Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

APR 0 4 2005

WBN-TS-04-17

10 CFR 50.90

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

Gentlemen:

In the Matter of) Docket No(s). 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) - UNIT 1 - PROPOSED TEMPORARY LICENSE AMENDMENT REQUEST CHANGE NO.WBN-TS-04-17 - REVISE SECTIONS 3.6.4 AND 3.6.15 TO ALLOW USE OF PENETRATIONS IN SHIELD BUILDING DOME DURING MODES 1-4 FOR PREPARATION OF STEAM GENERATOR REPLACEMENT PROJECT (SGRP)

Pursuant to 10 CFR 50.90, TVA is submitting a request for a temporary amendment to License NPF-90 for WBN to change the Technical Specifications (TS) for Unit 1. During the Cycle 6 refueling outage, two penetrations through the Shield Building dome were created. These penetrations were each closed with a steel hatch assembly prior to entering Mode 4 at the end of the outage. The proposed TS change will allow WBN Unit 1 to open one of the penetrations in the Shield Building dome up to five hours a day, six days a week while in Modes 1-4 during Cycle 7 operation from receipt of NRC approval for this request until entering Mode 5 at the start of the Cycle 7 refueling outage. Cycle 7 operation commences in Spring 2005. Based on dose information from previous outages, the proposed change will reduce dose to SGRP workers by six to seven REM by allowing SGRP materials to be passed through the open hatch in lieu of carrying the material past higher dose areas. Passing material through the open hatch will also provide work efficiency gains, since material will be provided directly to the point of use.

The TS will revert to the pre-amendment requirements prior to entering Mode 4 during startup from the Cycle 7 outage, since work activities related to the SGRP will permanently eliminate these penetrations.

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Enclosure 1 to this letter provides the description and evaluation of the proposed TS change. This includes TVA's determination that the proposed change does not involve a significant hazards consideration, and is exempt from environmental review. Enclosure 2 contains a copy of the appropriate TS pages, marked-up to show the proposed change. Enclosure 3 forwards the revised TS pages, which incorporate the proposed change. Enclosure 4 provides the TS Bases change associated with this requested TS change.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the TS change 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 enclosures to the Tennessee State Department of Public Health. The NRC was informed of the proposed request in a public meeting on August 26, 2004.

TVA requests approval of the TS change by January 6, 2006 to support work in advance of the Cycle 7 Refueling Outage, during which replacement steam generators will be installed and that the implementation of the revised TS be within 45 days of NRC approval. TVA is prepared to meet with the Staff if necessary to facilitate the NRC's review.

There are no regulatory commitments associated with this submittal. If you have any questions about this TS change, please contact me at (423) 365-1824.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 4th day of April 2005.

Sincerely,

P. L. Pace
Manager, Licensing
and Industry Affairs

Enclosures
1. TVA Evaluation of Proposed Change
2. Proposed Technical Specification Changes (mark-up)
3. Proposed Technical Specification Changes (re-typed)
4. Changes to Technical Specifications Bases pages

cc: See page 3

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ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
DOCKET NO. 390

DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGE

1.0 DESCRIPTION

This letter is a request to amend Operating License NPF-90 for WBN Unit 1.

The temporary proposed change would revise the Operating License to allow WBN Unit 1 to operate with one of the two approximately 18-inch diameter penetrations through the Shield Building dome, opened temporarily while the unit is in Modes 1-4. Either of the Shield Building penetrations will be allowed to be opened for a combined total of up to five hours a day, six days a week while in Modes 1-4 during the portion of Cycle 7 operation between receipt of NRC approval and Mode 5 at the start of the Cycle 7 refueling outage. The approximately 18-inch diameter penetrations are designated Penetrations 1-EQH-271-0010 and 1-EQH-271-0011.

TVA is requesting approval of this amendment by January 6, 2006, to support pre-outage activities for the Fall 2006 Unit 1 Cycle 7 (U1C7) Refueling Outage.

2.0 PROPOSED CHANGE

The proposed amendment would revise the WBN Unit 1 Technical Specifications (TS), Section 3.6.15, *Shield Building*, to allow the annulus negative pressure to be less than the specified limit (equal to or more positive than a negative 5 inches water gauge (wg) with respect to the atmosphere), when one of the two approximately 18-inch penetrations in the Shield Building dome is open. Section 3.6.4, Containment Pressure, would also be revised to allow time for the required differential pressure between the containment and the annulus (greater than or equal to -0.1 and less than or equal to +0.3 pounds per square inch differential [psid]) to be restored following opening or closing a Shield Building dome penetration.

Corresponding TS Bases changes are also proposed. The TS and TS Bases changes affect the following sections and are illustrated by marked-up and revised pages provided in Enclosures 2, 3 and 4:

Technical Specification

Section 3.6.4 - Added the following note to Condition A:

> *"NOTE - When opening or closing Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building Dome during Cycle 7 operation, time is allowed for Containment Annulus pressure equalization to occur."*

Section 3.6.15 - Added the following to the end of the note for Condition B:

> *"... or while Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building Dome is open until annulus pressure is restored.**
>
> *1. The combined opening time of Penetrations 1-EQH-271-0010 or 1-EQH-271-0011 is limited to a total time of five hours a day, six days a week during Cycle 7 operation.*
> *2. Penetrations 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building Dome may not be opened if in Action Conditions LCO 3.6.9A or 3.8.1B.*
> *3. Upon opening Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building Dome, both EGTS control loops shall be placed in the A-Auto Stand-by position and returned to normal position following closure of the penetrations."*

No change to Surveillance Requirement 3.6.15.1 is required. This SR would not be applicable while Penetration 1-EQH-271-0010 or 1-EQH-271-0011 is open due to the proposed change to Condition B.

Technical Specification Bases:

Bases Section B 3.6.4 - Added the following to the end of the Bases for Action A.1:

> *"When opening or closing Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building Dome, the differential pressure between the Containment and the Annulus may exceed the equal to or greater than -0.1 and equal to or less than +0.3 psid requirement. During this operation, time is allowed for Containment/Annulus pressure equalization to be re-established."*

Section 3.6.9 - Added reference to Section 3.6.15 in LCO Section to provide additional information.

