.	WLB

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CHRONOLOGICAL TEST LOG

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DATE/TIME

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7-22-95/CONT 2030	J. Hill.	
7-22-95/2100	CO ₂ meter set up, presigs verified included plant instr. cal'd, M+TG log, pretest brief, pretest walkdown, post and evacuate non essential personnel, no TACFA, panels installed, tanks filled, confined space permitted, PMs OK, strip-aimant from OK, proper alignment with exception of 522 which is closed, vendor C.D. Pitchard is on station, 2-PURF-39-16 installed during last pull test, Unit 2 temperature is 73 °F, CO ₂ meter is cal'd per Control Lab and cal charts available, OPS is aware O-M-29 will alarm and 2-IC-39-16 is reset to 229 seconds, torados dampers verified open.	WCB
7-22-95/2130	Communication established at CO ₂ vault, all presigs have been verified since O-ISV-39-522 opened as last presig.	WCB
7-22-95/2140	Announcement made by Control Room to plant.	WLB
7-22-95/2142	Test started at step 6.2.13.	WLB
7-22-95/2145	Test aborted at 19" H ₂ O DP. Max pressure was approximately 22" H ₂ O DP. TDN will be written.	WLB
7-22-95/2155	Notified Control Room of CO ₂ test abort.	WLB
7-22-95/2157	Evacuating Cable Spread Room due to lack of O ₂ .	WLB
7-22-95/2215	Opening 2-FSV-39-16 to relieve CO ₂ in header.	WLB
7-22-95/2217	Closing 2-FSV-39-16, and glass back in box.	WLB
7-22-95/2220	Opening doors to remove CO ₂ from U-2 Aux Int. Room to Trishine Bldg. El. 708, O ₂ meter used.	WLB
7-22-95/2330	CO ₂ is verified removed, O ₂ above 19.5 in Control Bldg. Opened valve 555 to release CO ₂ in	WLB

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CHRONOLOGICAL TEST LOG

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7-22-95/2330	^{CONT} header between valve S-22 and FCV-39-13. Advanced time to post discharge time, have removed chart recorder from 2-IC-39-16. ^{WLB 7-22-95} Manually reset latching relay, returned the SW-39-16 to the on position, and the red light came back on. Closed back O-ARB-39-16 box and 2-IC-39-16 box.	
7-22-95/2345	O-donors installed in Unit 1 and Unit 2 Aux. Instr. Rooms	WLB
7-22-95/2350	Reset dampers 2-ISD-31-2058 and 3955.	WLB
7-22-95/2355	All areas at 692, 708, 729 checked okay for O ₂ , have removed access controls and released guards.	WLB
7-23-95/0000	Advised A-505 Barker test is complete, and he has made the announcement. Barker has requested that O-ISV-39-522 remain closed and caution order O-95-574 is still in effect.	WLB
7-23-95/0100	Have returned CO ₂ meter to M+TE and requested post test cal. TDN 95-0791 is written concerning early test termination due to rapidly rising pressure. At end of test, tank CO ₂ level is 78% and pressure at tank is 299 psig.	WLB
7-23-95/0200	FPIV Operator at Stairwell was Steve Dolson, at CO ₂ vault was Bob Fugate, both attended pre-test brief. Temperature noted in U-2 Aux Instrument Room for a short period of time was -23°F.	WLB
7-23-95/0400	Signing out as T.E.	WLB
7-24-95/1200	Signing in as T.E.	WLB
7-24-95/1230	Installing CN-05 into procedure	WLB

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APPENDIX H
10CFR50.55(e) POTENTIAL REPORTABILITY SCREENING FORM
(TO BE USED FOR TEST DEFICIENCY NOTICES ONLY)
Page 1 of 2

PLANT/UNIT WBN-1

TDN Number 95-0778

BRIEF DESCRIPTION OF DEFICIENCY: unit 1 Aux instrument Room Pressure
Rise was higher than expected during CO₂ Fire Protection
Dump

I. Is the deficiency associated with a safety-related component or any support structure?

☒ YES ☐ NO ☐ INDETERMINATE

If the above answer is NO, the deficiency is not potentially reportable. Stop the screening at this point. If the above answer is either YES or INDETERMINATE, continue with the screening process.

II. Can the deficiency be clearly called corrective maintenance for a correctly designed and constructed installation:

☐ YES ☒ NO ☐ INDETERMINATE

Basis for YES answer: _____

III. Is the deficiency related only to test performance activities, such as procedure problems, test equipment or incorrect system lineups?

☐ YES ☒ NO ☐ INDETERMINATE

Basis for YES answer: _____

If the answer to either Question II or Question III is YES, the deficiency is not potentially reportable. Stop the screening at this point. Otherwise, continue with the screening process.

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APPENDIX H
10CFR50.55(e) POTENTIAL REPORTABILITY SCREENING FORM
(TO BE USED FOR TEST DEFICIENCY NOTICES ONLY)
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PLANT/UNIT WBN-1

TDN Number 95-0778

IV. Can you confirm that the affected system or component could have performed its required safety function without reliance on other components, future tests, or operator actions, if left uncorrected?

☐ YES ☐ NO ☒ INDETERMINATE

Basis for YES answer: _____

NOTE: You should consider the following attributes when answering Question IV:

(1) environmental qualifications, (2) seismicity, (3) flood analyses, (4) loss of onsite power, (5) materials application, (6) effect on operator information, and (7) any other attributes which may have an impact on operability.

If the answer to Question IV is YES, the deficiency is not potentially reportable. If the answer to Question IV is either NO or INDETERMINATE, a copy of the TDN and the completed copy of this form shall be submitted to Site Licensing for evaluation.


Signature

Date: 7/17/95

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PAGE 3

JUL 28 1995

T03 95.072.8 8 00;

Corrective Action/ACP Manager, M. Bajestani, STC 1A-WBN

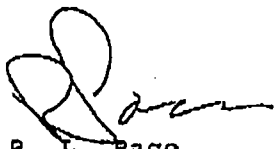
WATTS BAR NUCLEAR PLANT (WBN) - DETERMINATION OF REPORTABILITY FOR
TDN Nos. 95-0778, 95-0779, & 95-0791

The subject document has been evaluated by Site Licensing in accordance with Site Standard Practice (SSP)-4.05. The reportability determination is as follows:

Reportable under 10 CFR 50.55(e): Yes ☐ No ☒

Additional remarks: See attached worksheet.

The reportability worksheets are attached.



P. L. Pace
Compliance Licensing Supervisor
FSB 2K-WBN

DAJ

Attachment(s)

cc (Attachment(s)):

R. T. Purcell, MOB 2R-WBN--(if reportable)
D. E. Nunn, FSB 1A-WBN--(if reportable)
B. S. Schofield, FSB 2K-WBN--(if reportable)
J. E. Sanders, FSB 2K-WBN
NRC Resident Inspector, FSB 1J-WBN--(if reportable)
Responsible Organization Mgr., N/A
RIMS, QAC 1G-WBN

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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
DETERMINATION OF REPORTABILITY
WORKSHEET FOR 10 CFR 50.55 (e)

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PLANT/UNIT WBN/1&2

Item Number TDN Nos. 95-0788,
95-0779, & 95-0791

TITLE: Manual actions required to prevent room overpressurization during CO₂ testing.

DESCRIPTION OF DEFICIENCY: During performance of CO₂ system testing, action was taken to manually terminate the CO₂ injection to prevent overpressurization of the auxiliary instrument rooms. The actions to manually terminate the CO₂ injection were prescribed in the procedure.

I. Does the deficiency involve the construction of a facility or activity, or a basic component supplied for such facility or activity?

A. Construction means the analysis, design, manufacture, fabrication, quality assurance, placement, erection, installation, modification, inspection, or testing of a facility or activity and consulting services related to the facility or activity that are safety related. YES ☐ NO ☒

Explain: The deficiency involves safety related structures.

B. Basic Component

NOTE: In all cases, basic component includes safety related design (as approved and released for construction), analysis, inspection, testing, fabrication, replacement parts, or consulting services that are associated with the component hardware, whether these services are performed by the component supplier or other supplier.

Any plant structure, system, or component, or any part thereof, necessary to assure:

1. The integrity of the reactor coolant pressure boundary. YES ☐ NO ☒

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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
DETERMINATION OF REPORTABILITY
WORKSHEET FOR 10 CFR 50.55(e)

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- | | | | |
|----|--|--|--------------------------------|
| 2. | The capability to shut down the reactor and maintain it in a safe shutdown condition. | YES
<input checked="" type="checkbox"/> | NO
<input type="checkbox"/> |
| 3. | The capability to mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in 10 CFR 100.11. | YES
<input checked="" type="checkbox"/> | NO
<input type="checkbox"/> |

Explain: The walls of the auxiliary instrument rooms are safety related.

If all questions under items I.A and I.B are marked NO, the deficiency is not reportable under 10 CFR 50.55(e). Go to IV.

II. Did the construction of a facility or activity or a basic component supplied for such facility or activity:

- | | | | |
|----|--|---------------------------------|---|
| A. | Fail to comply with the Atomic Energy Act of 1954, as amended, or any applicable rule, regulation, order, or license of the Commission? (10CFR50.55(e)(2)) | YES
<input type="checkbox"/> | NO
<input checked="" type="checkbox"/> |
|----|--|---------------------------------|---|

Explain: No failure to comply is involved. Concern is being address
in accordance with programs developed to implement the Act

- B. Contain a defect? (10CFR50.55(e)(3))

NOTE: Deviation means a departure from the technical or quality assurance requirements defined in procurement documents, safety analysis report, construction permit or other documents provided for installed basic components.

- | | | | |
|----|---|---------------------------------|---|
| 1. | A deviation in a basic component delivered to a purchaser for use in a facility or activity subject to a construction permit? | YES
<input type="checkbox"/> | NO
<input checked="" type="checkbox"/> |
|----|---|---------------------------------|---|

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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
DETERMINATION OF REPORTABILITY
WORKSHEET FOR 10 CFR 50.55(e)

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2. The installation, use, or operation of a basic component containing a defect as defined in Item No. 1 above. YES ☐ NO ☒
3. A deviation in a portion of a facility subject to the construction permit? YES ☐ NO ☒

Explain: No deviation was involved. Auxiliary instrument room pressure was maintained below acceptable limits. Also, the potential for room overpressurization was a recognized consequence of the test and appropriate instructions were included to ensure that room design pressure was not exceeded. Actions taken to terminate the test were in accordance with the testing instructions.

- C. Undergo any significant breakdown in any portion of the quality assurance program conducted pursuant to the requirements of 10 CFR 50, Appendix B, which could have produced a defect in a basic component? (10CFR50.55(e) [4]) YES ☐ NO ☒

Explain: No significant QA breakdown is involved. Deficiency was documented per the QA program.

If all questions under Items II.A, II.B, and II.C are marked NO, the deficiency is not reportable under 10 CFR 50.55(e). Go to IV.

If any question under Items II.A, II.B, or II.C is marked YES, then continue with Item III.

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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
DETERMINATION OF REPORTABILITY
WORKSHEET FOR 10 CFR 50.55(e)

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III. Could the deficiency create a substantial safety hazard, were it to remain uncorrected?

Note: A substantial safety hazard is a loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety for any facility or activity authorized by the construction permit.

A. Moderate exposure to, or release of, licensed material.

- | | | | |
|----|--|---------------------------------|--------------------------------|
| 1. | Exposure in excess of 25 rem whole body (10 CFR 20.2202(a)(1)). | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| 2. | Release of radioactive material to an unrestricted area (10 CFR 20.2202(a)(2)). | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| 3. | Exposure of any individual in an unrestricted area to a total effective dose equivalent in any period of one calendar year in excess of 0.1 rem (10 CFR 20.1301(c)). | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |

Explain:

N/A
7/28/95

B. Major degradation of essential safety-related equipment.

- | | | | |
|----|---|---------------------------------|--------------------------------|
| 1. | A loss of redundancy if, in conjunction with a single failure, a required safety function could not be performed. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
|----|---|---------------------------------|--------------------------------|

Explain:

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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
 DETERMINATION OF REPORTABILITY
 WORKSHEET FOR 10 CFR 50.55(e)

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C. Major deficiencies in design, construction, inspection, test or operation.

- | | | | |
|----|--|---------------------------------|--------------------------------|
| 1. | A condition or circumstances which, under normal operating conditions or anticipated transient could contribute to exceeding a safety limit as defined in the facility technical specifications. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| 2. | A condition or circumstance which, under normal operating conditions or anticipated transient, could cause an accident or, in the event of an accident due to other causes could, considering an independent single failure, result in a loss of safety function necessary to mitigate the consequences of the accident. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| 3. | A deficiency which seriously compromised the ability of a confinement system to perform its designated function. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |

Explain:

N/A
2/28/95

If all questions under Items III.A, III.B, and III.C are marked NO, the deficiency is not reportable under 10 CFR 50.55(e). Go to IV. If any of the questions in III.A, III.B, or III.C are marked YES, the condition is reportable under 10 CFR 50.55(e). Go to IV.

IV.

ITEM IS:

REPORTABLE

NOT REPORTABLE

XXX

EVALUATION PERFORMED BY *[Signature]*DETERMINATION APPROVED BY *[Signature]*

DATE NRC NOTIFIED

INSPECTOR

NOTIFICATION MADE BY

DATE *7/28/95*DATE *7/28/95*

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APPENDIX A
(Sheet 1 of 2)

TEST DEFICIENCY NOTICE			1. TDN No. <u>95-079</u> Page <u>1</u> of <u>9</u>
2. TEST NO. <u>SPT-39-02/R0</u>	3. CSI NO. <u>N/A 7/17/95</u>	4. TREND CODE <u>Q-1</u>	
5. EQUIPMENT NAME: <u>Aux Inst. Room</u>	6. EQUIPMENT NO.: <u>NONE</u>	7. SYSTEM NO.: <u>039</u>	
8. SAFETY-RELATED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. ORIGINATOR/DATE/EXT. <u>Steve Poulsen 7-17-95</u>	10. REF DWG/DOCUMENT(S): <u>474843.1</u>	
11. DESCRIPTION OF DEFICIENCY: <input checked="" type="checkbox"/> HARDWARE <input type="checkbox"/> SOFTWARE <input type="checkbox"/> CONTINUED ① DURING the CO ₂ concentration Test of the U-1 Aux Instrument Room A wintergreen error was detected in the main control room. ② IN ADDITION the Eagle-21 system did not operate as expected during the CO ₂ concentration Test			
11a 10CFR50.55(e) Potential Reportability Screening complete. Site Licensing Evaluation Required <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <u>Steve Poulsen</u> 7/17/95 TEST ENGINEER (LEVEL III) DATE			
12. CORRECTIVE ACTION (S) <input type="checkbox"/> CONTINUED ① NUCLEAR ENGINEERING EVALUATION STATED IT IS UNLIKELY THAT ENOUGH CO ₂ WILL LEAK INTO THE MCR HZ DURING A CO ₂ RELEASE TO HAVE AN ADVERSE AFFECT ON THE OPERATORS. ② EVEN THOUGH THE SSPS EQUIPMENT WAS SUBJECTED TO ENVIRONMENTAL CONDITIONS OUTSIDE ITS DESIGN LIMITS THE EQUIPMENT CONTINUED TO FUNCTION AS DESIGNED <input checked="" type="checkbox"/> OTHER			
SPECIFIED BY: <u>Wayne Biehlman</u> 7-26-95 TEST ENGINEER DATE			
13. RETEST (S) REQUIREMENTS <input type="checkbox"/> CONTINUED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO JUSTIFICATION: SSPS RESPONDED AS EXPECTED. ALSO, NUC. ENG. EVALUATION STATES LEAK UNLIKELY TO HAVE ADVERSE AFFECT.		14. ASSOCIATED WORK DOCUMENTS <input type="checkbox"/> CONTINUED <u>N/A</u>	
SPECIFIED BY: <u>Wayne Biehlman</u> 7-26-95 TEST ENGINEER DATE		14. ASSOCIATED WORK DOCUMENTS <input type="checkbox"/> CONTINUED <u>N/A</u>	
APPROVED BY: <u>Steve Poulsen</u> 7/26/95 TEST GROUP SUPERVISOR DATE			
15. CORRECTIVE ACTION COMPLETE: <u>Wayne Biehlman</u> 17-31-95 TEST ENGINEER DATE		16. RETEST COMPLETE: <u>N/A</u> 7-26-95 TEST ENGINEER DATE	
17. REPORTABILITY EVALUATION COMPLETE: <u>Steve Poulsen</u> 7/31/95 TEST GROUP SUPERVISOR DATE Rins 703-950728-800		18. FINAL APPROVAL: <u>Steve Poulsen</u> 7/31/95 TEST GROUP SUPERVISOR DATE	

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APPENDIX H
10CFR50.55(e) POTENTIAL REPORTABILITY SCREENING FORM
(TO BE USED FOR TEST DEFICIENCY NOTICES ONLY)
Page 1 of 2

PLANT/UNIT WRN-1

TDN Number 95-0779

BRIEF DESCRIPTION OF DEFICIENCY: During the CO₂ concentration Test of
the 4-1 Aux. Instrument Room A winterspeed ^{or on} ~~operation~~ was detected
in the main control Room Aux Eagle-21 Did not operate as Expected

I. Is the deficiency associated with a safety-related component or any support structure?

☒ YES ☐ NO ☐ INDETERMINATE

If the above answer is NO, the deficiency is not potentially reportable. Stop the screening at this point. If the above answer is either YES or INDETERMINATE, continue with the screening process.

II. Can the deficiency be clearly called corrective maintenance for a correctly designed and constructed installation:

☐ YES ☒ NO ☐ INDETERMINATE

Basis for YES answer: _____

III. Is the deficiency related only to test performance activities, such as procedure problems, test equipment or incorrect system lineups?