Bases Section B3.6.15 - Added the following to the end of the Bases for Action B.1:

"... or while Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building dome is open until annulus pressure is restored. Allowing one of the Shield Building dome penetrations to be open is based on provisions being in place to close it within fifteen minutes of LOCA initiation. Limiting the time for opening either of the penetrations to a combined total of five hours a day, six days a week limits the amount of time the Shield Building is inoperable to approximately 60 percent of the eight hour completion time for LCO B.

During normal plant operation, the Annulus is maintained at a negative pressure equal to or more negative than -5 inches water gauge (wg) by the Annulus Vacuum Control subsystem (non-safety related) of the Emergency Gas Treatment System (EGTS). One train (loop) of EGTS is operating (controls in A-Auto) and one train is in standby (controls in A-Auto Stand-by). Opening Shield Building dome Penetration 1-EQH-271-0010 or 1-EQH-271-0011 during Modes 1-4 will result in the Annulus pressure becoming more positive than the -5 inches wg required by Technical Specification 3.6.15. When the Annulus pressure becomes more positive than -0.812 inches wg, the EGTS control system perceives that the loop in A-Auto (i.e., the operating train) has failed. Control of Annulus pressure is then transferred to the loop in A-Auto Stand-by (i.e., the train in standby). Since the loop originally controlling Annulus pressure is perceived to have failed, only one control loop (the controller originally in A-Auto Stand-by) remains functional. If a single failure of the remaining control loop were to occur, this would result in both control loops failing and would render the safety-related portion of EGTS inoperable. To prevent this situation, operator action will be taken to place both EGTS control loops in the A-Auto Stand-by position when the annulus differential pressure is more positive than a -5 inches wg. If EGTS is subsequently initiated in this configuration, both trains of EGTS will start. One EGTS control loop train will manually be returned to the A-Auto position when the Annulus differential pressure becomes more negative than -0.812 inches wg. In addition, the remaining EGTS control loop train will be turned off, then immediately placed in the A-Auto Stand-by position (i.e., the associated isolation valves shall be closed by means of the MCR hand switch). This action is in the design and is necessary to restore the EGTS to the normal operational configuration and to prevent excess EGTS exhaust and Annulus in-leakage.

Additional assurance is provided of support system operability by administratively restricting the opening of Penetration 1-EQH-271-0010 or 1-EQH-271-0011 if in

Actions for LCO 3.6.9.A EGTS, or 3.8.1.B, AC Sources - Operating. If a hatch is opened and one of the above systems become inoperable, the hatch will be closed."

In summary, the above change will allow one of the two approximately 18-inch diameter penetrations in the Shield Building dome to be temporarily open while the unit is in Modes 1-4 during Cycle 7 operation. Either of the Shield Building penetrations will be allowed to be open for a combined total of up to five hours a day, six days a week while in Modes 1-4 during the time between receipt of NRC approval and Mode 5 at the start of the Unit 1 Cycle 7 (U1C7) refueling outage. This will allow work to be performed in preparation for the steam generator replacements during the U1C7 Refueling Outage.

3.0 BACKGROUND

The WBN Unit 1 steam generators (SGs) will be replaced during the U1C7 refueling outage. Removal of the old steam generators and installation of the replacement steam generators will take place through holes in the SG compartment roofs, the Steel Containment Vessel (SCV) dome, and the Shield Building dome. Preparation for creation of these holes will involve numerous activities, such as welding stiffeners to the SCV, installation of a water collection system for hydro-demolition of the Shield Building concrete, and installation of scaffolding/work platforms inside the annulus between the SCV and the Shield Building. These preparatory activities will be performed while the unit is in Modes 1-4 during Cycle 7 operation. Movement of material required to support these activities to the top of the annulus is currently only possible by hauling the material through the annulus and up the side of the SCV along the annulus ladder.

To support efficient movement of the material to the top of the annulus, two approximately 18-inch diameter penetrations were drilled through the Shield Building dome during the Unit 1 Cycle 6 (U1C6) Refueling Outage (Spring 2005). Movement of most of the material required for pre-outage work inside the annulus through these penetrations is expected to reduce the amount of time spent working inside the annulus and personnel radiation exposures by six to seven REM. It will also minimize congestion and delays at the annulus ladder and reduce the potential for damaging equipment while hauling the material through the Auxiliary Building and up through the annulus. The movement of material to the Shield Building dome will utilize a mobile crane and will follow a defined safe load path. Load height and weight restrictions will be imposed to preclude nearby safety-related structures, systems or components (SSCs) from being adversely affected by a postulated load drop. Protection of nearby SSCs during material movement

and storage inside the annulus is described in the portion of Section 4.0 entitled *Use of Hatch Assemblies*.

A pre-fabricated, water tight, spring balanced, steel hatch assembly has been installed over each penetration to provide a means to close each penetration and restore Shield Building integrity. Opening and closing of the hatch while the annulus is at a negative pressure relative to the outside atmosphere is assisted by the spring loaded hinges. Leakage testing of the installed hatch assemblies was performed prior to entering Mode 4 following installation of the hatch assembly to ensure that the hatches provided a leak-tight barrier when closed. Leakage testing of the hatch assemblies in Modes 1-4 is described in the portion of Section 4.0 entitled *Use of Hatch Assemblies*. The closed hatch assemblies are capable of withstanding the applicable design basis tornado missiles without perforation and the effects of tornado wind pressure and depressurization.

Creation of the Shield Building penetrations and installation of the steel hatch assembly during the U1C6 outage and operation with the steel hatch assembly closed has been evaluated under 10 CFR 50.59, *Changes, Tests, and Experiments,* and found acceptable. Opening the steel hatch assembly and using the penetration during Modes 1-4 was determined to require prior approval by the NRC because of the impact on the operability requirements in Technical Specifications 3.6.4 and 3.6.15 and the increase in post-loss-of-coolant-accident (LOCA) offsite and Control Room thyroid doses beyond the ten percent increase allowed by 10 CFR 50.59 guidelines.

The Updated Final Safety Analysis Report (UFSAR) Section 6.2.3, *Secondary Containment Functional Design,* indicates that the Shield Building is part of the secondary containment system. The emergency gas treatment system (EGTS) is provided for ventilation control and cleanup of the atmosphere inside the annulus between the Shield Building and the primary Containment Building. The Reactor Building purge air system is also available for cleaning up the atmosphere inside the Shield Building Annulus. Section 6.2.3.1.1, *Secondary Containment Enclosures,* of the UFSAR states that the design bases for the secondary containment structures were devised to assure that an effective barrier exists for airborne fission products that may leak from the primary containment during a LOCA or from the Auxiliary Building fuel handling area following a fuel handling accident. Per UFSAR Section 15.5.3, *Environmental Consequences of a Postulated Loss of Coolant Accident,* the presence of the annulus between the primary containment and the Shield Building reduces the probability of direct leakage from the containment vessel to the atmosphere and allows holdup, dilution, sizing, and plate-out of fission products in the Shield Building.

UFSAR Section 6.2.3.1.2, *Emergency Gas Treatment System (EGTS)*, indicates that the EGTS is used following an accident to keep the air pressure within the Shield Building annulus below atmospheric pressure when containment integrity is required (Modes 1-4). The EGTS is also used to reduce the concentration of radioactive nuclides in annulus air that is released to the environs during a LOCA to levels sufficiently low to keep the site boundary and Low Population Zone (LPZ) doses below 10 CFR 100, *Reactor Site Criteria*, values. The EGTS instrumentation and associated valves are supplied by the 125 volt direct current (VDC) battery boards and the associated fans are supplied by the diesel generators in case of a loss of offsite power. The batteries provide sufficient power for approximately four hours without receiving a charge. In addition, the battery boards can also be powered from either train of diesels.

As described in UFSAR Section 6.2.3.2.2, *Emergency Gas Treatment System (EGTS)*, the EGTS has two subsystems, the annulus vacuum control subsystem and the air cleanup subsystem. The annulus vacuum control subsystem is used to establish and maintain a negative pressure within the annulus during normal operations. The annulus vacuum control subsystem maintains the annulus pressure at or more negative than a negative 5-inches wg with respect to the outside atmosphere. The maintenance of this negative pressure is verified by the Surveillance Requirements of Technical Specification 3.6.15. The required negative pressure level ensures that the annulus pressure will not reach positive values during the annulus pressure surge produced by a LOCA in the primary containment. During a postulated LOCA, this subsystem is isolated and shutdown. The air cleanup subsystem has the capability to perform two functions for the affected reactor secondary containment during a LOCA. One of these functions is to keep the secondary containment annulus air volume below atmospheric pressure. The negative pressure control setpoint chosen for post-accident operation is low enough that leakage across the boundary is into the annulus from both the primary containment and areas adjacent to the Shield Building. The second function is to remove airborne particulates and vapors that may contain radioactive nuclides from air drawn from the annulus.

Use of the Shield Building dome penetration during Modes 1-4 creates a direct pathway to the outside atmosphere that would affect the ability of the 1) annulus vacuum control subsystem to maintain the required annulus negative pressure under normal operation conditions and 2) the air cleanup subsystem to reach required negative pressure in the timeframe assumed in the current accident analyses under post-accident conditions.

UFSAR Section 6.2.3.2.1, *Secondary Containment Enclosures*, states that the total expected infiltration rate across all leakage paths into the annulus is 250 cubic feet per minute (cfm) at the post-accident control setpoint and that there are no significant leakage paths by which primary containment leakage may bypass both the Shield Building and the Auxiliary Building, and result in exceeding offsite dose limits. If one of the Shield Building dome penetrations is in use when an event requiring operation of the EGTS occurs, leakage into the annulus will exceed 250 cfm and primary containment leakage may bypass the EGTS until the penetration can be closed.

Opening of the Shield Building penetration during Modes 1-4 will affect the ability of the Shield Building to maintain leakage into the annulus less than or equal to the 250 cfm assumed in the post-accident analyses discussed in UFSAR Section 6.2.3.3.2, *Emergency Gas Treatment System (EGTS)*. It will also affect the ability of the normal annulus ventilation system to maintain the annulus at the negative pressure assumed in the accident analyses and required by Technical Specification 3.6.15. Therefore, NRC approval is required prior to using one of the penetrations while the unit is in Modes 1-4.

4.0 TECHNICAL ANALYSIS

Technical Specification 3.6.15 requires that the Shield Building be operable during Modes 1-4. Surveillance requirements for that TS specify that the annulus negative pressure is equal to or more negative than a negative 5-inches wg relative to the outside atmosphere during Modes 1-4 and that EGTS operation produces a negative pressure equal to or more negative than a negative 0.61 inches water gauge at Elevation 783. The Bases for the TS indicate that the Shield Building is required to be operable to ensure retention of containment leakage following a design basis accident (DBA) and for proper operation of the EGTS.

Revision to TS 3.6.15 and the associated Bases is required to support operation with one of the Shield Building dome penetrations open while in Modes 1-4. The proposed change to TS 3.6.15 is discussed in Section 2 of this Enclosure.

Technical Specification 3.6.4 requires that Containment pressure shall be equal to or greater than -0.1 and equal to or less than +0.3 psid relative to the annulus during Modes 1-4. Action Condition A requires that the containment pressure be restored within 1 hour. The Bases for the TS indicate that the action is necessary to return operation to within the bounds of the containment analysis.

Revision to TS 3.6.4 and the associated Bases is required to support operation with one of the Shield Building dome

penetrations open while in Modes 1-4. The proposed change to TS 3.6.4 is discussed in Section 2 of this Enclosure.