☐ YES ☒ NO ☐ INDETERMINATE

Basis for YES answer: _____

If the answer to either Question II or Question III is YES, the deficiency is not potentially reportable. Stop the screening at this point. Otherwise, continue with the screening process.

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APPENDIX H
10CFR50.55(e) POTENTIAL REPORTABILITY SCREENING FORM
(TO BE USED FOR TEST DEFICIENCY NOTICES ONLY)
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PLANT/UNIT WRN-1

TDN Number 95-0779

IV. Can you confirm that the affected system or component could have performed its required safety function without reliance on other components, future tests, or operator actions, if left uncorrected?

☐ YES

~~☒ NO~~ ^{11/17/95}

~~☒ INDETERMINATE~~

Basis for YES answer: _____

NOTE: You should consider the following attributes when answering Question IV:

(1) environmental qualifications, (2) seismicity, (3) flood analyses, (4) loss of onsite power, (5) materials application, (6) effect on operator information, and (7) any other attributes which may have an impact on operability.

If the answer to Question IV is YES, the deficiency is not potentially reportable. If the answer to Question IV is either NO or INDETERMINATE, a copy of the TDN and the completed copy of this form shall be submitted to Site Licensing for evaluation.


Signature

Date: 7/17/95

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ATTACHMENT 9.4.2
PAGE 3

JUL 28 1995

T03 95.072.8 8 00:

Corrective Action/ACP Manager, M. Bajestani, STC 1A-WBN

WATTS BAR NUCLEAR PLANT (WBN) - DETERMINATION OF REPORTABILITY FOR
TDN Nos. 95-0778, 95-0779, & 95-0791

The subject document has been evaluated by Site Licensing in accordance with Site Standard Practice (SSP)-4.05. The reportability determination is as follows:

Reportable under 10 CFR 50.55(e): Yes ☐ No ☒

Additional remarks: See attached worksheet.

The reportability worksheets are attached.



P. L. Pace
Compliance Licensing Supervisor
FSB 2K-WBN

DAJ

Attachment(s)

cc (Attachment[s]):

R. T. Purcell, MOB 2R-WBN--(if reportable)
D. E. Nunn, FSB 1A-WBN--(if reportable)
B. S. Schofield, FSB 2K-WBN--(if reportable)
J. E. Sanders, FSB 2K-WBN
NRC Resident Inspector, FSB 1J-WBN--(if reportable)
Responsible Organization Mgr., N/A
RIMS, QAC 1G-WBN

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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
DETERMINATION OF REPORTABILITY
WORKSHEET FOR 10 CFR 50.55(e)

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PLANT/UNIT WBN/1&2

Item Number TDN Nos. 95-0788,
95-0779, & 95-0791

TITLE: Manual actions required to prevent room overpressurization during
CO₂ testing.

DESCRIPTION OF DEFICIENCY: During performance of CO₂ system testing,
action was taken to manually terminate the CO₂ injection to prevent
overpressurization of the auxiliary instrument rooms. The actions to
manually terminate the CO₂ injection were prescribed in the procedure.

I. Does the deficiency involve the construction of a facility or activity, or a basic component supplied for such facility or activity?

A. Construction means the analysis, design, manufacture, YES NO
fabrication, quality assurance, placement, erection, ☐
installation, modification, inspection, or testing of
a facility or activity and consulting services related
to the facility or activity that are safety related.

Explain: The deficiency involves safety related structures.

B. Basic Component

NOTE: In all cases, basic component includes safety related design (as approved and released for construction), analysis, inspection, testing, fabrication, replacement parts, or consulting services that are associated with the component hardware, whether these services are performed by the component supplier or other supplier.

Any plant structure, system, or component, or any part thereof, necessary to assure:

1. The integrity of the reactor coolant pressure boundary. YES NO
☐ ☒

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AC
8.3.75

APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
DETERMINATION OF REPORTABILITY
WORKSHEET FOR 10 CFR 50.55(e)

Page 2 of 5

- | | | | |
|----|--|--|--------------------------------|
| 2. | The capability to shut down the reactor and maintain it in a safe shutdown condition. | YES
<input checked="" type="checkbox"/> | NO
<input type="checkbox"/> |
| 3. | The capability to mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in 10 CFR 100.11. | YES
<input checked="" type="checkbox"/> | NO
<input type="checkbox"/> |

Explain: The walls of the auxiliary instrument rooms are safety related.

If all questions under items I.A and I.B are marked NO, the deficiency is not reportable under 10 CFR 50.55(e). Go to IV.

II. Did the construction of a facility or activity or a basic component supplied for such facility or activity:

- | | | | |
|----|---|---------------------------------|---|
| A. | Fail to comply with the Atomic Energy Act of 1954, as amended, or any applicable rule, regulation, order, or license of the Commission? (10CFR50.55(e) [2]) | YES
<input type="checkbox"/> | NO
<input checked="" type="checkbox"/> |
|----|---|---------------------------------|---|

Explain: No failure to comply is involved. Concern is being address
in accordance with programs developed to implement the Act

- B. Contain a defect? (10CFR50.55(e) [3])

NOTE: Deviation means a departure from the technical or quality assurance requirements defined in procurement documents, safety analysis report, construction permit or other documents provided for installed basic components.

- | | | | |
|----|---|---------------------------------|---|
| 1. | A deviation in a basic component delivered to a purchaser for use in a facility or activity subject to a construction permit? | YES
<input type="checkbox"/> | NO
<input checked="" type="checkbox"/> |
|----|---|---------------------------------|---|

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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
DETERMINATION OF REPORTABILITY
WORKSHEET FOR 10 CFR 50.55(e)

Page 3 of 5

2. The installation, use, or operation of a basic component containing a defect as defined in Item No. 1 above. YES ☐ NO ☒
3. A deviation in a portion of a facility subject to the construction permit? YES ☐ NO ☒

Explain: No deviation was involved. Auxiliary instrument room pressure was maintained below acceptable limits. Also, the potential for room overpressurization was a recognized consequence of the test and appropriate instructions were included to ensure that room design pressure was not exceeded. Actions taken to terminate the test were in accordance with the testing instructions.

- C. Undergo any significant breakdown in any portion of the quality assurance program conducted pursuant to the requirements of 10 CFR 50, Appendix B, which could have produced a defect in a basic component? (10CFR50.55(e) [4]) YES ☐ NO ☒

Explain: No significant QA breakdown is involved. Deficiency was documented per the QA program.

If all questions under Items II.A, II.B, and II.C are marked NO, the deficiency is not reportable under 10 CFR 50.55(e). Go to IV.

If any question under Items II.A, II.B, or II.C is marked YES, then continue with Item III.

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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
DETERMINATION OF REPORTABILITY
WORKSHEET FOR 10 CFR 50.55(e)

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III. Could the deficiency create a substantial safety hazard, were it to remain uncorrected?

Note: A substantial safety hazard is a loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety for any facility or activity authorized by the construction permit.

A. Moderate exposure to, or release of, licensed material.

- | | | | |
|----|--|---------------------------------|--------------------------------|
| 1. | Exposure in excess of 25 rem whole body (10 CFR 20.2202(a)(1)). | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| 2. | Release of radioactive material to an unrestricted area (10 CFR 20.2202(a)(2)). | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| 3. | Exposure of any individual in an unrestricted area to a total effective dose equivalent in any period of one calendar year in excess of 0.1 rem (10 CFR 20.1301(c)). | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |

Explain:

N/A
7/28/95

B. Major degradation of essential safety-related equipment.

- | | | | |
|----|---|---------------------------------|--------------------------------|
| 1. | A loss of redundancy if, in conjunction with a single failure, a required safety function could not be performed. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
|----|---|---------------------------------|--------------------------------|

Explain:

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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
 DETERMINATION OF REPORTABILITY
 WORKSHEET FOR 10 CFR 50.55(e)

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C. Major deficiencies in design, construction, inspection, test or operation.

- | | | | |
|----|--|---------------------------------|--------------------------------|
| 1. | A condition or circumstances which, under normal operating conditions or anticipated transient could contribute to exceeding a safety limit as defined in the facility technical specifications. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| 2. | A condition or circumstance which, under normal operating conditions or anticipated transient, could cause an accident or, in the event of an accident due to other causes could, considering an independent single failure, result in a loss of safety function necessary to mitigate the consequences of the accident. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| 3. | A deficiency which seriously compromised the ability of a confinement system to perform its designated function. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |

Explain:

N/A
 7/28/95

If all questions under Items III.A, III.B, and III.C are marked NO, the deficiency is not reportable under 10 CFR 50.55(e). Go to IV. If any of the questions in III.A, III.B, or III.C are marked YES, the condition is reportable under 10 CFR 50.55(e). Go to IV.

IV.

ITEM IS:

REPORTABLE

NOT REPORTABLE

XXX

EVALUATION PERFORMED BY

DETERMINATION APPROVED BY

DATE NRC NOTIFIED

NOTIFICATION MADE BY

INSPECTOR

DATE 7/28/95

DATE 7/28/95

PROC. SPT 39-02 REV. 0

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mf

APPENDIX A
(Sheet 1 of 2)

TEST DEFICIENCY NOTICE			1. TDN No. <u>95-0791</u>
			Page <u>1</u> of <u>9</u>
2. TEST NO. <u>SPT-039-02</u>	3. CSI NO. <u>N/A 7/23/95</u>	4. TREND CODE <u>Q-1</u>	
5. EQUIPMENT NAME: <u>Aux Inst Room Timer</u>	6. EQUIPMENT NO.: <u>2-IC-39-16</u>	7. SYSTEM NO.: <u>39</u>	
8. SAFETY-RELATED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. ORIGINATOR/DATE/EXT. <u>7-22-95 27981</u> <u>WAYNE BICHLMEIN</u>	10. REF DWG/DOCUMENT(S): <u>47W 843-1</u>	
11. DESCRIPTION OF DEFICIENCY: <input checked="" type="checkbox"/> HARDWARE <input type="checkbox"/> SOFTWARE <input type="checkbox"/> CONTINUED UNIT-2 Aux. Inst. Room Pressure WAS Rising Steadily TOWARD maximum Allowable Room D.P. OF 2" H ₂ O; Decision WAS MADE to Abort TEST By PLACING 2-SW-39-16 to off AUXILIARY MANUAL ISOLATION VALVE 0-ISV-39-522. Pressure Relief DAMPER 0-DMP-031-5440 WAS ADDED By DCN-W-35588 to prevent overpressurization. TALLIEST D.P. RECORDED During Test WAS APPROX. 20" H ₂ O			
11a 10CFR50.55(e) Potential Reportability Screening complete. Site Licensing Evaluation Required <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <u>Shackel</u> <u>1 7/23/95</u> TEST ENGINEER (LEVEL III) DATE		11b Operability Determination LCO <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <u>WLB 7-25-95</u> <u>N/A</u> <u>1</u> SOS DATE	
12. CORRECTIVE ACTION (S) <input type="checkbox"/> CONTINUED DCN 37610 LOWERS THE TIME SETTING OF 2-IC-39-16 FROM 260 SECONDS TO 201 SECONDS. THIS REDUCTION IN TIME WILL ELIMINATE OVER-PRESSURIZATION CONCERNS BY LIMITING THE AMOUNT OF CO ₂ FLOWING INTO THE UNIT 2 AUX. INSTRUMENT ROOM. <input checked="" type="checkbox"/> REWORK <input type="checkbox"/> REPAIR <input type="checkbox"/> ACCEPT-AS-IS <input type="checkbox"/> OTHER PROC. SPT 39-02REV. 0 ATTACHMENT 9.4.3 PAGE 1			
SPECIFIED BY: <u>Wayne Bichlmei</u> <u>7-26-95</u> TEST ENGINEER DATE			
13. RETEST (S) REQUIREMENTS <input type="checkbox"/> CONTINUED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO JUSTIFICATION: DCN 37610 LOWERS TIME SETTING, FROM 260 TO 201 SECONDS.		14. ASSOCIATED WORK DOCUMENTS <input type="checkbox"/> CONTINUED <u>W.O. 95-17680-00</u>	
SPECIFIED BY: <u>Wayne Bichlmei</u> <u>1 7-26-95</u> TEST ENGINEER DATE		APPROVED BY: <u>Shackel</u> <u>1 7/26/95</u> TEST GROUP SUPERVISOR DATE	
APPROVED BY: <u>Shackel</u> <u>1 7/26/95</u> TEST GROUP SUPERVISOR DATE			
15. CORRECTIVE ACTION COMPLETE: <u>Wayne Bichlmei</u> <u>17-31-95</u> TEST ENGINEER DATE		16. RETEST COMPLETE: <u>WLB</u> <u>N/A 7-26-95</u> <u>1</u> TEST ENGINEER DATE	
17. REPORTABILITY EVALUATION COMPLETE: <u>Shackel</u> <u>1 7/31/95</u> TEST GROUP SUPERVISOR DATE		18. FINAL APPROVAL: <u>Shackel</u> <u>7/31/95</u> TEST GROUP SUPERVISOR DATE	

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APPENDIX H
10CFR50.55(e) POTENTIAL REPORTABILITY SCREENING FORM
(TO BE USED FOR TEST DEFICIENCY NOTICES ONLY)
Page 1 of 2

PLANT/UNIT WBN-1

TDN Number 95-0791

BRIEF DESCRIPTION OF DEFICIENCY: Pressure Rise was Greater than Expected
During CO₂ test of U-2 Aux inlets Room.

I. Is the deficiency associated with a safety-related component or any support structure?

☒ YES ☐ NO ☐ INDETERMINATE

If the above answer is NO, the deficiency is not potentially reportable. Stop the screening at this point. If the above answer is either YES or INDETERMINATE, continue with the screening process.

II. Can the deficiency be clearly called corrective maintenance for a correctly designed and constructed installation:

☐ YES ☐ NO ☒ INDETERMINATE

Basis for YES answer: _____

III. Is the deficiency related only to test performance activities, such as procedure problems, test equipment or incorrect system lineups?

☐ YES ☒ NO ☐ INDETERMINATE

Basis for YES answer: _____

If the answer to either Question II or Question III is YES, the deficiency is not potentially reportable. Stop the screening at this point. Otherwise, continue with the screening process.

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APPENDIX H
10CFR50.55(e) POTENTIAL REPORTABILITY SCREENING FORM
(TO BE USED FOR TEST DEFICIENCY NOTICES ONLY)

Page 2 of 2

PLANT/UNIT WBN-1

TDN Number 95-0791

IV. Can you confirm that the affected system or component could have performed its required safety function without reliance on other components, future tests, or operator actions, if left uncorrected?

☐ YES

☐ NO

☒ INDETERMINATE

Basis for YES answer: _____

NOTE: You should consider the following attributes when answering Question IV:

(1) environmental qualifications, (2) seismicity, (3) flood analyses, (4) loss of onsite power, (5) materials application, (6) effect on operator information, and (7) any other attributes which may have an impact on operability.

If the answer to Question IV is YES, the deficiency is not potentially reportable. If the answer to Question IV is either NO or INDETERMINATE, a copy of the TDN and the completed copy of this form shall be submitted to Site Licensing for evaluation.


Signature

Date: 7/23/85

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PAGE 3

JUL 28 1995

TO3 95.0728 800;

Corrective Action/ACP Manager, M. Bajestani, STC 1A-WBN

WATTS BAR NUCLEAR PLANT (WBN) - DETERMINATION OF REPORTABILITY FOR
TDN Nos. 95-0778, 95-0779, & 95-0791

The subject document has been evaluated by Site Licensing in accordance with Site Standard Practice (SSP)-4.05. The reportability determination is as follows:

Reportable under 10 CFR 50.55(e): Yes ☐ No ☒

Additional remarks: See attached worksheet.

The reportability worksheets are attached.



P. L. Pace
Compliance Licensing Supervisor
FSB 2K-WBN

DAJ

Attachment(s)

cc (Attachment[s]):

R. T. Purcell, MOB 2R-WBN--(if reportable)
D. E. Nunn, FSB 1A-WBN--(if reportable)
B. S. Schofield, FSB 2K-WBN--(if reportable)
J. E. Sanders, FSB 2K-WBN
NRC Resident Inspector, FSB 1J-WBN--(if reportable)
Responsible Organization Mgr., N/A
RIMS, QAC 1G-WBN

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ATTACHMENT 9.4.3
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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
DETERMINATION OF REPORTABILITY
WORKSHEET FOR 10 CFR 50.55(a)

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PLANT/UNIT WBN/1&2

Item Number TDN Nos. 95-0788,
95-0779, & 95-0791

TITLE: Manual actions required to prevent room overpressurization during CO₂ testing.

DESCRIPTION OF DEFICIENCY: During performance of CO₂ system testing, action was taken to manually terminate the CO₂ injection to prevent overpressurization of the auxiliary instrument rooms. The actions to manually terminate the CO₂ injection were prescribed in the procedure.

I. Does the deficiency involve the construction of a facility or activity, or a basic component supplied for such facility or activity?

A. Construction means the analysis, design, manufacture, YES NO
fabrication, quality assurance, placement, erection, ☐
installation, modification, inspection, or testing of
a facility or activity and consulting services related
to the facility or activity that are safety related.

Explain: The deficiency involves safety related structures.

B. Basic Component

NOTE: In all cases, basic component includes safety related design (as approved and released for construction), analysis, inspection, testing, fabrication, replacement parts, or consulting services that are associated with the component hardware, whether these services are performed by the component supplier or other supplier.