The technical basis for the change to TS 3.6.4, 3.6.9, and 3.6.15 is summarized below:

Offsite and Control Room Doses

The accidents of interest for the use of the Shield Building dome penetration during Modes 1-4 are those that rely on the Shield Building boundary to limit the release of radioactivity to the environment (with the limiting accident being a LOCA) and those that result from some external event (i.e., a tornado). The integrity of the Shield Building is required to limit the release of radioactivity to the atmosphere following an accident and to protect the SCV from damage due to external events. The accident analyses assume that the Shield Building is intact and that the annulus is at a negative pressure relative to the outside atmosphere at the start of the postulated accident. The accident analyses further assume that the air cleanup subsystem of the EGTS keeps the secondary containment annulus air volume below atmospheric pressure during an accident. The determination of Control Room and offsite doses following a LOCA is based on these assumptions. The offsite and Control Room radiological consequences of a LOCA, as detailed in UFSAR Table 15.5-9, *Doses from Loss-of-Coolant-Accident,* are within the limits of 10 CFR 100, *Reactor Site Criteria*, and 10 CFR 50, Appendix A, General Design Criteria (GDC) 19, *Control Room,* respectively.

Use of one of the Shield Building dome penetrations during Modes 1-4 will affect the LOCA analysis assumptions that are described in UFSAR Section 15.5.3. Since the limiting accident during operation and associated with containment from a dose standpoint, is the design basis LOCA, no other accidents were reevaluated for the change in consequences due to the opening of a Shield Building dome penetration. The size of the Shield Building dome penetrations is greater than currently allowed by the plant design basis. Therefore, with a Shield Building dome penetration open, the ability of the annulus vacuum control subsystem of the EGTS to maintain the annulus at a negative pressure relative to the outside atmosphere as required by TS 3.6.15 may be affected. If an accident occurs with the Shield Building dome penetration open and the annulus at a reduced differential pressure, the air cleanup subsystem of the EGTS will likely not be able to keep the annulus at a negative pressure relative to the outside atmosphere, until the steel hatch assembly over the open penetration is closed.

While a Shield Building dome penetration is open, a dedicated trained individual with no other duties will be stationed on the Auxiliary Building roof to close the hatch,

should an event requiring Shield Building integrity occur. This dedicated operator will be provided with the capability to communicate (two way radio and telephone) directly with another dedicated trained individual with no other duties in the Control Room area. The operability of the two way radio and telephone will be verified prior to each opening of a Shield Building dome penetration and hourly while the penetration is open. The dedicated individual in the Control Room will initiate closure of the penetration should a reactor trip be announced by the Control Room operators. Upon notification from the dedicated individual in the Control Room, which is not assumed to occur until ten minutes into the event, the dedicated individual stationed on the Auxiliary Building roof will immediately proceed from the Auxiliary Building roof to the Shield Building dome and close the open Shield building dome penetration. The steel hatch assembly used to seal the penetration has been designed such that it may be closed quickly (assumed to be one minute) to restore Shield Building integrity. Material being passed through the penetration will be sized such that it may be handled using manual means. The length of the material will also be such that it can be quickly passed through or removed from the penetration so that the steel hatch assembly may be closed within the assumed one minute time frame. Following closure of the steel hatch assembly, the dedicated individual on the Auxiliary Building roof will notify the dedicated individual in the Control Room that the hatch has been closed.

Closure of the steel hatch assembly against the maximum calculated positive pressure (2 inches of water) shown on Figure 1 (page E1-11) was evaluated. This maximum positive pressure could exert an upward force of approximately 41 lbs on the hatch. Since the hatch weighs more than 100 lbs, the weight of the hatch alone is sufficient to overcome the maximum calculated positive pressure and allow closure of the hatch following a LOCA.

As detailed in the Mission Dose discussion below, the time required to notify the dedicated individual on the Auxiliary Building roof, close the open hatch, and for the individual to reach the inside of the Auxiliary Building is 13.5 minutes. An evaluation of the impact on offsite and Control Room doses following a LOCA with the Shield Building dome penetration assumed to be open for the first fifteen minutes of the LOCA was performed. This evaluation conservatively assumed that during the first fifteen minutes of the LOCA, releases to the annulus were immediately released to the outside atmosphere without being filtered. Following closure of the steel hatch assembly and the actions discussed below, EGTS operation will return the annulus to a negative pressure relative to the outside atmosphere and subsequent releases will be filtered by the air cleanup subsystem of the EGTS as described in UFSAR Section 15.5.3.

The following would be the expected sequence if a design basis LOCA were to occur with the hatch opened:

- Design Basis LOCA occurs while hatch is opened.
- Containment Isolation Phase A signal occurs.
- Both EGTS fans automatically start and both EGTS control loops exhaust to Shield Building stack since both control loops are in the A-Auto Stand-by position.
- (No manual actions credited to occur for 10 minutes).
- The hatch is shut 15 minutes post-LOCA (per analysis).
- Annulus pressure decreases to -0.812 inches wg or less.
- Operations places one EGTS control loop in A-AUTO.
- Operations turns the hand switch for the other EGTS control loop to off position and then resets to A-AUTO Stand-by.
- Pressure decreases to -1.45 inches wg control setpoint.

The TVA calculation that models the annulus pressure response during a LOCA, analyzed the accident pressure curve and EGTS exhaust rates for the situation where the annulus starts at atmospheric conditions (zero differential pressure), which corresponds to the assumed starting condition when a Shield Building penetration is open. The closure of the open Shield Building dome penetration fifteen minutes into the accident was modeled by taking the calculation zero differential pressure case and adding fifteen minutes to all times following when the annulus reaches its maximum post-accident pressure. The resulting EGTS flows versus time (Figure 1) were then used in the Source Transport Program (STP) computer code model from the dose calculation to determine the releases. The STP model (Figure 2) was modified as follows:

1. The EGTS exhaust flows (flow from 5 to 6) as shown in Table 1.

2. EGTS recirculation flows (flow from 5 to 4) as shown in Table 1 (equals 3600 cfm - EGTS exhaust flow).

3. For times less than 15 minutes, the flow from containment to the annulus (flow from 2 to 4) is redirected to the environment (flow from 2 to 6).

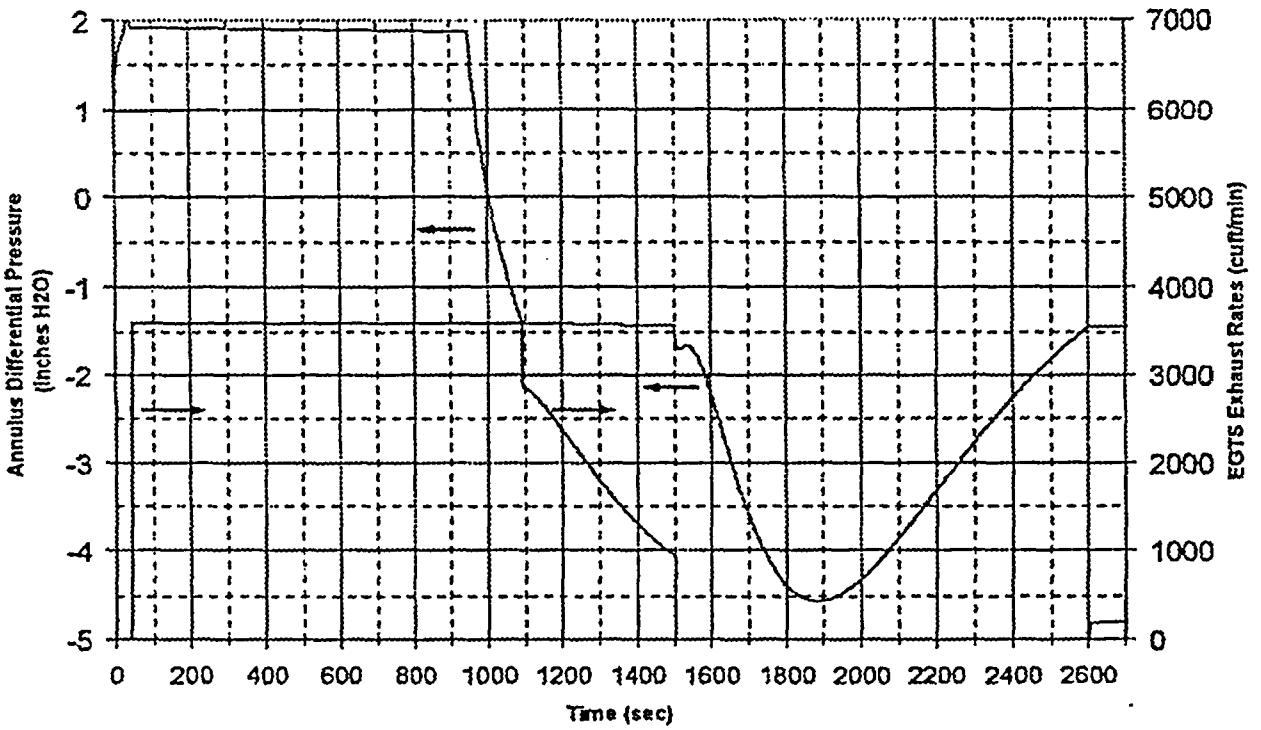
Note that the EGTS flow rates are modeled with the 15-minute delay at the maximum pressure/maximum exhaust flow point, whereas flow from the containment starts at time zero. Delaying the exhaust flow until maximum pressure maximizes the releases.

The STP computer code is described in UFSAR Section 15.5.3. The calculation base model is a Tritium Production Core (TPC) with 100 percent airborne tritium. The calculation is based on a full TPC even though the current technical specification limit is 240 pins. The addition of tritium marginally increases the Beta dose, however; it has little affect on thyroid and whole body gamma doses.

Figure 1

WBN LOCA with 15 Minute Annulus Bypass

Annulus Differential Pressure and EGTS Exhaust Rates
Annulus Leakage = 250 cfm,
Initial Annulus Pressure = 0 inches H_2O, -1.45 inches setpoint



The releases determined by the STP computer code were then used as input into the FENCDOSE computer code to determine the offsite doses and as input into the COROD computer code to determine the control room doses. These codes have been reviewed by NRC in other TVA License Amendment requests, such as the Tritium Production Core dated May 21, 2002. Control Room inleakage was tested as recommended in Generic Letter 2003-01, *Control Room Habitability* and as noted in TVA's letter dated August 4, 2004. The control room unfiltered inleakage testing results were a small fraction of those assumed in the LOCA analysis control room inleakage as noted in UFSAR Section 15.5.3.

The results of the evaluation of offsite and Control Room doses following a LOCA with the Shield Building dome penetration open for fifteen minutes are as summarized in Table 2. Also provided in Table 2 are the doses resulting from a more realistic (Regulatory Guide 1.183, *Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors*) analysis of a LOCA with a Shield Building penetration open for 15 minutes. These results do not include any contribution to offsite and Control Room doses due to skyshine through the two penetrations, since the skyshine contribution was determined to be a small fraction of the calculated doses. The baseline and more realistic analysis are not intended to support any change to the Watts Bar Unit 1 licensing bases. The baseline LOCA doses are provided for comparison. These baseline LOCA doses are documented in UFSAR Table 15.5-9.

Thus, the EGTS will perform its safety function of maintaining the offsite accident dose limits within the guidelines of 10 CFR 100.