Any plant structure, system, or component, or any part thereof, necessary to assure:

1. The integrity of the reactor coolant pressure boundary. YES NO
☐ ☒

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PAGE 5 7-3145

APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
DETERMINATION OF REPORTABILITY
WORKSHEET FOR 10 CFR 50.55(e)

Page 2 of 5

- | | | | |
|----|--|--|--------------------------------|
| 2. | The capability to shut down the reactor and maintain it in a safe shutdown condition. | YES
<input checked="" type="checkbox"/> | NO
<input type="checkbox"/> |
| 3. | The capability to mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in 10 CFR 100.11. | YES
<input checked="" type="checkbox"/> | NO
<input type="checkbox"/> |

Explain: The walls of the auxiliary instrument rooms are safety related.

If all questions under items I.A and I.B are marked NO, the deficiency is not reportable under 10 CFR 50.55(e). Go to IV.

II. Did the construction of a facility or activity or a basic component supplied for such facility or activity:

- | | | | |
|----|---|---------------------------------|---|
| A. | Fail to comply with the Atomic Energy Act of 1954, as amended, or any applicable rule, regulation, order, or license of the Commission? (10CFR50.55(e) [2]) | YES
<input type="checkbox"/> | NO
<input checked="" type="checkbox"/> |
|----|---|---------------------------------|---|

Explain: No failure to comply is involved. Concern is being address
in accordance with programs developed to implement the Act

- B. Contain a defect? (10CFR50.55(e) [3])

NOTE: Deviation means a departure from the technical or quality assurance requirements defined in procurement documents, safety analysis report, construction permit or other documents provided for installed basic components.

- | | | | |
|----|---|---------------------------------|---|
| 1. | A deviation in a basic component delivered to a purchaser for use in a facility or activity subject to a construction permit? | YES
<input type="checkbox"/> | NO
<input checked="" type="checkbox"/> |
|----|---|---------------------------------|---|

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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
DETERMINATION OF REPORTABILITY
WORKSHEET FOR 10 CFR 50.55(e)

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2. The installation, use, or operation of a basic component containing a defect as defined in Item No. 1 above. YES ☐ NO ☒
3. A deviation in a portion of a facility subject to the construction permit? YES ☐ NO ☒

Explain: No deviation was involved. Auxiliary instrument room pressure was maintained below acceptable limits. Also, the potential for room overpressurization was a recognized consequence of the test and appropriate instructions were included to ensure that room design pressure was not exceeded. Actions taken to terminate the test were in accordance with the testing instructions.

- C. Undergo any significant breakdown in any portion of the quality assurance program conducted pursuant to the requirements of 10 CFR 50, Appendix B, which could have produced a defect in a basic component? (10CFR50.55(e) [4]) YES ☐ NO ☒

Explain: No significant QA breakdown is involved. Deficiency was documented per the QA program.

If all questions under Items II.A, II.B, and II.C are marked NO, the deficiency is not reportable under 10 CFR 50.55(e). Go to IV.

If any question under Items II.A, II.B, or II.C is marked YES, then continue with Item III.

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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
DETERMINATION OF REPORTABILITY
WORKSHEET FOR 10 CFR 50.55(a)

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III. Could the deficiency create a substantial safety hazard, were it to remain uncorrected?

Note: A substantial safety hazard is a loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety for any facility or activity authorized by the construction permit.

A. Moderate exposure to, or release of, licensed material.

- | | | |
|---|---------------------------------|--------------------------------|
| 1. Exposure in excess of 25 rem whole body (10 CFR 20.2202(a)(1)). | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| 2. Release of radioactive material to an unrestricted area (10 CFR 20.2202(a)(2)). | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| 3. Exposure of any individual in an unrestricted area to a total effective dose equivalent in any period of one calendar year in excess of 0.1 rem (10 CFR 20.1301(c)). | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |

Explain:

N/A
7/28/91

B. Major degradation of essential safety-related equipment.

- | | | |
|--|---------------------------------|--------------------------------|
| 1. A loss of redundancy if, in conjunction with a single failure, a required safety function could not be performed. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
|--|---------------------------------|--------------------------------|

Explain:

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APPENDIX E-3

FORMS FOR EVALUATING REPORTABILITY
 DETERMINATION OF REPORTABILITY
 WORKSHEET FOR 10 CFR 50.55(e)

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C. Major deficiencies in design, construction, inspection, test or operation.

- | | | | |
|----|--|---------------------------------|--------------------------------|
| 1. | A condition or circumstances which, under normal operating conditions or anticipated transient could contribute to exceeding a safety limit as defined in the facility technical specifications. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| 2. | A condition or circumstance which, under normal operating conditions or anticipated transient, could cause an accident or, in the event of an accident due to other causes could, considering an independent single failure, result in a loss of safety function necessary to mitigate the consequences of the accident. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| 3. | A deficiency which seriously compromised the ability of a confinement system to perform its designated function. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |

Explain:

N/A
 7/28/95

If all questions under Items III.A, III.B, and III.C are marked NO, the deficiency is not reportable under 10 CFR 50.55(e). Go to IV. If any of the questions in III.A, III.B, or III.C are marked YES, the condition is reportable under 10 CFR 50.55(e). Go to IV.

IV.

ITEM IS:

REPORTABLE

NOT REPORTABLE

XXX

EVALUATION PERFORMED BY

DETERMINATION APPROVED BY

DATE NRC NOTIFIED

NOTIFICATION MADE BY

INSPECTOR

DATE 7/24/95

DATE 7/28/95

PROC. SPT 39-02 REV. 0
 ATTACHMENT 9.4.3
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08:29:36 07-14-95

ISSUE TICKET

PAGE 1

WIDH - SPT03902 20

EMPLOYEE - B8096 WAYNE BICHLMEIR

ISSUED - 07/14/9

M&TE	DESCRIPTION/ LIMITATIONS	DUE TO RETURN	LAST CALIB	NEXT CALIB	ACCURACY/ CON P/P
S18478	PRESSURE GAUGE, DIGITAL NONE	07/17/95	06/20/95	09/20/95	+/- .048% RANGE N N
E19502	DIGITAL THERMONETER NONE	07/17/95	07/11/95	07/11/96	+/- 2 DEG F N N
902498	MANOMETER	07/17/95	11/26/91		N

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PAGE 1

16:17:53 07-19-95

M&TE USAGE HISTORY FROM 07/16/95 TO 07/16/95 FOR SELECTED M&TE

PAGE: 1

M&TE NUMBER	M&TE DESCRIPTION	WORK DOCUMENT ID	ISSUE DATE	ORGANIZATION	EMPLOYEE NAME
E23176	CO2 ANALYZER	SPT-039-02	07/16/95	FIRE	STERCHI

One record listed.

A3-85

PROC. SPT 39-02 REV. 0
ATTACHMENT 9.5
PAGE 2

85

14:09:14 07-21-95

ISSUE TICKET

PAGE 1

WID# - SPT03902/RO
/95

EMPLOYEE - B8096 WAYNE BICHLMEIR

ISSUED - 07/21

M&TE	DESCRIPTION/ LIMITATIONS	DUE TO RETURN	LAST CALIB	NEXT CALIB	ACCURACY/ CON P/P
902594 D	TIMER, DIGITAL	07/24/95	10/20/94	10/20/95	+/- 0.1 SECON
903386	NONE STOPWATCH, DIGITAL	07/24/95	04/20/95	04/20/96	N N +/- .1 SEC.
902498	NOLR MANOMETER	07/24/95	11/26/91		N N N
518477 E	PRESSURE GAUGE, DIGITAL	07/24/95	06/13/95	09/13/95	+/- .048% RANG
E19497	NONE DIGITAL THERMONETER	07/24/95	01/19/95	01/19/96	N N +/- 2 DEG F
	NONE				N N

PROC. SPT 39-02 REV. 0
ATTACHMENT 9.5
PAGE 3

17:36:15 07-22-95

ISSUE TICKET

PAGE 1

WID# - SPT-039-02-R0

EMPLOYEE - S2852 JOHN STERCHI

ISSUED - 07/22/95

M&TE	DESCRIPTION/ LIMITATIONS	DUE TO RETURN	LAST CALIB	NEXT CALIB	ACCURACY/ CON P/P
891536	RECORDER NOLR	09/02/95	06/12/95	06/12/96	SEE REPORT N N
490470	C02 ANALYZER NONE	07/25/95	07/20/95	10/20/95	SEE REPORT N

PROC. SPT 39-02 REV. 0
ATTACHMENT 9.5
PAGE 4

12:34:42 07-21-95

ISSUE TICKET

PAGE 1

WID# - SPT03902/R0

EMPLOYEE - E0199 DOUGLAS ELY

ISSUED - 07/21/9

M&TE	DESCRIPTION/ LIMITATIONS	DUE TO RETURN	LAST CALIB	NEXT CALIB	ACCURACY/ CON P/P
891513	PRESSURE GAUGE, DIGITAL NONE	07/24/95	05/18/95	09/18/95	SEE CAL REPORT
557886	DIGITAL MULTIMETER NONE	08/04/95	06/29/95	12/29/95	SEE CAL REPORT
512752	RECORDER NONE	08/20/95	03/15/95	03/15/96	SEE REPORT N N
458944	DIGITAL CALIBRATOR NONE	07/24/95	06/30/95	12/30/95	SEE CAL REPORT
416651	DECADE RES BOX NONE	08/20/95	03/02/95	03/02/96	SEE CAL REPORT N N
557886	DIGITAL MULTIMETER NONE	08/04/95	06/29/95	12/29/95	SEE CAL REPORT N N

PROC. SPT 39-02 REV. 0
ATTACHMENT 9.5
PAGE 5

Tennessee Valley Authority

CENTRAL LABORATORIES SERVICES

Chattanooga, Tennessee

ID NO. E23176

REPORT OF CALIBRATION

DATE: 7-17-95

Instrument: CO₂ AnalyzerPLANT: ~~Factory~~ W.B.N.P.

Manufacturer: TURE INST. CO.

CAL DATES: LAST: 7-10-95

Model: CH3F

NEXT: N-A

Instruction No.: 409,3-4

INTERVAL: ~~6 MO.~~ NA 08 7-18-95

Disposition to: Factory

Standard(s) Used: - NA

Instrument Accuracy: ± 15 Seconds / Hour ; CO₂ SPAN - Functional

AS FOUND

WITHIN TOLERANCE ☒OUT OF TOLERANCE ☐NOT REQUIRED ☐

AS LEFT

WITHIN TOLERANCE ☐TEST INCOMPLETE ☐NOT REQUIRED ☒

CHART SPEED -

Functional

Nominal 1.2 in/hr

A F
✓AL
✓
7-18-95

OPERATION FOR THE 100% CO₂ RANGE WAS FUNCTIONALLY TESTED USING A NON-CERTIFIED CONCENTRATION OF 100% CO₂. AFTER THE RECORDER WAS ZEROED, THE CO₂ WAS THEN APPLIED AND THE FULL SCALE DEFLECTION ERROR WAS NOTED. REPEATABILITY WAS VERIFIED BY MULTIPLE CHECKS. THE LARGEST FULL SCALE ERROR WAS NOTED TO BE 2% ON ANY CHANNEL.

THE CONCENTRATION OF CO₂ AT CLS IS NOT CERTIFIED AND THEREFORE THE SPAN ACCURACY CHECK SHOULD NOT BE INFERRED AS A CERTIFIED MEASUREMENT. INST RETURNED TO DIXIE FIRE PROTECTION CO. DECERTIFIED.

PROC. SPT 39-02 REV. 0
ATTACHMENT 9.6
PAGE 1

All measurement ratios between the standards referenced in this instruction and the M&TE calibrated are greater than or equal to 4:1.

This instrument was tested and calibrated to prescribed test procedures and the condition of the instrument is indicated.

Tested by:

Gerald A. Burt

Approved by:

H. R. Bly

Page 1 of 1

Tennessee Valley Authority

CENTRAL LABORATORIES SERVICES

Chattanooga, Tennessee

ID NO. 490470

REPORT OF CALIBRATION

DATE: 7-23-95

Instrument: CO₂ Analyzer

PLANT: WBNP

Manufacturer: PERCO

CAL DATES: LAST: 7-20-95

Model: 113

NEXT: --

Instruction No.: 909.34

INTERVAL: --

Disposition to: WBNP

Standard(s) Used: 902648

Instrument Accuracy: Chart Speed 15 Second/hour & CO₂ Functionally Tested

AS FOUND

WITHIN TOLERANCE ☒OUT OF TOLERANCE ☐NOT REQUIRED ☐

AS LEFT

WITHIN TOLERANCE ☐TEST INCOMPLETE ☐NOT REQUIRED ☐

A Non Certified Concentration of CO₂ was applied to all 3 channels after those channels were zeroed. The span was adjusted for a reading of 100% CO₂ on all channels. Multiple tests were performed to ensure repeatability. Since CLS does not have a certified concentration of CO₂, this test is functional only.

Chart speed Verification:

Nominal chart speed
15 in/hr

A.F.

A.L.

✓

PROC. SPT 39-02 REV. 0

ATTACHMENT 9.6

PAGE 2

All measurement ratios between the standards referenced in this instruction and the M&TE calibrated are greater than or equal to 4:1

This instrument was tested and calibrated to prescribed test procedures and the condition of the instrument is indicated.

Calibrated by: Denise A. HuntApproved by: Roger W. Phillips

Page 1 of 1

TOTAL P.02

CENTRAL LABORATORIES SERVICES

Chattanooga, Tennessee

ID NO. E23176

REPORT OF CALIBRATION

DATE: 7-10-95

Instrument: CO ₂ ANALYZER	PLANT: FACTORY		
Manufacturer: TUORE INSTRUMENT CO.	CAL DATES: LAST: INITIAL		
Model: CH3F	NEXT: 1-10-96		
Instruction No.: 409.3-4	INTERVAL: 6 MONTHS		
Disposition to: WATTS BAR NP			
Standard(s) Used: USTVA 902-648			
Instrument Accuracy: ± 15 seconds/HOUR; CO ₂ SPAN - FUNCTIONAL			
AS FOUND	WITHIN TOLERANCE <input type="checkbox"/>	OUT OF TOLERANCE <input type="checkbox"/>	NOT REQUIRED <input checked="" type="checkbox"/>
AS LEFT	WITHIN TOLERANCE <input checked="" type="checkbox"/>	TEST INCOMPLETE <input type="checkbox"/>	NOT REQUIRED <input type="checkbox"/>

CHART SPEED VERIFICATION

NOMINAL

CHART SPEED 12 IN/HR

AS FOUND

AS LEFT

OPERATION FOR THE 100% CO₂ RANGE WAS FUNCTIONALLY TESTED USING A NON-CERTIFIED CONCENTRATION OF 100% CO₂. AFTER THE RECORDER WAS ZEROED, THE CO₂ WAS THEN APPLIED AND THE FULL SCALE DEFLECTION ERROR WAS NOTED. REPEATABILITY WAS VERIFIED BY MULTIPLE CHECKS. THE LARGEST FULL SCALE ERROR WAS NOTED TO BE 2% ON ANY CHANNEL. THE CONCENTRATION OF CO₂ AT CLS IS NOT CERTIFIED AND THEREFORE THE SPAN ACCURACY CHECK SHOULD NOT BE INFERRED AS A CERTIFIED MEASUREMENT. LIMITED CERTIFICATION AFFIXED.

PROC. SPT 39-02 REV. 0

ATTACHMENT 9.7

PAGE 1

All measurement ratios between the standards referenced in this instruction and the M&TE calibrated are greater than or equal to 4:1.

This instrument was tested and calibrated to prescribed test procedures and the condition of the instrument is indicated.

Calibrated by:

Roger W. Phillips

Approved by:

[Signature]

Page 1 of 1

CONCENTRATION TEST

Dixie Fire Protection Co.