Figure 2

Source Transport Program Model

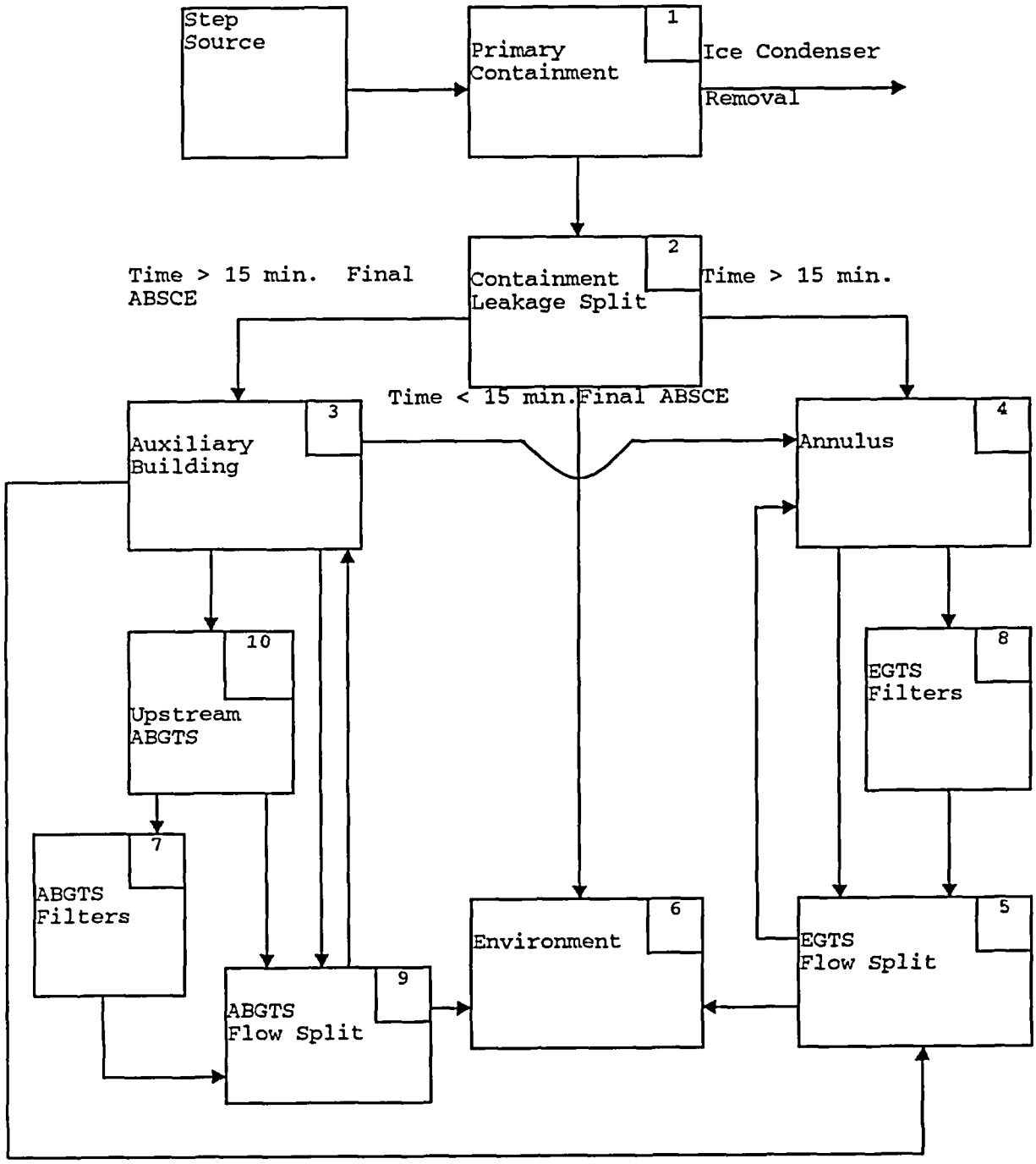


Table 1

EGTS Flow Rates

Calculation TI-ANL-166		Time interval		Start	End	Recirculation Rate		Exhaust Rate	
time interval [sec]		w/15 min. bypass [sec]		[hours]	[hours]	[cfm]	[cfh]	[cfm]	[cfh]
0	30	0	30	0.0000	0.0083	0	0.00E+00	0	0.00E+00
30	39	30	39	0.0083	0.0108	3600	2.16E+05	0	0.00E+00
39	40	39	40	0.0108	0.0111	3286.62	1.97E+05	313.38	1.88E+04
40	41	40	41	0.0111	0.0114	2352.31	1.41E+05	1247.69	7.49E+04
41	42	41	42	0.0114	0.0117	1304.79	7.83E+04	2295.21	1.38E+05
42	43	42	43	0.0117	0.0119	362.6	2.18E+04	3237.4	1.94E+05
43	155	43	1055	0.0119	0.2931	0	0.00E+00	3600	2.16E+05
155	156	1055	1056	0.2931	0.2933	220.66	1.32E+04	3379.34	2.03E+05
156	157	1056	1057	0.2933	0.2936	721	4.33E+04	2879	1.73E+05
157	158	1057	1058	0.2936	0.2939	718.15	4.31E+04	2881.85	1.73E+05
158	159	1058	1059	0.2939	0.2942	717	4.30E+04	2883	1.73E+05
159	164	1059	1064	0.2942	0.2956	714.535	4.29E+04	2885.465	1.73E+05
164	172	1064	1072	0.2956	0.2978	712.08	4.27E+04	2887.92	1.73E+05
172	180	1072	1080	0.2978	0.3000	716.31	4.30E+04	2883.69	1.73E+05
180	190	1080	1090	0.3000	0.3028	728.205	4.37E+04	2871.795	1.72E+05
190	210	1090	1110	0.3028	0.3083	765.07	4.59E+04	2834.93	1.70E+05
210	230	1110	1130	0.3083	0.3139	834.05	5.00E+04	2765.95	1.66E+05
230	250	1130	1150	0.3139	0.3194	923.09	5.54E+04	2676.91	1.61E+05
250	270	1150	1170	0.3194	0.3250	1025.665	6.15E+04	2574.335	1.54E+05
270	446	1170	1346	0.3250	0.3739	1567.885	9.41E+04	2032.115	1.22E+05
446	601	1346	1501	0.3739	0.4169	2359.365	1.42E+05	1240.635	7.44E+04
601	602	1501	1502	0.4169	0.4172	2663.39	1.60E+05	936.61	5.62E+04
602	1606	1502	2506	0.4172	0.6961	3600	2.16E+05	0	0.00E+00
1606	1607	2506	2507	0.6961	0.6964	3589.98	2.15E+05	10.02	6.01E+02
1607	1608	2507	2508	0.6964	0.6967	3458.25	2.07E+05	141.75	8.51E+03
1608	1609	2508	2509	0.6967	0.6969	3438.66	2.06E+05	161.34	9.68E+03
1609	1610	2509	2510	0.6969	0.6972	3435.52	2.06E+05	164.48	9.87E+03
1610	1611	2510	2511	0.6972	0.6975	3434.8	2.06E+05	165.2	9.91E+03
1611	1612	2511	2512	0.6975	0.6978	3434.43	2.06E+05	165.57	9.93E+03
1612	1855	2512	2755	0.6978	0.7653	3409.41	2.05E+05	190.59	1.14E+04
1855	2100	2755	3000	0.7653	0.8333	3374.25	2.02E+05	225.75	1.35E+04
2100	30 days	3000	30 days	0.8333	720.0	3350	2.01E+05	250	1.50E+04