2816 Commerce Square East

Birmingham, AL 35210

(205) 956-2325

RM #B40049

TEST DATE 7-10-95 TEST NO. ① THIS HAZARD TEST TIME 1400

CUSTOMER DIXIE FIRE PROTECTION

HAZARD IDENTIFICATION CALIBRATION OF TEST ALGA W/CO2

SAMPLE POINT #1

TEST

SAMPLE POINT #2

TEST

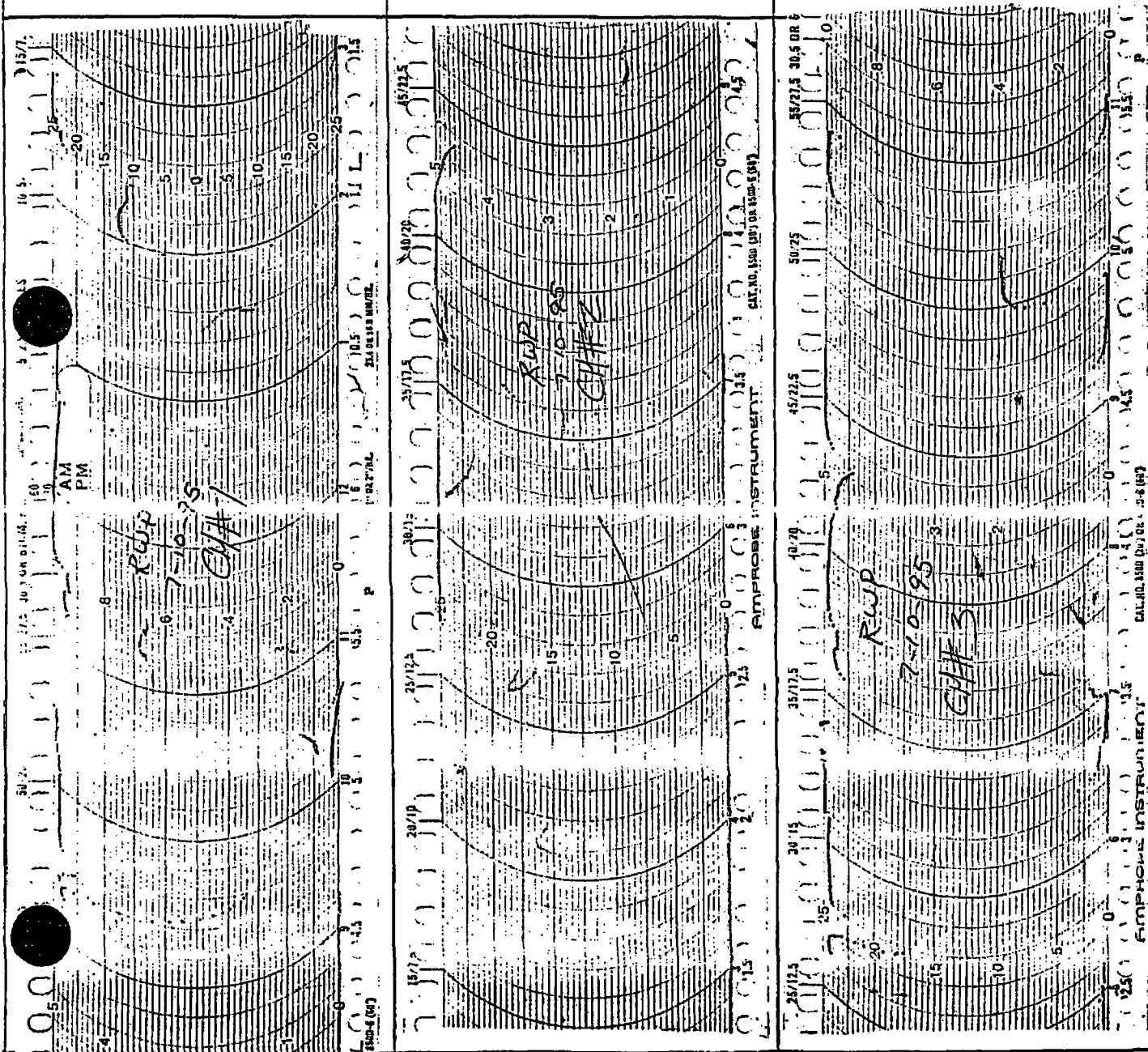
PROC. OPT 39-02 REV. 0

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SAMPLE POINT #3

TEST



CENTRAL LABORATORIES SERVICES

Chattanooga, Tennessee

ID NO. 490470

REPORT OF CALIBRATION

DATE: 7-20-95

Instrument: CO₂ ANALYZER

PLANT: WBVP Lab Relations & Safety

Manufacturer: PERCO

CAL DATES: LAST: 3-21-95

Model: 113

NEXT: 10-20-95

Instruction No.: 409.3-4

INTERVAL: 3 Mo

Disposition to: WBVP - Lab Relations and Safety

Standard(s) Used: 902648

Instrument Accuracy: Recorder ± 15 seconds/hour : CO₂ function

AS FOUND

WITHIN TOLERANCE

9

OUT OF TOLERANCE

☐

NOT REQUIRED

☐

AS LEFT

WITHIN TOLERANCE

OK

TEST INCOMPLETE

☐

NOT REQUIRED

☐

A non certified concentration of CO₂ was applied to all 3 channels after those channels were zeroed. The span was adjusted for a reading of 100% CO₂ on all channels. Multiple tests were performed to ensure repeatability. Since CLS does not have a certified concentration of CO₂, this test is functional only. Limited Certification Affixed.

Chart Speed Test
12 IN / Hour

AS Found

✓

AS Left

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All measurement ratios between the standards referenced in this instruction and the M&TE calibrated are greater than or equal to 4:1.

This instrument was tested and calibrated to prescribed test procedures and the condition of the instrument is indicated.

Calibrated by: Gerald Abuch

Approved by: Harlin L. Beyer

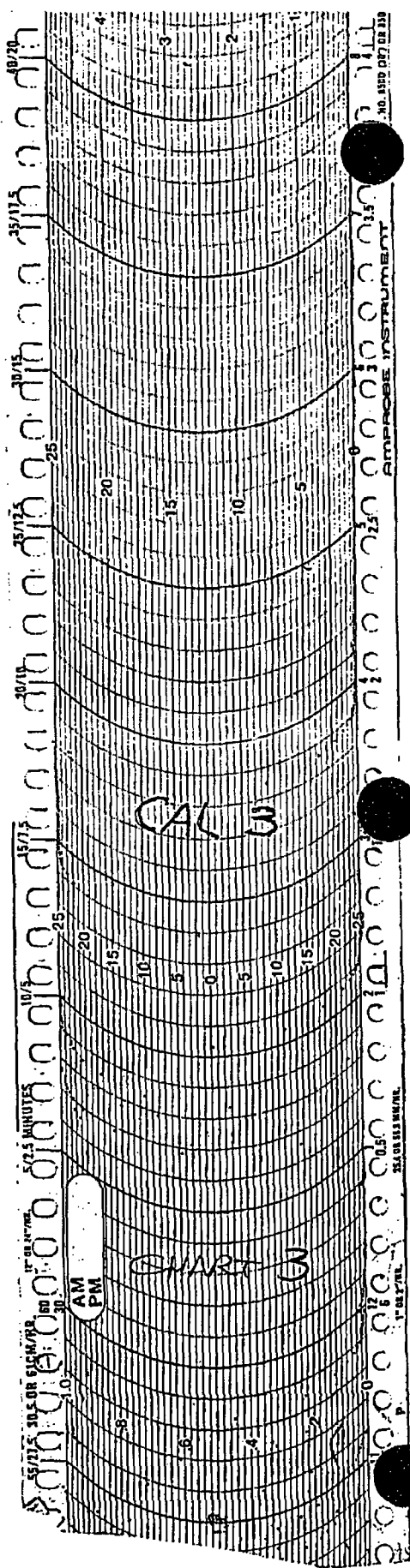
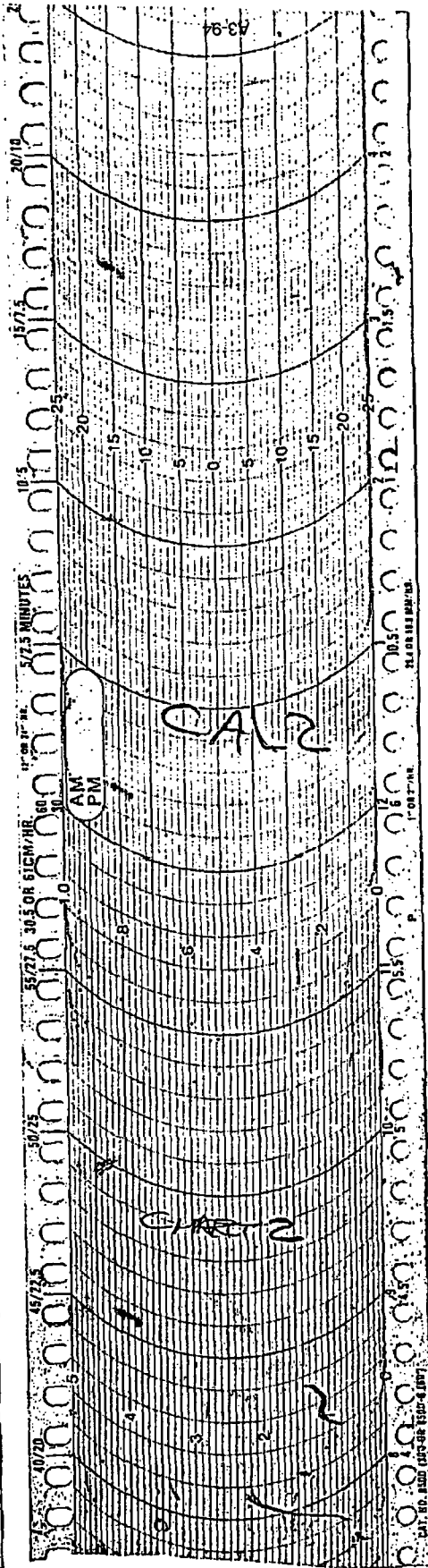
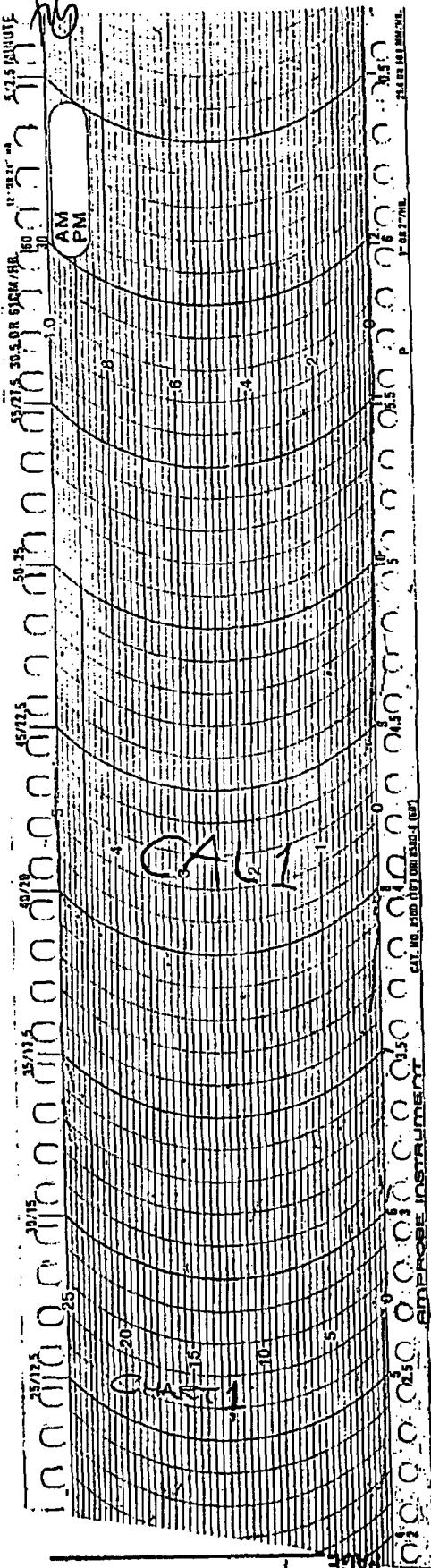
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CALIBRATION OF CO₂ TEST METER

7-22-PRSC, SP134-02 REV. 0

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PAGE 4



CONCENTRATION TEST

PROC. SPI 039-02, REV. 0

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PROPERTY OF DIXIE ENGINEERING CO. FORM #D40049

TEST DATE 7-17-95 TEST NO. 4 THIS HAZARD TEST TIME 0130

CUSTOMER TVA SPRING CITY TN

HAZARD IDENTIFICATION AUXILIARY INSTRUMENTATION Room UNIT #1

SAMPLE POINT #1

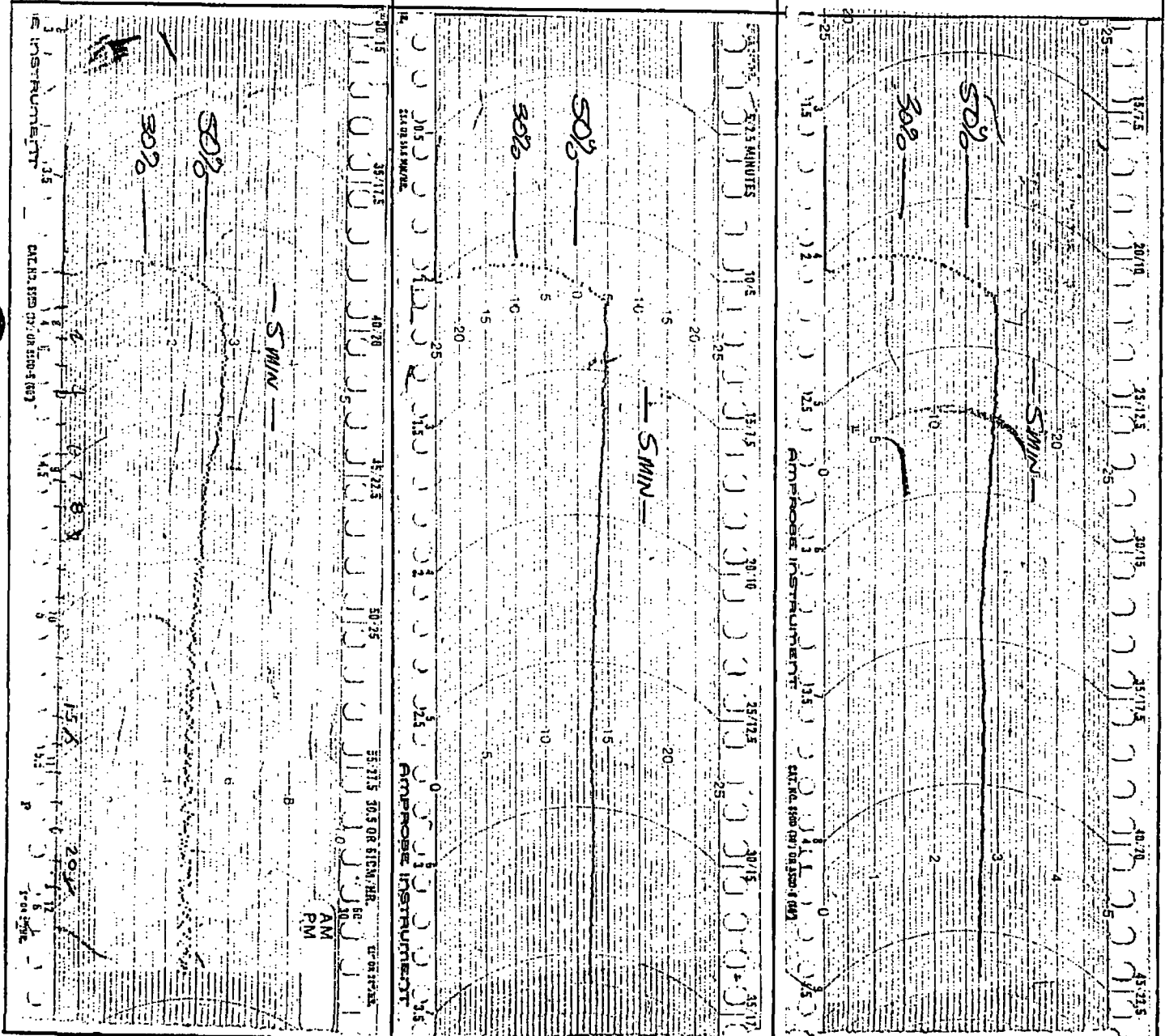
@ 14.75 FT

SAMPLE POINT #2

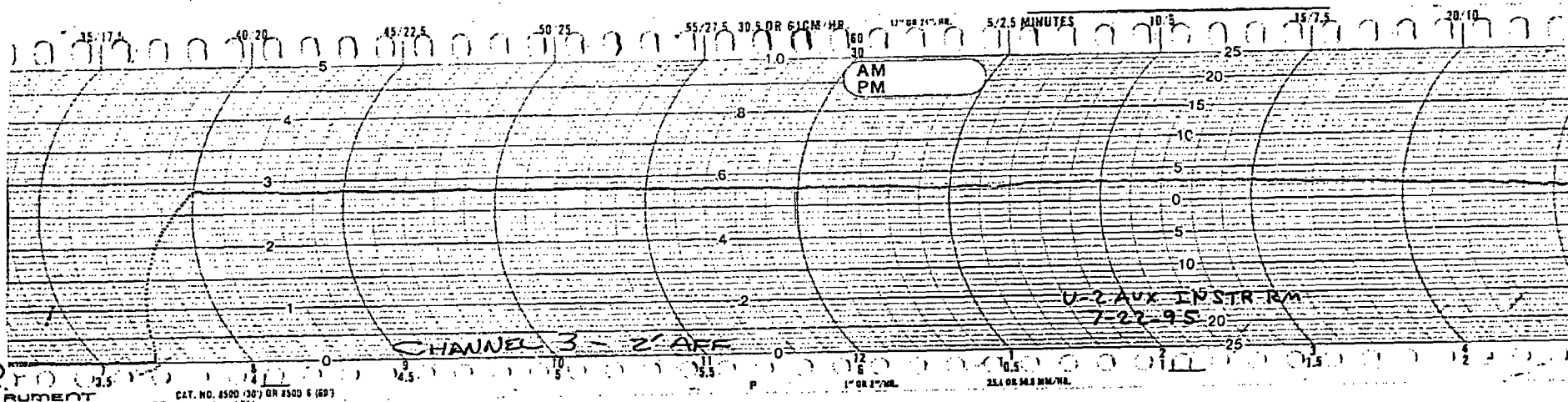
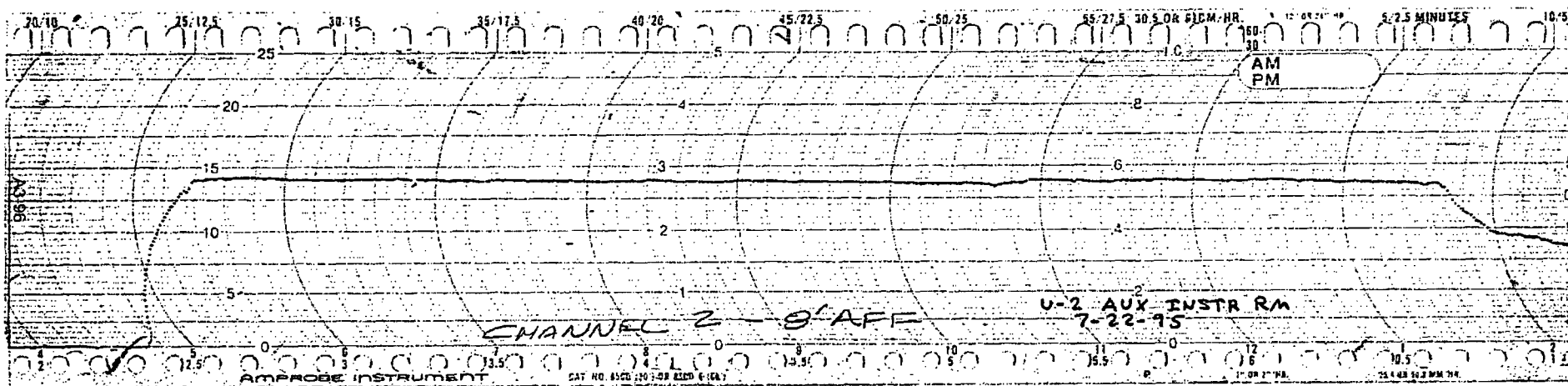
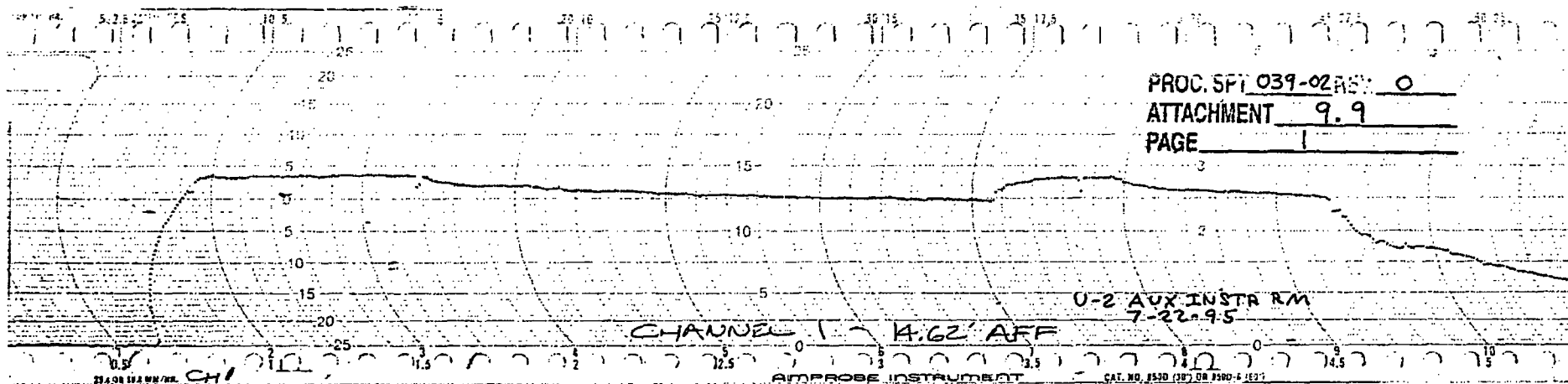
@ 8.67 FT