Table 2

Comparison of LOCA Doses
(Regulatory Guides 1.4 and 1.183)
with
Open Shield Building Penetration to Baseline Doses

Open Annulus for 15 Minutes (Regulatory Guide 1.4)					
	30 Day LPZ	2 Hour EAB	10CFR100 Limits	Control Room	10CFR50, App. A, GDC 19 Limits
Gamma (whole body)	1.746	3.507	25	0.8245	5
Beta (skin)	1.782	1.761	300	7.033	30
Thyroid (ICRP-30)	33.27	134.3	300	11.46	30
Open Annulus for 15 minutes (Regulatory Guide 1.183)					
	30 Day LPZ	2 Hour EAB	10CFR 50.67 Limits	Control Room	10CFR50.67 Limits
Gamma (whole body)	1.564	1.039	NA	0.82	NA
Beta (skin)	1.783	0.624	NA	7.19	NA
Thyroid (ICRP-30)	10.14	9.528	NA	4.39	NA
Baseline Doses (Regulatory Guide 1.4)					
	30 Day LPZ	2 Hour EAB	10CFR100 Limits	Control Room	10CFR50, App. A, GDC 19 Limits
Gamma (whole body)	1.328	1.66	25	0.796	5
Beta (skin)	1.605	0.955	300	6.769	30
Thyroid (ICRP-30)	6.563	19.34	300	2.076	30

The revised Regulatory Guide 1.4, *Assumptions Used for Evaluating the Potential Radiological Consequences of a Loss of Coolant Accident for Pressurized Water Reactors*, analysis results indicate that an open Shield Building dome penetration during the first fifteen minutes of a LOCA will result in an increase in the offsite and Control Room doses. However, these post-LOCA doses remain within the limits of 10 CFR 100 and 10 CFR 50, Appendix A, GDC 19. The more realistic (Regulatory Guide 1.183) analysis simply demonstrates that the LOCA doses resulting from the source term releases through the open penetration are comparable to the current licensing basis doses.

Mission Doses

NRC Information Notice (IN) 97-78, *Crediting of Operator Actions in Place of Automatic Actions and Modifications of Operator Actions, Including Response Times*, and ANSI/ANS-58.8, *Time Response Design Criteria for Safety-related*

Operator Actions, provide guidance for consideration of safety-related operator actions. This guidance is summarized as:

1. the specific operator actions required,
2. the potentially harsh or inhospitable environmental conditions expected,
3. a general discussion of the ingress/egress paths taken by the operators to accomplish functions,
4. procedural guidance for required actions,
5. specific operator training necessary to carry out actions, including operator qualifications required to carry out actions,
6. additional support personnel and/or equipment required by the operator to carry out actions,
7. description of information required by the Control Room staff to determine whether such operator action is required, including qualified instrumentation used to diagnose the situation and to verify that the required action has successfully been taken,
8. the ability to recover from credible errors in performance of manual actions, the expected time to make such a recovery, and
9. consideration of the risk significance of the proposed operator actions.

TVA has evaluated the above guidance relevant to the manual action to close an open Shield Building dome penetration as discussed below.

A mission dose evaluation of the post-LOCA exposure to personnel during ingress from the staging location on the Auxiliary Building roof to the Shield Building dome, closure of the steel hatch assembly, and egress from the Shield Building dome has been performed. The mission requires two dedicated trained individuals, one pre-staged on the Auxiliary Building roof and one in the Control Room, whenever a Shield Building dome penetration is open. Since the individuals are dedicated to this mission, there is no impact on plant staffing requirements. The mission assumes the individual on the Auxiliary Building roof is dressed normally (i.e., no anti-contamination clothing or self-contained breathing apparatus). No special tools or equipment, other than dedicated communication capability for the two individuals, are required to complete the mission. Details of the mission are:

- notify dedicated individual pre-staged on Auxiliary Building roof to close hatch (10 minutes),

- climb the Shield Building ladder to the dome (30 seconds),
- walk towards the hatch from the east (30 seconds),
- clear any object blocking the hatch and close the hatch (60 seconds),
- walk off the Shield Building dome to the east (30 seconds),
- climb down ladder to the Auxiliary Building roof and enter the Auxiliary Building door A207 on Elevation 786 of the Auxiliary Building roof (60 seconds),
- walk through the Auxiliary Building to airlock door A57 and exit the Auxiliary Building (790 seconds).

A walkdown of the ingress/egress pathway was performed to conservatively determine/estimate the time required to complete each of the steps described above. The walkdown was performed by personnel familiar with the plans for installation of the hatches and scaffolding necessary to support their use and the planned ingress/egress pathway. The estimated times for the activities on the Shield Building dome (steps 3-5 above) have been confirmed since the hatch assemblies have been installed.