SAMPLE POINT #3

@ 2.0 FT



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DOCUMENT LOCATION NOTICE

ROLL AND FRAME NUMBER: E4340
DOCUMENT OR RECORD TYPE: SPT-D39-D2 TIMER 2-IC-39-16 Discharge
DOCUMENT ID: PROC. SPT 39-D2 Rev D ATT. 9.1D
DOCUMENT DATE: 6-12-96
DESCRIPTION: Chart
NUMBER OF PAGES REMOVED: 1

REMOVED ITEM INFORMATION

- ☐ Drawing Aperture Card _____
☐ Non-Drawing Aperture Card _____
☒ Hard Copy Storage _____

COMMENTS: _____

DOCUMENT LOCATION NOTICE

ROLL AND FRAME NUMBER: E434D
DOCUMENT OR RECORD TYPE: PRDC. SPT 39-02 Rev 0
DOCUMENT ID: ATT. 9-11 2-FSV-39-16
DOCUMENT DATE: _____
DESCRIPTION: CHART
NUMBER OF PAGES REMOVED: 1

REMOVED ITEM INFORMATION

- ☐ Drawing Aperture Card _____
☐ Non-Drawing Aperture Card _____
☒ Hard Copy Storage _____

COMMENTS: _____

PROCEDURE / TOP MATRIX

 PROC. SPT 039-02 REV. 0
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PROCEDURE TOP #	REV	TITLE TRANS #	PROCEDURE TOP #	REV	TITLE TRANS #	PROCEDURE TOP #	REV	TITLE TRANS #
ATI-001-05	0	Secondary Hydro-Test Sequence	ATI-055-01	0	Operations Recording & Annunciation System	ATI-251-01	0	Health Physics, DG & Maintenance Sound Powered Telephone System
NONE			NONE			NONE		
ATI-005-01	0	Extraction Steam System	ATI-055-01	0	Operations Recording & Annunciation System Supplement 1	ATI-280-01	0	Condenser Tube Cleaning
NONE			NONE			NONE		
ATI-006-01	0	Heater Drains & Vents	ATI-058-01	0	24KV Main Generator Buss Cooling System	PTI-001-01	0	Main Steam Isolation Valves
NONE			NONE			NONE		
ATI-018-01	0	Fuel Oil	ATI-077-05	0	Wet Active Waste Handling	PTI-001-02	0	Steam Generator PORVs & Turbine Bypass VLVTS
TOP 018-01		332904 332934 332780	NONE			TOP 001-02		332898
ATI-020-01	0	Lube Oil System	ATI-200-01	0	6.9KV Common Boards A and B	PTI-001-03	0	Main Steam Safety Valve Lift Point
NONE			NONE			NONE		
ATI-024-01	0	Raw Cooling Water System	ATI-201-01	0	Unit Boards 1A, 1B, 1C, & 1D Transformers 1A & 1B	PTI-002-01	0	Condensate System
TOP 024-01		332904	NONE			NONE		
ATI-024-01	0	Raw Cooling Water System Supplement 1	ATI-202-01	0	6.9KV Reactor Coolant Pump Boards	PTI-002-02	0	Condensate Vacuum
		PROCEDURE NOT WRITTEN	NONE			NONE		
ATI-035-01	0	Generator Cooling - Hydrogen Seal Oil System	ATI-203-01	0	480V Unit Boards 1A & 1B Functional	PTI-003A-01	0	Feedwater Isolation & Bypass Valves
NONE			NONE			NONE		
ATI-035-02	1	Generator Cooling - Hydrogen Gas & CO2 System	ATI-204-01	0	Switchyard Power System	PTI-003A-02	1	Feedwater & Steam Generator Level
TOP 035-06		332889 332911 332918 332930 332780	NONE			TOP 002-02		332898
ATI-035-03	0	Generator Cooling - Stator Cooling System	ATI-205-01	0	480V Turbine Bldg. Common Boards	TOP 015-02		332904 328444
NONE			NONE			PTI-003A-03	0	Main Feedwater System Functional Test
ATI-043-03	0	Secondary Plant Sampling	ATI-206-01	0	480V Auxiliary Bldg. Common Power	TOP 002-02		332898
NONE			NONE			PTI-003B-04	0	Auxiliary Feedwater Pumps & Valves Logic Test
ATI-047-02	2	EH Fluid System	ATI-221-01	0	480V Service Bldg Power	NONE		
NONE			NONE			PTI-003B-05	0	Aux Feedwater Pumps & Valves Dynamic Test
ATI-047-02	1	EH Fluid System	ATI-225-01	1	CCW Pump Station Power	NONE		
NONE			NONE			PTI-003B-06	0	ATWS Mitigation System Actuation Circuitry (AMSAC) Test
ATI-047-05	2	Main Turbine Turning Gear & Lube Oil Pumps	ATI-226-01	0	480V Intake Pump Station Power	NONE		
NONE			NONE			PTI-013-01	0	Fire Detection
ATI-047-07	0	Initial Turbine Roll Test	ATI-238-01	0	120V AC Preferred Power	TOP 013-01		332901 332930 332907
TOP 047-07 R0		332916	NONE			PTI-015-01	0	Steam Generator Blowdown
ATI-047-08	0	Turbine Trips & Protections	ATI-239-01	0	250 Volt DC Power	TOP 015-02		332904 328444
NONE			NONE			PTI-026-01	0	High Pressure Fire Protection
ATI-055-01	1	Operations Recording & Annunciation System	ATI-244-01	0	Unit 1 Main Step-up Transformers	TOP 026-01		332906 332918 332946 333021 332793
		REV 1 NOT PERFORMED	NONE			TOP 026-01		328409 328432
TOP 055-08 R0		332916	ATI-244-02	0	Unit 2 Main Step-up Transformers	PTI-027-01	0	Condenser Circulating Water
			NONE			NONE		

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PROCEDURE / TOP MATRIX

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PROCEDURE TOP #	REV	TITLE TRANS #	PROCEDURE TOP #	REV	TITLE TRANS #	PROCEDURE TOP #	REV	TITLE TRANS #
PTI-030-01	0	HFT Temperature Survey	PTI-031A-01	0	Auxiliary Bldg Chiller Water	PTI-052-01	0	Loose Parts Monitoring
NONE			TOP 031A-01		332908 328444	NONE		
PTI-030A-01	1	Diesel Bldg HVAC Electrical	TOP 032-01		332911 332916 332918 332797 333021 332780	PTI-061-01	0	Ice Condenser System
NONE			TOP 032-01		328399	NONE		
PTI-030B-01	1	Auxiliary/Fuel Bldg Exhaust & Supp	TOP 024-01		332904	PTI-061-02	0	Ice Condenser Ice Loading
NONE			PTI-031C-01	0	Shutdown Board Room HVAC System	TOP 061-01		332916 332917 332946 332980 328432
PTI-030C-01	1	Auxiliary Bldg Room/Area Cooler	NONE			TOP 061-01		328444
NONE			PTI-031E-01	0	480V Board Room HVAC Electrical	TOP 061-02		332917 332793
PTI-030D-01	0	Auxiliary Bldg. Gas Treatment Elect	NONE			TOP 030-04		332907 328420
NONE			PTI-031F-02	0	PASS Ventilation Electrical Test	PTI-062-01	0	CVCS Charging & Letdown
PTI-030D-02	0	Auxiliary Bldg Gas Treatment Filter	NONE			NONE		
PROC NOT PERF			PTI-031G-01	1	Incore Instr Rm Ventilation & Chill	PTI-062-02	0	Chemical and Volume Control - Subsystem Logic Test
PTI-030D-03	1	Aux Bldg Gas Treatment Negative Pressure	TOP 030-05		332907	TOP 077-02		332922 332946 328399 328420
TOP 030-01		332907 332793 332797 328399 328432	PTI-031M-01	1	Main Control Room Chilled Water	TOP 062-04		332918 333021 328409 328432 328444
TOP 030-03		333010 332793 328399 328409 328432	NONE			PTI-062-03	0	HFT Charging & Letdown
TOP 030-07		332907 332934 333010 332780 332797 328399	PTI-031N-01	0	Board Room Chilled Water Electrical	TOP 062-02 R0		332917 333021 328444
TOP 031-02		332908 332918 332980 332797 333021 328420	TOP 031-01		332908 332918 332946 332797 333021	TOP 062-03 R0		332917 333021
TOP 031C-02		332908 332780	TOP 031-01		328399 328409 328420 328432 328444	PTI-063-01	2	Safety Injection Sytem Integrated Test
TOP 031E-01		332911 328420 328432	PTI-031P-01	0	Main Control Room HVAC Electrical	TOP 062-02		332917 333021 328444
PTI-030D-03	0	Aux Bldg Gas Treatment Negative Pressure	NONE			TOP 063-02 R2		332918
TOP 030-01		332907 332793 332797 328399 328432	PTI-031P-03	0	Main Control Room HVAC Pressure	TOP 070-01		332921 332934 332946 333021 328409
TOP 030-07		332907 332934 332780 332797 328399	TOP 031-01		332908 332918 332946 332797 333021	TOP 072-01 R0		332922
TOP 031-02		332908 332918 332980 332797 333021 032840	TOP 031-01		328399 328409 328420 328432 328444	TOP 074-02 R2		332922 332780
TOP 031C-02		332908 332780	PTI-032-01	0	Control Air	TOP 070-01		328432
PTI-030F-01	0	Battery Exhaust Fans/Damper Test	NONE			PTI-063-02	1	Safety Injection System Accumulator Test
NONE			PTI-032-02	0	Loss of Air Test	TOP 077-02		332922 332946 328399 328420
PTI-030I-01	1	Containment Purge Electrical Test	TOP 032-01		332911 332916 332918 332797 333021 332780	TOP 236-01		332930
NONE			TOP 032-01		328399	TOP 236-02		332930
PTI-030J-01	1	Lower Containment Coolers	TOP 032-03		332925 332980 332797 328399 328420 328444	PTI-063-03	4	Safety Injection, Charging & RHR Flow Balance
NONE			PTI-039-01	1	CO2 Fire Protection for WBNP Powerhouse	TOP 062-02		332917 333021 328444
PTI-030J-02	1	Upper Containment Cooler	TOP 039-01		332911 332916 332946	TOP 063-02		332918
NONE			TOP 039-03		332911 332946	TOP 074-02		332922 332780
PTI-030K-01	0	CRDM Cooling Unit Electrical Test	PTI-039-02	1	CO2 Fire Portection for WBNP Diesel Generator Building	TOP 236-01		332930
NONE			TOP 039-02		332911 332946 332980 332780	TOP 236-02		332930
PTI-030L-01	1	Containment Air Return Fan	TOP 039-04		332911 332918 332930 333021 332946	TOP 070-01		332921 332934 332946 333021 328409
NONE			PTI-043-01	1	Post-Accident Sampling	TOP 070-01		328432
			NONE			PTI-063-05	0	Safety Injection, Charging & RHR Flow Balance
			PTI-043-02	0	Primary Plant Sampling	NONE		
			NONE			PTI-063-06	0	Safety Injection System Check Valve Tests
						TOP 063-02 R0		332918

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PROCEDURE TOP #	REV	TITLE TRANS #	PROCEDURE TOP #	REV	TITLE TRANS #	PROCEDURE TOP #	REV	TITLE TRANS #
PTI-064-01	1	Local Leak Rate Testing	PTI-068-12	0	Reactor Coolant Pressure Boundary Leakage	PTI-082-01	0	Diesel Generator 1A
NONE			NONE			TOP 082-01		332925 332934 332980
PTI-064-02	0	Integrated Leak Rate Test	PTI-068-13	0	Shutdown From Outside Control Room	PTI-082-02	0	Diesel Generator 1B
NONE			TOP 068-01		332920	TOP-082-02		332925
PTI-065-01	1	Emergency Gas Treatment	TOP 062-02		332917 333021 328444	PTI-082-03	0	Diesel Generator 2A
NONE			TOP 003-01		332898 332780 332797 328399	TOP 082-03		332930 332934
PTI-065-02	1	EGTS Annulus Negative Pressure Test	TOP 068-03		332920	PTI-082-04	0	Diesel Generator 2B
PROC NOT PERF			PTI-068-15	0	Pressurizer Pressure and Level	TOP 082-04		332930 332934
PTI-067-01	0	ERCW System Test	TOP 068-02		332920 332780	PTI-083-01	0	Hydrogen Recombiner
NONE			TOP 062-02		332917 333021 328444	NONE		
PTI-067-02	0	ERCW Flow Balance	PTI-070-01	1	Component Cooling Water Pump/VLV Logic Test	PTI-084-01	0	Flood Mode Boration
TOP 067-01		332920 328399 328409 328420 328444	NONE			NONE		
TOP 067-03		332920	PTI-070-02	2	Component Cooling System Flow Balance	PTI-085-01	0	Rod Control Sys Functional Test
PTI-067-03	0	ERCW VLV Logic Test	TOP 070-01		332921 332934 332946 333021 328409	TOP 085-01		332930
TOP 067-01		332920 328399 328409 328420 328444	TOP 070-01		328432	PTI-085-02	0	Rod Control - Non HFT
PTI-068-01	1	HFT Heatup & Cooldown	PTI-072-01	0	Containment Spray Pump/VLV Logic Test	TOP 085-02		332930
TOP 068-05		332921	TOP 072-01		332922	PTI-090-01	1	Radiation Monitors (A) Area, (B) Process Liquid, (D) Gas
TOP 068-06		332921	PTI-072-02	0	Containment Spray System Air Test	NONE		
TOP 074-02		332922 332780	NONE			PTI-090-02	0	Radiation Monitors (E) Particulate, Iodine, and Gas, (F) Continuous Air Monitor
TOP 068-02		332920 332780	PTI-074-01	0	Residual Heat Removal System	NRC REVIEW		
TOP 062-02		332917 333021 328444	NONE			PTI-090-09	0	Process Radiation Monitoring System - HFT
TOP 068-03		332920	PTI-074-02	1	RHR HOT	NONE		
PTI-068-02	0	Reactor Coolant System Flow Measurement	TOP 068-06		332921	PTI-092-01	0	Power Range Nuclear Instrumentation
TOP 068-03		332920	TOP 062-02		332917 333021 328444	NONE		
PTI-068-03	0	Pressurizer Heater and Spray Control	TOP 074-02		332922 332780	PTI-092-02	0	Source / Intermediate Range Nuclear Instr.
TOP 062-03		332917 333021	TOP 068-02		332920 332780	NONE		
PTI-068-04	0	Pressurizer Relief Tank	PTI-077-01	0	Liquid Waste Processing System	PTI-099-01	0	Reactor Protection Sensor Response Time
TOP 068-02		332920 332780	TOP 077-13		332925 332946 333021 328399 332780	NONE		
TOP 077-02		332922 332946 328399 328420	TOP 077-13		328409 328420 328432 328444	PTI-099-03	0	Reactor Protection System Operational Test
TOP 081-01		332925	PTI-077-02	0	Gaseous Waste Disposal System	NONE		
TOP 077-08		332922	TOP 062-02		332917 333021 328444	PTI-099-04	0	Safeguards System Operational Test
PTI-068-07	0	Reactor Coolant Pump Motor Logic Test	PTI-077-03	0	Liquid Waste Collection	NONE		
NONE			TOP 077-11		332922 332946 332980 333021 332780	PTI-099-05	0	Turbine Runback
PTI-068-09	1	Reactor Vessel Head Vent System	PTI-079-01	0	Fuel Transfer System	NONE		
NONE			NONE			PTI-099-06	0	Reactor Protection Setpoint Verification
PTI-068-10	1	Inadequate Core Cooling Monitoring - RVLIS	PTI-079-03	0	Manipulator Crane	NONE		
TOP 068-02		332920 332780	NONE			NONE		
PTI-068-11	0	RTD Cross Calibration	PTI-081-01	2	Primary Water	PTI-099-06	0	Reactor Protection Setpoint Verification
NONE			NONE			NONE		

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PROCEDURE / TOP MATRIX

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PROCEDURE TOP #	REV	TITLE TRANS #	PROCEDURE TOP #	REV	TITLE TRANS #	PROCEDURE TOP #	REV	TITLE TRANS #
PTI-099-08	0	SSPS Block and Go Test	PTI-261-04	0	Temperature Monitoring System Hardware	PTI-999-02	0	Thermal Expansion
NONE			NONE			NONE		
PTI-200-01	1	Preferred Offsite Power System	PTI-261-05	0	PPC Application Software	SPT-013-01	0	Fire Detection
NONE			NONE			NONE		
PTI-200-02	0	AC Aux Power Sys Survey	PTI-262-01	0	Integrated Safeguards Actuation	SPT-014-01	0	Condensate Polisher Demin System FCV
NONE			TOP 030-01		332907 332793 332797 328399 328432	NONE		
PTI-211-01	1	6.9KV Shutdown Boards	TOP 030-03		332907 332793 328399 328409 328432	SPT-014-02	0	Condensate Polisher Demineralizer Air Operated Valve Test
NONE			TOP 030-04		332907 328420			
PTI-212-01	0	480V Shutdown Power Unit 1 "A" Train	TOP 030-05		332907	NONE		
NONE			TOP 031-01		332908 332918 332946 332797 333021	SPT-014-03	0	Condens Polishing Denim Resin Transfer/Regeneration
PTI-212-02	1	480V Shutdown Power Unit 1 "B" Train	TOP 031-02		332908 332918 332980 332797 333021 328420			
NONE			TOP 003-01		332898 3332780 332797 328399	NONE		
PTI-212-03	1	480V Shutdown Power Unit 2 "A" Train	TOP 015-02		332904 328444	SPT-014-04	0	High Crud Filter
NONE			TOP 025-01		332906 332946	NONE		
PTI-212-04	1	480V Shutdown Power Unit 2 "B" Train	TOP 031C-01		332908 332780 328444	SPT-039-01	1	CO2 Enclosure Door Fan Testing
NONE			TOP 032-02		332917 332980 328420	NONE		
PTI-213-01	0	480V Reactor MOV Boards	TOP 062-02		332917 333021 328444	SPT-047-01	0	EHC SYSTEM FLUSH
NONE			TOP 063-02		332918	NONE		
PTI-214-01	0	480V Control & Aux Building Vent Boards	TOP 065-01		332918 332793 332797 328399 328409 328444	SPT-055-01	1	Annunciator Return to Service Performance Test REV 1 NOT PERFORMED
NONE			TOP 067-01		332920 328399 328409 328420 328444	NONE		
PTI-215-01	1	Diesel Generator Batteries & Chargers	TOP 070-01		332921 332934 332946 328409 333021	SPT-055-02	1	Main Control Room Annun System Software Functional Test
NONE			TOP 072-01		332922	NONE		
PTI-215-02	1	Standby Power Motor Control Centers	TOP 074-02		332922 332780	SPT-055-02	0	Main Control Room Annun System Software Functional Test
NONE			TOP 081-01		332925	NONE		
PTI-228-01	0	Emergency Lighting	TOP 215-01		332930	SPT-064-01	1	Local Leak Rate Testing
NONE			TOP 032-03		332925 332980 332797 328399 328420 328444	NONE		
PTI-232-01	0	480V Reactor Vent Boards	TOP 082-01		332925 332934 332980	SPT-064-02	1	Containment Isolation Valve (LLRT)
NONE			TOP 082-02		332925	NONE		
PTI-235-01	0	Vital 120V AC Power System	TOP 082-03		332930 332934	SPT-068-02 1	1	Reactor Coolant Pump Motor Uncoupled Run 1a
NONE			TOP 082-04		332930 332934	NONE		
PTI-236-01	0	Vital 125V DC Power System	TOP 236-01		332930	SPT-068-02 1	1	Reactor Coolant Pump Motor Uncoupled Run 1B
NONE			TOP 236-02		332930	NONE		
PTI-261-01	1	Process Computer Hardware	TOP 236-03		332930	SPT-068-02 1	1	Reactor Coolant Pump Motor Uncoupled Run 1C
NONE			TOP 236-04		332930	NONE		
PTI-261-02	1	Process Computer Data Input	TOP 030-07		332907 332934 332780 332797 328399	SPT-068-02 1	1	Reactor Coolant Pump Motor Uncoupled Run 1D
NONE			TOP 030-08		332907	NONE		
PTI-261-03	0	Process Computer Software	TOP 031-01		328399 328409 328420 328432 328444	NONE		
NONE			TOP 070-01		328432	NONE		
			PTI-268-01	0	Permanent Hydrogen Mitigation System	SPT-068-02 1	1	Reactor Coolant Pump Motor Uncoupled Run 1D
			NONE			NONE		
			PTI-999-01	0	Operation Vibration Testing	NONE		
			NONE			NONE		

PROCEDURE / TOP MATRIX

7/17/95

PROCEDURE TOP #	REV	TITLE TRANS #	PROCEDURE TOP #	REV	TITLE TRANS #	PROCEDURE TOP #	REV	TITLE TRANS #
SPT-077-02	0	Gross Leakage Rate of the Waste Gas System	SPT-252-01	0	Non-IE Low Voltage CAP Battery Discharge Test			
PROC IN DRAFT			NONE					
SPT-077-03	0	Liquid Process Tank Recirculation Test	SPT-252-02	0	Code-Call, Paging, Evacuation Alarm			
NONE			NONE					
SPT-078-01	0	Refueling Water Purification Test	SPT-253-01	0	VHF Radio			
TOP 078-01		332780 332793 332797 328399 328409	PROC NOT PERF					
TOP 078-01		328432	SPT-256-01	1	Emergency Shutdown Sound Powered Phone			
SPT-082-01	3	Emergency Diesel Generation 1A-A	NONE					
TOP 082-01		332925 332934 332980	SPT-257-01	0	Security Diesels			
SPT-082-02	0	DG-1B Initial D/G C/O & Tests	TOP 257-01		332930			
TOP 082-02		332925	SPT-261-01	1	Functional Testing of Plant Process Computer Hardware			
SPT-082-03	0	Initial D/G-2A Initial D/G C/O & Tests	NONE					
TOP 082-03		332930 332934	SPT-262-01	0	Plant Normalization			
SPT-082-04	0	DG-2B Initial D/G C/O & Tests	NONE					
TOP 082-04		332930 332934	SPT-264-01	0	Emergency Response Data Acquisition			
SPT-082-05	1	HFT Automatic Diesel Generator 1A Loading Test	PROC NOT PERF					
TOP 082-01		332925 332934 332980	SPT-264-02	0	TSC Power System Functional Test			
SPT-092-01	0	Source Range NIS	TOP 264-01		328432 328444			
NONE			SPT-264-03	0	ERFDS Software Functional Test			
SPT-099-02	0	Slave Relay to End Device Test	PROC NOT PERF					
NONE								
SPT-099-07	0	SSPS Operational Check						
NONE								
SPT-099-09	0	Response Time Test of Turbine Trip & Pressurizer Level Generated Reactor Trips						
NONE								
SPT-099-10	0	Response Time Test of Nuclear Instrumentation System Generated Reactor Trips						
NONE								
SPT-240-01	0	Non 1E Low Voltage Discharge						
NONE								
SPT-250-01	0	Non 1E Telephone Battery Discharge Test						
NONE								
SPT-251-01	0	Maintenance & Operations Sound Powered Phone						
NONE								
SPT-251-02	0	Sound Powered Phone Functional Test						
NONE								

PROC. SPT039-02 REV. 0
ATTACHMENT 9.12
PAGE 5

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ATTACHMENT 4

Special Performance Test
"CO₂ Enclosure Door Fan Testing"

SPT-039-01
Revision 1 (Selected Sections)

WATTS BAR NUCLEAR

SPECIAL PERFORMANCE TEST PROCEDURE

SPT-039-01
REVISION 1

CO₂ ENCLOSURE DOOR FAN TESTING

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
SPT-039-01 /R1

Greg Linnell 12-2-94
Prepared by Date

[Signature] 12-2-94
Reviewed by Date
M. Bajic 12-2-94
Approved by Date

INFORMATION ONLY OFFICIAL TEST COPY

INITIALS/DATE

6.1 CO₂ Protected Enclosure, U-1 Auxiliary Instrument Room

6.1.1 DETERMINE the dimensions of the enclosure by measurement of the following:

Height	<u>19'</u>	Ft.	<u>5 1/2</u>	in.
Length	<u>86</u>	Ft.	<u>2 1/2</u>	in.
Width	<u>42</u>	Ft.	<u>0</u>	in.

CM / 12-10-94

6.1.2 CALCULATE the room volume in Cubic Ft. as follows:

H 19' 5 1/2" x L 86' 2 1/2" x W 42' = 7046.2 Cu.Ft.

CM / 12-10-94

6.1.3 RECORD vendor calculations of the maximum developed head (in. W.C.) of the CO₂/air mixture column. (Using the measured room height, CO₂ System Design information, and previous concentration test results).

.078 in. W.C.

CM / 12-10-94

6.1.4 INSTALL the Door Fan Apparatus in the door which provides the most favorable relief area (i.e., Leaks which leave the room during pressurization can be readily returned to the Fan Apparatus through a return air path).

CM / 12-10-94

6.1.5 SEAL the Fan Apparatus completely in the door opening.

6.1.6 MANIPULATE the ~~following to simulate the~~ ^{equipment listed on Appendix 9.1 position to simulate the require} condition immediately following CO₂ discharge into the protected area, and ~~RECORD specific~~ ^{actions or verifications in the Chronological} ~~actions or verifications in the Chronological~~ ^{Log} ~~Log~~

~~A. Vent or exhaust fans OFF~~ ✓

~~B. Doors CLOSED or door opening SEALED with door fan Apparatus.~~ ✓

~~C. Dampers in AFTER DISCHARGE position per design.~~ ✓

OFFICIAL TEST COPY

INITIALS/DATE

- 6.1.7 RECORD the measured Pressure Differential across the door fan.

in. W.C. .006

CM / 12-10-94

- 6.1.8 IF the pressure measurement in Step 6.1.7 is 25% or more of the previously calculated column pressure using absolute values, DETERMINE the cause of the excessive static pressure and REDUCE to less than 25%.

CM / 12-10-94

- 6.1.9 OPEN Doors, Ventilation openings, etc. in the adjacent areas on each side, above and below the enclosure being tested to the maximum extent possible to provide a return air path for all leakage leaving the enclosure. Any adjacent areas in which a return air path cannot be established are to be evaluated by the Contractor.

CM / 12-10-94

- 6.1.10 UNSEAL Fan Apparatus and OPERATE fan in the De-pressurization mode. (CONTROL fan speed such that the absolute value of the pressure developed matches the calculated column pressure, adjusted for the previously measured static pressure, per the NFPA procedure).

CM / 12-10-94

NOTE: IF it is not possible to achieve sufficient pressure due to excessive leakage, either find the source of the leakage and seal, or, in the case of ventilation openings in the wall or ceiling slab, measure the opening (in²) and temporarily seal. When sufficient pressure is achieved continue to next step.

INITIALS/DATE

6.1.11 RECORD under DE-PRESSURIZATION mode the following;

- A. Diff. Press. Across Fan Opening (in. W.C.)
.090
- B. Flow through Fan(s) CFM 1381.82
- C. Inside temperature 67.6 °F.
- D. Outside Temperature 70.0 °F.

CM / 12-10-94

6.1.12 REVERSE Fan position and PRESSURIZE enclosure. (CONTROL fan speed such that the absolute value of the pressure developed matches the calculated column pressure, adjusted for the previously measured static pressure, per NFPA Procedure).

CM / 12-10-94

6.1.13 RECORD the following Data while pressurizing the Enclosure.

- A. Diff. Press. Across Fan Opening. (in. W.C.)
.090
- B. Flow through Fan(s). CFM 1440
- C. Inside temperature 68.8 °F.
- D. Outside temperature 67.8 °F.

CM / 12-10-94

NOTE: Steps 6.1.5 through 6.1.13 may be reperformed as necessary until acceptable results are obtained.

NOTE: IF the Retention time predicted for the minimum protected Height is less than the desired hold time, use the fan apparatus and a smoke pencil to find the leakage, and seal as necessary.

OFFICIAL TEST COPY

INITIALS/DATE

- 6.1.14 RECORD vendor calculation results of the equivalent leakage area (Sq. in.) using recorded data, and the retention time through use of the fan apparatus testing software, using the previously determined hold time and the minimum protected height.

Whole Room Leakage Area 277.6 Sq. in.
BCLA 138.6 Sq. in.

37.7 Retention Time (\geq 20 minutes)

[Signature]
12-10-94

- 6.1.15 REMOVE Door Fan Apparatus from doorway.

OM / 12-10-94

- 6.1.16 RETURN doors, fans, and dampers to NORMAL, per Appendix 9.1

[Signature] / 12-10-94
[Signature] / 12-10-94

- 6.1.17 NOTIFY SOS that Door Fan Test in U-1 Auxiliary Instrument Room is COMPLETE.

OM / 12-10-94

OFFICIAL TEST COPY

INITIALS/DATE

6.2 CO₂ Protected Enclosure, U-2 Auxiliary Instrument Room

6.2.1 DETERMINE the dimensions of the enclosure by measurement of the following:

Height	<u>19</u>	Ft.	<u>6 1/2</u>	in.
Length	<u>92</u>	Ft.	<u>6</u>	in.
Width	<u>42</u>	Ft.	<u>0</u>	in.

[Signature] / 12/14/94

6.2.2 CALCULATE the room volume in Cubic Ft. as follows:

H 19' 6 1/2" x L 92' 6" x W 42 = 75,212.9 Cu.Ft.

[Signature] / 12/14/94

6.2.3 RECORD vendor calculations of the maximum developed head (in. W.C.) of the CO₂/air mixture column. (Using the measured room height, CO₂ System Design information, and previous concentration test results).

0.087 in. W.C.

[Signature] / 12/14/94

6.2.4 INSTALL the Door Fan Apparatus in the door which provides the most favorable relief area (i.e., Leaks which leave the room during pressurization can be readily returned to the Fan Apparatus through a return air path).

[Signature] / 12/14/94

6.2.5 SEAL the Fan Apparatus completely in the door opening.

[Signature] / 12/14/94

6.2.6 MANIPULATE the ~~following to simulate the~~ ^{equipment listed on Appendix 9.1 to simulate the required partition} condition immediately following CO₂ discharge into the protected area, and ~~RECORD specific actions or verifications in the Chronological Log.~~

~~A. Vent or exhaust fans OFF~~

 /

~~B. Doors CLOSED or door opening SEALED with door fan apparatus.~~

 /

~~C. Dampers in AFTER DISCHARGE position per design.~~

 /

OFFICIAL TEST COPY

INITIALS/DATE

- 6.2.7 RECORD the measured Pressure Differential across the door fan.
in. W.C. 0.029 ^{14/10/94} 0.018
- 6.2.8 IF the pressure measurement in Step 6.2.7 is 25% or more of the previously calculated column pressure using absolute values, DETERMINE the cause of the excessive static pressure and REDUCE to less than 25%. T.D. 94
14/10/94
- 6.2.9 OPEN Doors, Ventilation openings, etc. in the adjacent areas on each side, above and below the enclosure being tested to the maximum extent possible to provide a return air path for all leakage leaving the enclosure. Any adjacent areas in which a return air path cannot be established are to be evaluated by the Contractor. 14/10/94
- 6.2.10 UNSEAL Fan Apparatus and OPERATE fan in the De-pressurization mode. (CONTROL fan speed such that the absolute value of the pressure developed matches the calculated column pressure, adjusted for the previously measured static pressure, per the NFPA procedure). 14/10/94
- NOTE: IF it is not possible to achieve sufficient pressure due to excessive leakage, either find the source of the leakage and seal, or, in the case of ventilation openings in the wall or ceiling slab, measure the opening (in²) and temporarily seal. When sufficient pressure is achieved continue to next step.

OFFICIAL TEST COPY

INITIALS/DATE

- 6.2.11 RECORD under DE-PRESSURIZATION mode the following;
- A. Diff. Press. Across Fan Opening (in. W.C.)
0.082
 - B. Flow through Fan(s) CFM 1572.73
 - C. Inside temperature 64.8 °F.
 - D. Outside Temperature 66.4 °F.
- 6.2.12 REVERSE Fan position and PRESSURIZE enclosure. (CONTROL fan speed such that the absolute value of the pressure developed matches the calculated column pressure, adjusted for the previously measured static pressure, per NFPA Procedure).
- 6.2.13 RECORD the following Data while pressurizing the Enclosure.
- A. Diff. Press. Across Fan Opening. (in. W.C.)
0.118
 - B. Flow through Fan(s) CFM 1232.73
 - C. Inside temperature 66.4 °F.
 - D. Outside temperature 66.0 °F.

NOTE: Steps 6.2.5 through 6.2.13 may be reperformed as necessary until acceptable results are obtained.

NOTE: IF the Retention time predicted for the minimum protected Height is less than the desired hold time, use the fan apparatus and a smoke pencil to find the leakage, and seal as necessary.

OFFICIAL TEST COPY

INITIALS/DATE

- 6.2.14 RECORD vendor calculation results of the equivalent leakage area (Sq. in.) using recorded data, and the retention time through use of the fan apparatus testing software, using the previously determined hold time and the minimum protected height.

Whole Room Leakage Area 261.45 sq in.
BCLA 130.72 Sq. in.

37.7 Retention Time (≥ 20 minutes)

[Signature]
12/24
CO
0:

- 6.2.15 REMOVE Door Fan Apparatus from doorway.

[Signature] / 14/10/24

- 6.2.16 RETURN doors, fans, and dampers to NORMAL, per Appendix 9.1.

[Signature] / 14/10/24
[Signature] / 14/10/24

- 6.2.17 NOTIFY SOS that Door Fan Test in U-2 Auxiliary Instrument Room is COMPLETE.

[Signature] / 14/10/24

OFFICIAL TEST COPY

INITIALS/DATE

6.10 CO₂ Protected Enclosure, Diesel Generator Room 1A-A

6.10.1 DETERMINE the dimensions of the enclosure by measurement of the following:

Height	<u>17</u>	Ft.	<u>0</u>	in.
Length	<u>78</u>	Ft.	<u>0</u>	in.
Width	<u>29</u>	Ft.	<u>0</u>	in.

[Signature] 12/9/94

6.10.2 CALCULATE the room volume in Cubic Ft. as follows:

H 17 x L 78 x W 29 = 38,454 Cu.Ft.

[Signature] 12/9/94

6.10.3 RECORD vendor calculations of the maximum developed head (in. W.C.) of the CO₂/air mixture column. (Using the measured room height, CO₂ System Design information, and previous concentration test results).

0.065 in. W.C.

[Signature] 12/9/94

6.10.4 INSTALL the Door Fan Apparatus in the door which provides the most favorable relief area (i.e., Leaks which leave the room during pressurization can be readily returned to the Fan Apparatus through a return air path).

[Signature] 12/9/94

6.10.5 SEAL the Fan Apparatus completely in the door opening.

[Signature] 12/9/94 CN01

6.10.6 ~~MANIPULATE the following to simulate the condition immediately following CO₂ discharge into the protected area. and RECORD specific actions or verifications in the Chronological Log.~~
~~simulate the~~ ~~equipment listed on Appendix 9-1 to the required position to~~ ~~actions or verifications in the Chronological Log.~~

[Signature] 12/9/94

~~A. Vent or exhaust fans OFF~~

~~B. Doors CLOSED or door opening SEALED with door fan Apparatus.~~

~~C. Dampers in AFTER DISCHARGE position per design.~~

A4-10
OFFICIAL TEST COPY

INITIALS/DATE

- 6.10.7 RECORD the measured Pressure Differential across the door fan.

in. W.C. 0.002

[Signature] / 11/9/94

- 6.10.8 IF the pressure measurement in Step 6.10.7 is 25% or more of the previously calculated column pressure using absolute values, DETERMINE the cause of the excessive static pressure and REDUCE to less than 25%.

[Signature] / 11/9/94

- 6.10.9 OPEN Doors, Ventilation openings, etc. in the adjacent areas on each side, above and below the enclosure being tested to the maximum extent possible to provide a return air path for all leakage leaving the enclosure. Any adjacent areas in which a return air path cannot be established are to be evaluated by the Contractor.

[Signature] / 11/9/94

- 6.10.10 UNSEAL Fan Apparatus and OPERATE fan in the De-pressurization mode. (CONTROL fan speed such that the absolute value of the pressure developed matches the calculated column pressure, adjusted for the previously measured static pressure, per the NFPA procedure).

[Signature] / 11/9/94

NOTE: IF it is not possible to achieve sufficient pressure due to excessive leakage, either find the source of the leakage and seal, or, in the case of ventilation openings in the wall or ceiling slab, measure the opening (in²) and temporarily seal. When sufficient pressure is achieved continue to next step.

OFFICIAL TEST COPY

INITIALS/DATE

- 6.10.11 RECORD under DE-PRESSURIZATION mode the following;
- A. Diff. Press. Across Fan Opening (in. W.C.)
0.062.
 - B. Flow through Fan(s) CFM 518.4
 - C. Inside temperature 72.4 °F.
 - D. Outside Temperature 69.8 °F.
- 6.10.12 REVERSE Fan position and PRESSURIZE enclosure. (CONTROL fan speed such that the absolute value of the pressure developed matches the calculated column pressure, adjusted for the previously measured static pressure, per NFPA Procedure).
- 6.10.13 RECORD the following Data while pressurizing the Enclosure.
- A. Diff. Press. Across Fan Opening. (in. W.C.)
0.067.
 - B. Flow through Fan(s). CFM 559.6
 - C. Inside temperature 73.2 °F.
 - D. Outside temperature 64.8 °F.

[Signature] / 12/9/94

[Signature] / 12/9/94

[Signature] / 12/9/94

NOTE: Steps 6.10.5 through 6.10.13 may be reperformed as necessary until acceptable results are obtained.

NOTE: IF the Retention time predicted for the minimum protected Height is less than the desired hold time, use the fan apparatus and a smoke pencil to find the leakage, and seal as necessary.

OFFICIAL TEST COPY

INITIALS/DATE

- 6.10.14 RECORD vendor calculation results of the equivalent leakage area (Sq. in.) using recorded data, and the retention time through use of the fan apparatus testing software, using the previously determined hold time and the minimum protected height.

Whole Room Leakage Area 15,591.85 Sq. in.

BCLA 145.07 Sq. in.

18.4 Retention Time (≥ 10 minutes)

[Signature] 12/1/14 CN 03

- 6.10.15 REMOVE Door Fan Apparatus from doorway.

[Signature] 12/1/14

- 6.10.16 RETURN doors, fans, and dampers to NORMAL per Appendix 9.1.

[Signature] 12/1/14

[Signature] 12/1/14 CN 02

- 6.10.17 NOTIFY SOS that Door Fan Test in Diesel Generator Room 1A-A is COMPLETE.

[Signature] 12/1/14

INITIALS/DATE

6.11 CO₂ Protected Enclosure, Diesel Generator
Room 1B-B

6.11.1 DETERMINE the dimensions of the enclosure by
measurement of the following:

Height	<u>17</u>	Ft.	<u>0</u>	in.
Length	<u>78</u>	Ft.	<u>0</u>	in.
Width	<u>29</u>	Ft.	<u>0</u>	in.

[Signature] 12/9/94

6.11.2 CALCULATE the room volume in Cubic Ft. as
follows:

H 17 x L 78 x W 29 = 38,454 Cu.Ft.

[Signature] 12/9/94

6.11.3 RECORD vendor calculations of the maximum
developed head (in. W.C.) of the CO₂/air
mixture column. (Using the measured room
height, CO₂ System Design information, and
previous concentration test results).

0.065 in. W.C.

[Signature] 12/9/94

6.11.4 INSTALL the Door Fan Apparatus in the door
which provides the most favorable relief area.
(i.e., Leaks which leave the room during
pressurization can be readily returned to the
Fan Apparatus through a return air path).

[Signature] 12/9/94

6.11.5 SEAL the Fan Apparatus completely in the door
opening.

[Signature] 12/9/94

6.11.6 MANIPULATE the ~~following to simulate the~~ ^{equipment listed on Appendix 9.1 to the required positions to}
~~condition immediately following CO₂ discharge~~ ^{into the protected area, and RECORD specific}
~~into the protected area, and RECORD specific~~ ^{actions or verifications in the Chronological}
~~actions or verifications in the Chronological~~ ^{Log.}

[Signature] 12/9/94

~~A. Vent or exhaust fans OFF~~ 12/9/94

~~B. Doors CLOSED or door opening SEALED with door~~
~~fan Apparatus.~~

~~C. Dampers in AFTER DISCHARGE position per~~ 12/9/94
~~design.~~

INITIALS/DATE

- 6.11.7 RECORD the measured Pressure Differential across the door fan.

in. W.C. 0.005

[Signature] 12/9/94

- 6.11.8 IF the pressure measurement in Step 6.11.7 is 25% or more of the previously calculated column pressure using absolute values, DETERMINE the cause of the excessive static pressure and REDUCE to less than 25%.

[Signature] 12/9/94

- 6.11.9 OPEN Doors, Ventilation openings, etc. in the adjacent areas on each side, above and below the enclosure being tested to the maximum extent possible to provide a return air path for all leakage leaving the enclosure. Any adjacent areas in which a return air path cannot be established are to be evaluated by the Contractor.

[Signature] 12/9/94

- 6.11.10 UNSEAL Fan Apparatus and OPERATE fan in the De-pressurization mode. (CONTROL fan speed such that the absolute value of the pressure developed matches the calculated column pressure, adjusted for the previously measured static pressure, per the NFPA procedure).

[Signature] 12/9/94

NOTE: IF it is not possible to achieve sufficient pressure due to excessive leakage, either find the source of the leakage and seal, or, in the case of ventilation openings in the wall or ceiling slab, measure the opening (in²) and temporarily seal. When sufficient pressure is achieved continue to next step.

INITIALS/DATE

6.11.11 RECORD under DE-PRESSURIZATION mode the following;

- A. Diff. Press. Across Fan Opening (in. W.C.)
0.06.
- B. Flow through Fan(s) CFM 552.0
- C. Inside temperature 70.4 °F.
- D. Outside Temperature 71.8 °F.

AS 1/12/94

6.11.12 REVERSE Fan position and PRESSURIZE enclosure. (CONTROL fan speed such that the absolute value of the pressure developed matches the calculated column pressure, adjusted for the previously measured static pressure, per NFPA Procedure).

AS 1/12/94

6.11.13 RECORD the following Data while pressurizing the Enclosure.

- A. Diff. Press. Across Fan Opening. (in. W.C.)
0.07.
- B. Flow through Fan(s). CFM 603.98
- C. Inside temperature 72.0 °F.
- D. Outside temperature 66.8 °F.

AS 1/12/94

NOTE: Steps 6.11.5 through 6.11.13 may be reperformed as necessary until acceptable results are obtained.

NOTE: IF the Retention time predicted for the minimum protected Height is less than the desired hold time, use the fan apparatus and a smoke pencil to find the leakage, and seal as necessary.

INITIALS/DATE

- 6.11.14 RECORD vendor calculation results of the equivalent leakage area (Sq. in.) using recorded data, and the retention time through use of the fan apparatus testing software, using the previously determined hold time and the minimum protected height.

Whole Room Leakage Area 15,595.32 Sq. in.
BCLA 153.62 Sq. in.

17.0 Retention Time (≥ 10 minutes)

- 6.11.15 REMOVE Door Fan Apparatus from doorway.

- 6.11.16 RETURN doors, fans, and dampers to NORMAL, per Appendix 9.1.

- 6.11.17 NOTIFY SOS that Door Fan Test in Diesel Generator Room 1B-B is COMPLETE.

OFFICIAL TEST COPY

INITIALS/DATE

6.12 CO₂ Protected Enclosure, Diesel Generator Room 2A-A

6.12.1 DETERMINE the dimensions of the enclosure by measurement of the following:

Height	<u>17</u>	Ft.	<u>0</u>	in.
Length	<u>78</u>	Ft.	<u>0</u>	in.
Width	<u>29</u>	Ft.	<u>0</u>	in.

6.12.2 CALCULATE the room volume in Cubic Ft. as follows:

H 17 x L 78 x W 29 = 38454 Cu.Ft.

6.12.3 RECORD vendor calculations of the maximum developed head (in. W.C.) of the CO₂/air mixture column. (Using the measured room height, CO₂ System Design information, and previous concentration test results).

0.065 in. W.C.

6.12.4 INSTALL the Door Fan Apparatus in the door which provides the most favorable relief area (i.e., Leaks which leave the room during pressurization can be readily returned to the Fan Apparatus through a return air path).

6.12.5 SEAL the Fan Apparatus completely in the door opening.

6.12.6 MANIPULATE the ~~following to simulate the~~ ^{equipment listed on Appendix 9.1 to the required position to} condition immediately following CO₂ discharge into the protected area. ~~and RECORD specific actions or verifications in the Chronological Log.~~

~~A. Vent or exhaust fans OFF~~ [✓] 11/4/94

~~B. Doors CLOSED or door opening SEALED with door fan apparatus.~~

~~C. Dampers in AFTER DISCHARGE position per design~~

OFFICIAL TEST COPY

INITIALS/DATE

6.12.7 RECORD the measured Pressure Differential across the door fan.
in. W.C. 0.003

[Signature] / 12/9/14

6.12.8 IF the pressure measurement in Step 6.12.7 is 25% or more of the previously calculated column pressure using absolute values, DETERMINE the cause of the excessive static pressure and REDUCE to less than 25%.

[Signature] / 12/9/14

6.12.9 OPEN Doors, Ventilation openings, etc. in the adjacent areas on each side, above and below the enclosure being tested to the maximum extent possible to provide a return air path for all leakage leaving the enclosure. Any adjacent areas in which a return air path cannot be established are to be evaluated by the Contractor.

[Signature] / 12/9/14

6.12.10 UNSEAL Fan Apparatus and OPERATE fan in the De-pressurization mode. (CONTROL fan speed such that the absolute value of the pressure developed matches the calculated column pressure, adjusted for the previously measured static pressure, per the NFPA procedure).

[Signature] / 12/9/14

NOTE: IF it is not possible to achieve sufficient pressure due to excessive leakage, either find the source of the leakage and seal, or, in the case of ventilation openings in the wall or ceiling slab, measure the opening (in²) and temporarily seal. When sufficient pressure is achieved continue to next step.

INITIALS/DATE

6.12.11 RECORD under DE-PRESSURIZATION mode the following;

- A. Diff. Press. Across Fan Opening (in. W.C.)
0.062
- B. Flow through Fan(s) CFM 481.7
- C. Inside temperature 79.0 °F.
- D. Outside Temperature 73.6 °F.

JSW / 1/14/94

6.12.12 REVERSE Fan position and PRESSURIZE enclosure. (CONTROL fan speed such that the absolute value of the pressure developed matches the calculated column pressure, adjusted for the previously measured static pressure, per NFPA Procedure).

JSW / 1/14/94

6.12.13 RECORD the following Data while pressurizing the Enclosure.

- A. Diff. Press. Across Fan Opening. (in. W.C.)
0.068
- B. Flow through Fan(s). CFM 536.7
- C. Inside temperature 79.8 °F.
- D. Outside temperature 64.6 °F.

JSW / 1/14/94

NOTE: Steps 6.12.5 through 6.12.13 may be reperformed as necessary until acceptable results are obtained.

NOTE: IF the Retention time predicted for the minimum protected Height is less than the desired hold time, use the fan apparatus and a smoke pencil to find the leakage, and seal as necessary.

A4-20
OFFICIAL TEST COPY

INITIALS/DATE

- 6.12.14 RECORD vendor calculation results of the equivalent leakage area (Sq. in.) using recorded data, and the retention time through use of the fan apparatus testing software, using the previously determined hold time and the minimum protected height.

Whole Room Leakage Area 15,582.03 Sq. in.
BCLA 137.71 Sq. in.

19.1 Retention Time (\geq 10 minutes)

[Signature] 11/9/94 | 0

- 6.12.15 REMOVE Door Fan Apparatus from doorway.

[Signature] 11/13/94

- 6.12.16 RETURN doors, fans, and dampers to NORMAL, per Appendix 9.1.

[Signature]

[Signature] 11/13/94
[Signature] 11/29/94

- 6.12.17 NOTIFY SOS that Door Fan Test in Diesel Generator Room 2A-A is COMPLETE.

[Signature] 11/29/94

INITIALS/DATE

6.13 CO₂ Protected Enclosure, Diesel Generator Room 2B-B

6.13.1 DETERMINE the dimensions of the enclosure by measurement of the following:

Height	<u>17</u>	Ft.	<u>0</u>	in.
Length	<u>78</u>	Ft.	<u>0</u>	in.
Width	<u>29</u>	Ft.	<u>0</u>	in.

[Signature] / 10.9.94

6.13.2 CALCULATE the room volume in Cubic Ft. as follows:

H 17 x L 78 x W 29 = 38,454 Cu.Ft.

[Signature] / 10.9.94

6.13.3 RECORD vendor calculations of the maximum developed head (in. W.C.) of the CO₂/air mixture column. (Using the measured room height, CO₂ System Design information, and previous concentration test results).

0.065 in. W.C.

[Signature] / 12.9.94

6.13.4 INSTALL the Door Fan Apparatus in the door which provides the most favorable relief area (i.e., Leaks which leave the room during pressurization can be readily returned to the Fan Apparatus through a return air path).

[Signature] / 12.9.94

6.13.5 SEAL the Fan Apparatus completely in the door opening.

[Signature] / 12.9.94

6.13.6 MANIPULATE the ~~following to simulate the~~ ^{equipment listed on Appendix 9.1 to the required position to} condition immediately following CO₂ discharge into the protected area. ~~and RECORD specific actions or verifications in the Chronological Log.~~

[Signature] / 12.9.94

~~A. Vent or exhaust fans OFF~~

 /

~~B. Doors CLOSED or door opening SEALED with door fan Apparatus.~~

 /

~~C. Dampers in AFTER DISCHARGE position per design.~~


 /

4422
OFFICIAL TEST COPY


INITIALS/DATE

- 6.13.7 RECORD the measured Pressure-Differential across the door fan.


in. W.C. 0.002

 / 12.9.94


- 6.13.8 IF the pressure measurement in Step 6.13.7 is 25% or more of the previously calculated column pressure using absolute values, DETERMINE the cause of the excessive static pressure and REDUCE to less than 25%.

 / 12.9.94

- 6.13.9 OPEN Doors, Ventilation openings, etc. in the adjacent areas on each side, above and below the enclosure being tested to the maximum extent possible to provide a return air path for all leakage leaving the enclosure. Any adjacent areas in which a return air path cannot be established are to be evaluated by the Contractor.

 / 12.9.94

- 6.13.10 UNSEAL Fan Apparatus and OPERATE fan in the De-pressurization mode. (CONTROL fan speed such that the absolute value of the pressure developed matches the calculated column pressure, adjusted for the previously measured static pressure, per the NFPA procedure).

 / 12.9.94

NOTE: IF it is not possible to achieve sufficient pressure due to excessive leakage, either find the source of the leakage and seal, or, in the case of ventilation openings in the wall or ceiling slab, measure the opening (in²) and temporarily seal. When sufficient pressure is achieved continue to next step.

INITIALS/DATE

- 6.13.11 RECORD under DE-PRESSURIZATION mode the following;
- A. Diff. Press. Across Fan Opening (in. W.C.)
0.063
 - B. Flow through Fan(s) CFM 1860
 - C. Inside temperature 80.6 °F.
 - D. Outside Temperature 71.0 °F.
- 6.13.12 REVERSE Fan position and PRESSURIZE enclosure. (CONTROL fan speed such that the absolute value of the pressure developed matches the calculated column pressure, adjusted for the previously measured static pressure, per NFPA Procedure).
- 6.13.13 RECORD the following Data while pressurizing the Enclosure.
- A. Diff. Press. Across Fan Opening. (in. W.C.)
0.067
 - B. Flow through Fan(s). CFM 1790
 - C. Inside temperature 80.0 °F.
 - D. Outside temperature 68.2 °F.

[Signature] / 11-2-94

[Signature] / 11-2-94

[Signature] / 11-2-94

NOTE: Steps 6.13.5 through 6.13.13 may be reperformed as necessary until acceptable results are obtained.

NOTE: IF the Retention time predicted for the minimum protected Height is less than the desired hold time, use the fan apparatus and a smoke pencil to find the leakage, and seal as necessary.

INITIALS/DATE

- 6.13.14 RECORD vendor calculation results of the equivalent leakage area (Sq. in.) using recorded data, and the retention time through use of the fan apparatus testing software, using the previously determined hold time and the minimum protected height.

Whole Room Leakage Area: 15,593.57 Sq. in.
BCLA 146.9 Sq. in.

17.0 Retention Time (≥ 10 minutes)

[Signature] 11/14/94 CN 03

- 6.13.15 REMOVE Door Fan Apparatus from doorway.

[Signature] 11/9/94

- 6.13.16 RETURN doors, fans, and dampers to NORMAL, per Appendix 9.1.

[Signature] 12/2/94

[Signature] 11/9/94 CN

[Signature] 12/1/94

- 6.13.17 NOTIFY SOS that Door Fan Test in Generator Room 2B-B is COMPLETE.

[Signature] 11/2/94

ATTACHMENT 5

Letter from TVA to NRC
dated June 15, 1995

and

WBN Fire Protection Report
Revision 3 (selected sections)



T04 950615 150

Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381

JUN 1 5 1995

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of the Application of) Docket Nos. 50-390
Tennessee Valley Authority) 50-391

WATTS BAR NUCLEAR PLANT (WBN) - FIRE PROTECTION REPORT (FPR)
REVISION (TAC M63648)

The purpose of this letter is to submit the latest FPR revision to support the Staff's review and inspection of the WBN Fire Protection Program. The FPR now consists of 3 volumes. Volumes 1 and 2 provide the overall description of the WBN Fire Protection Program and safe shutdown strategy. Volume 3 contains WBN Fire Protection Program implementing procedures and is available onsite for review.

TVA has completed revising the FPR to address Staff comments or questions, and requests for information. To address Staff comments received in a TVA/NRC meeting on December 14, 1994, TVA extensively revised the FPR to include additional information and submitted Revision 1 on April 27, 1995. A safe shutdown strategy summary description requested by NRC in the December 14, 1994, meeting was included in FPR Revision 2, which was approved by TVA on May 24, 1995. The safe shutdown summary description included in the FPR is based on "as-designed" information. Final verification and validation of the safe shutdown actions is ongoing as part of TVA's efforts to develop the safe shutdown implementing procedures.

Revision 2 also addressed NRC inspector comments received during NRC inspections and incorporated changes resulting from TVA initiatives to reduce the amount of Thermo-Lag used at WBN. Revision 2 was made available to NRC Staff personnel during a site review of the WBN FPR on May 31, 1995. During the site review, TVA

U.S. Nuclear Regulatory Commission
Page 2

JUN 15 1995

and NRC staff agreed upon additional changes to address NRC comments/questions. In order to incorporate the changes, the commitment date for submitting an updated FPR by May 31, 1995, was extended to June 15, 1995.

FPR Revision 3, Volumes 1 and 2, incorporates the changes agreed upon during the site review. Complete copies of FPR Volumes 1 and 2 are being submitted (Enclosure) to facilitate the Staff's review. Except where extensive revisions were required to incorporate the safe shutdown summary description, change bars indicate where information has been revised. The summary description of the WBN safe shutdown strategy was added to Part VI, "Fire Hazards Analysis."

TVA staff personnel are available to meet with NRC or hold a telephone conversation to discuss the changes at the Staff's convenience. There are no new commitments made in this submittal. If you should have any questions, please contact Mr. P. L. Pace at (615)365-1824.

Sincerely,



Raul R. Baron
Nuclear Assurance
and Licensing Manager (Acting)

Enclosure

cc (Enclosure):

NRC Resident Inspector
Watts Bar Nuclear Plant
Rt. 2, Box 700
Spring City, Tennessee 37381

Mr. P. S. Tam, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852

U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

ENCLOSURE

WATTS BAR NUCLEAR PLANT
FIRE PROTECTION REPORT
VOLUMES 1 AND 2
REVISION 3

201

FIRE PROTECTION REPORT

Revision 3

Technical Review By: J. Pierce 16/15/95

Technical Review By: J. D. Sted. 1 6/15/95

Submitted By: T. R. Jones 1 6/15/95

Approved By: [Signature] 6/15/95
PORC Chairman

Approved By: R. P. Pucell 1 6/15/95
Plant Manager

12.3.3 Carbon Dioxide Suppression Systems

Automatic total flooding CO₂ suppression systems have been provided for the Auxiliary Instrument Rooms and Computer Room in the Control Building; and the Lube Oil Storage Room, each Diesel Engine Room (4), Fuel Oil Transfer Room, and each 480-V Board Rooms (4) in the Diesel Generator Building.

The design basis for the areas protected by CO₂ are as follows:

Auxiliary Instrument Rooms - Deep seated fires. Must achieve 30% concentration within 2 minutes, 50% concentration within 7 minutes, and maintain at least 45% concentration for at least 15 minutes.

Computer Room - Deep seated fire. Must achieve 30% concentration within 2 minutes and 50% concentration within 7 minutes.

Diesel Generator Engine Rooms - Surface fire (diesel fuel) and rotating electrical equipment. Must achieve 34% concentration within 1 minute and maintain at least 30% concentration for at least 20 minutes.

Diesel Generator Electrical Board Rooms - Deep seated fires. Must achieve 30% concentration within 2 minutes and 50% concentration within 7 minutes.

Lube Oil Storage and Fuel Oil Transfer Rooms - Surface fire. Must achieve 34% concentration within 1 minute.

A signal from either the fire detection system or a push button station activates the area alarms, CO₂ discharge timer which actuates the master control valve and the area selector valve permitting the CO₂ to be discharged into the selected area. In addition, the system can be manually operated via the electro-manual pilot valve for each hazard protected.

Personnel safety is considered by providing the predischARGE alarm to notify anyone in the area that CO₂ is going to be discharged and by the addition of an odorizer to the CO₂ to warn personnel that CO₂ has been discharged.

Actuation of the CO₂ system causes selective closure of dampers and doors to the area protected and shuts down HVAC fans to the protected area. This prevents spread of the fire and ensures that the minimum concentration of CO₂ is maintained. Full discharge tests for representative rooms in conjunction with door fan pressurization tests have been conducted to validate CO₂ concentration and soak times. The duration of the discharge is

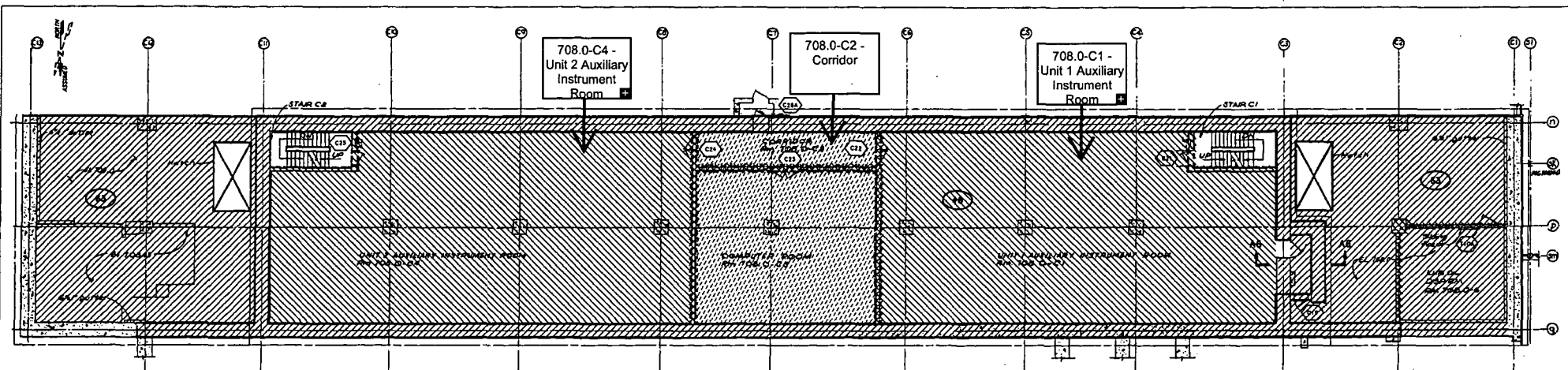
PART X - NFPA CODE EVALUATION

2211	Comply	Unclosable opening area for flash or surface-type fires exceed either 3% of the cubic foot volume or 10% of the square foot room surface area. If exceeded, the system shall be tested to assure proper performance
2212	Comply	Unclosable opening area for deep seated fires exceeds small openings in or near the ceiling unless the system is tested to assure proper performance
2213	Comply	Prevention of fire spread
2214	N/A	Process and storage tank with flammable vapors are not applicable to WBN.
222	Comply See Note 1	Leakage and ventilation is not compensated by extended discharge of CO ₂ agent.
2221	Comply	Automatic closure of openings (see 2351 for diesel engine rooms)
2222	Comply	Shut down of ventilation
223	N/A	Types of fires - general information
2231	N/A	Surface fire extinguishment - General Information
2232	Comply	Deep seated fire extinguishment does not specify the soak time and concentration levels required to be maintained. Where required, soak time of 15 minutes at 45% concentration is maintained.
23	N/A	Title, CO ₂ Requirements for Surface Fires
231	N/A	General information
232	Comply	Flammable material design concentration
2321	Comply	Table 4 carbon dioxide concentrations
2322	N/A	Calculation of design concentration if not on Table 4
233	Comply	Volume factor
2331	Comply	Calculating volume to protect
2332	Comply	Table 5 Volume Factors
2333	Comply	Comment on Column B Table 5
2334	Comply	Interconnected volumes

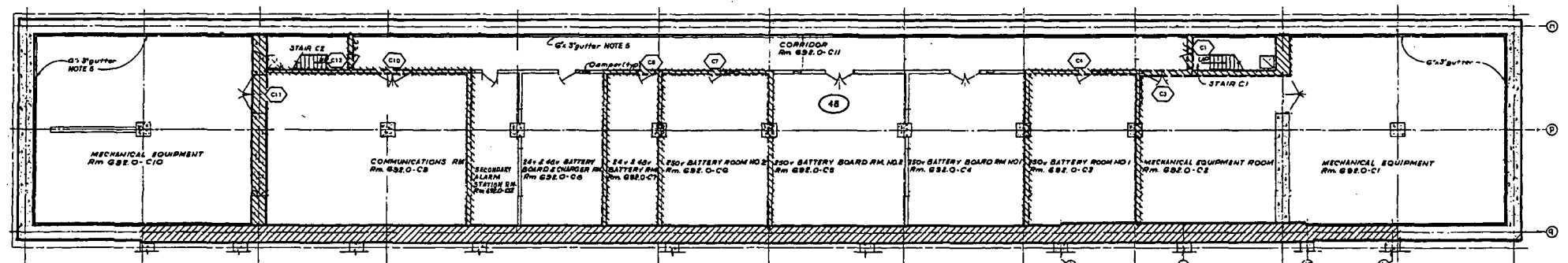
234	N/A	Material conversion factor
235	N/A	Special conditions require additional agent
2351	Comply See Note 1	Compensating for openings that cannot close (i.e., ceiling grills in diesel engine rooms) by addition of 1 pound of agent per square foot of opening.
2352	Comply See Note 1	Ventilation fans are shut off or taken into account.
2353	N/A	Elevated temperature of the enclosure is not anticipated.
2354	N/A	Low temperature of the enclosure is not anticipated.
2355	Comply	Surface fire extinguishment
24	N/A	Title, CO ₂ Requirements for Deep Seated Fires
241	Comply See Note 1	General - Soak times are specified where required. Soak time is 15 minutes at 45% concentration.
242	Comply	Combustible materials
2421	Comply	Flooding factors for specific hazards (50% for deep seated fire locations such as board rooms, instrument rooms, etc.)
2422	N/A	Flooding factors for other deep seated fires
243	Comply	Volume of space protected
244	N/A	The discharge timers are adjusted for the hazard protected.
2441	Comply See Note 1	Compensating for openings that cannot close
25	N/A	Title, Distribution Systems
251	Comply	General
252	Comply See Note 1	Rate of Application
2521	Comply See Note 1	Time to reach design concentration for surface fires
2522	N/A	High pressure systems are not used at WBN.

ATTACHMENT 6

WBN Fire Protection Report
Figure II-33
TVA DWG No. 47W240-6 R8

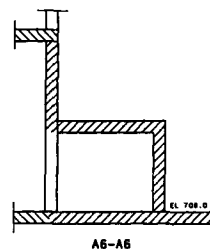
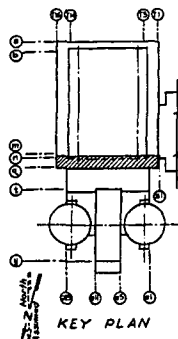


PLAN - EL 708.0



PLAN - EL 692.0

ROOM SCHEDULE			
ROOM NO.	NAME OF ROOM	ROOM NO.	NAME OF ROOM
692.0-C1	Mechanical Equip	708.0-C1	Unit 1 Auxiliary Instrument Room
692.0-C2	Mechanical Equip	708.0-C2	Corridor
692.0-C3	240 Battery Rm No 1	708.0-C3	Computer Room
692.0-C4	250 Battery Rm No 1	708.0-C4	Unit 2 Auxiliary Instrument Room
692.0-C5	250 Battery Rm No 2	C1	Stair
692.0-C6	250 Battery Rm No 3	C2	Stair
692.0-C7	240 Battery Rm No 2	708.0-C6	End Oil Shop Rm
692.0-C8	240 Battery Rm No 3		
692.0-C9	Communications Rm		
692.0-C10	Mechanical Equip		
692.0-C11	Corridor		
C1	Stair		
C2	Stair		
692.0-C12	Secondary Alarm Station		



NOTES:

- FOR GENERAL NOTES AND REF. DWGS SEE SHEET 1.
- CEILING OF MECH. EQUIP. ROOMS (692.0-C1 AND C10) ARE 3-HOUR REGULATORY BARRIERS.
- FLOOR AND CEILING OF COMPUTER ROOM AND CORRIDOR (708.0-C2 AND C11) ARE 1-HOUR REGULATORY BARRIERS.
- FLOOR AND CEILING OF ALL INSTR. ROOMS (708.0-C1 & C4) ARE 2-HOUR NON-REGULATORY BARRIERS.

SCALE: 1/8" = 1'-0"
ELEV: AS NOTED

- 2-HR REGULATORY FLOOR
- 3-HR REGULATORY BARRIER
- 2-HR REGULATORY BARRIER
- 2-HR NON-REGULATORY BARRIER
- FIRE DOOR
- FIRE AREA
- FIRE AREA BOUNDARY
SHOW OFFSET FROM WALLS FOR CLARITY
- UNPROTECTED OPENING

COMPARISON DRAWINGS:
STRENGTH - 1 THRU - 8 AND
- 9 THRU - 12

WATTS BAR
FIRE PROTECTION
REPORT
POWERHOUSE
CONTROL BUILDING - UNITS 1 AND 2
FIRE PROTECTION
COMPARTMENTATION - FIRE CELLS
PLAN EL 692.0 & 708.0
FIRE PROTECTION REPORT
TVA DWG NO. 47W240-6 R8
FIGURE II-33