Existing procedures describe required operator actions to respond to various plant events. Procedures for events requiring Shield Building integrity will not require revision to initiate closure of the open Shield Building dome penetration, since the dedicated individual in the Control Room will initiate closure immediately following an announcement of a reactor trip over the PA system, regardless of the reason for the trip. Procedures will be revised as necessary to 1) place both EGTS control loops in the A-Auto Stand-by position when a Shield Building dome penetration is opened and 2) reset one EGTS control loop to A-Auto and one to A-Auto Stand-by once annulus pressure becomes more negative than -0.812 inches wg following closure of a hatch assembly. Annulus pressure indication is provided in the Control Room. Training will be conducted for any procedure revisions, interim procedure revisions, and new procedures either through training classes, "hands-on" training, and/or required reading. In addition, the Control Room will be notified prior to opening a Shield Building dome penetration. Following closure of the steel hatch assembly, the dedicated individual on the Auxiliary Building roof will notify the dedicated individual in the Control Room that the hatch has been closed.

The current LOCA source term assumes that fuel gap and fuel melt activity is released to the containment at Time = 0. The source term used for TVA's mission dose analysis of the open Shield Building penetration consists of the gap

release for the first 13.5 minutes of the accident. After 13.5 minutes, fuel melt is assumed to occur, adding that component to the source term. Even though the fuel melt contribution to the source term is delayed compared to the existing LOCA analysis, this is considered acceptable based on the guidance in Regulatory Guide 1.183. Regulatory Guide 1.183 provides guidance on the use of an alternative source term (AST) and states that fuel melt does not occur until 30 minutes post-LOCA and the gap release does not occur until 30 seconds post-LOCA. Therefore, TVA's assumptions of a gap release starting at Time = 0 and fuel melt at 13.5 minutes are more conservative than Regulatory Guide 1.183. Based on Regulatory Guide 1.25, *Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors (Safety Guide 25),* which is the current design basis and is more conservative than Regulatory Guide 1.183, the gap activities were assumed to be ten percent iodines and ten percent noble gases (except for Kr-85 which is thirty percent). All source term components were modeled to be airborne. Since the sources were assumed to be airborne, the sources are not assumed to go to the sump. Therefore, the containment spray and sump source terms were not included since this would be counting the source terms twice. The annulus source terms were also not included in the analysis, since these source terms are a factor of 10^4 lower than containment source terms.

New atmospheric dispersion (χ/Q) factors for receptors at the Shield Building penetration (2.59E-02), edge of the Shield Building dome (3.55E-03), and Auxiliary Building roof staging area (2.53E-03) were calculated using ARCON96 methodology. Use of this methodology was reviewed for the LOCA analysis by NRC in TVA's letter dated May 21, 2002 concerning the Tritium Production Core and is incorporated into the UFSAR Section 15.5.3. The calculated χ/Qs were input into FENCDOSE (Computer Code for Offsite Dose) for the 0-2 hour time period χ/Q to determine the doses during the ingress from the Auxiliary Building roof, closure of the steel hatch assembly, and egress to door A207. The doses associated with the post-LOCA airborne sources in the Auxiliary Building were calculated by multiplying the general area dose rates by the time spent in the Auxiliary Building during egress (790 seconds).

The summation of the direct radiation and airborne components of the mission dose is provided in Table 3.

Table 3

Penetration Hatch Closure Mission Doses

	Dose (rem)	10 CFR 50, App. A, GDC 19 Limits
Gamma (whole body)	4.09	5
Beta (skin)	0.15	30
Inhalation (thyroid)	26.29	30

Credit for Operation Actions

ANSI/ANS-58.8, Subparagraph 3.1.3, states that *safety-related operator actions shall be credited only where a single operator error of omission does not result in exceeding any limiting design requirement for the design basis event under consideration.* Section 2 of ANSI/ANS-58.8, however, defines operator error in the context of single failure criteria; i.e., a single incorrect or omitted action by a human operator attempting to perform a safety-related action in response to an initiating occurrence is a single failure. The operator actions to place both EGTS control loops in the A-Auto Stand-by position assure that a single failure concurrent with the perceived failure of the operating loop will not render the EGTS inoperable after opening a Shield Building dome penetration. Single failure criteria do not require the assumption of two unrelated failures. Consequently, an assumption of a single failure of the EGTS along with a failure of an operator to place both EGTS loops in the A-Auto Stand-by position is not considered a credible failure. Therefore, the intent of ANSI/ANS-58.8 is met as related to design basis considerations.

An error of commission or omission by a dedicated individual to close an open Shield Building penetration when directed by the dedicated individual in the Control Room is considered unlikely. The individuals involved in performance of this task are dedicated to the task, diverse means of communication between the individuals are provided, and adequate communication exists in the Control Room to alert the dedicated individual in the Control Room of a reactor trip.

The EGTS system and the Shield Building are not credited in the WBN Unit 1 Probabilistic Safety Analysis (PSA) Level I/Level II analysis. WBN has not performed a Level III analysis therefore; a qualitative discussion of the risk significance of the action to close an open Shield Building penetration follows:

Closure of the Shield Building penetrations is required following a LOCA event. The frequencies of occurrence of LOCA events are small. The initiating events to be considered and their frequency of occurrence are listed below.

Excessive LOCA	2.67E-07
Large LOCA	2.67E-06
Medium LOCA	2.67E-05

Allowing one of the Shield Building dome penetrations to be open is based on dedicated provisions and trained individuals being in place to close it within fifteen minutes of initiation of an event requiring Shield Building integrity. The individuals required to close the penetrations are dedicated and trained to the task. Redundant communication methods will be in place to notify the individual on the Auxiliary Building roof to close the hatch. Therefore, the likelihood of failing to close the equipment hatch is considered low. Given the low probability of an initiating event and low probability of failing to close the equipment hatch when required; the failure to close the open penetration after a LOCA is considered unlikely.

Tornado Protection

Administrative controls will be put in place to require closure of the Shield Building dome penetration under a National Weather Service issued tornado watch or warning. The steel hatch assembly is designed to protect against tornado differential pressure and the spectrum of applicable tornado missiles described in UFSAR Table 3.5-7, *Tornado Missile Spectrum A for Category I Structures*. Therefore, closure of the open penetration restores the ability of the Shield Building to protect SSCs inside the Shield Building from tornado missiles and the differential pressure created by a tornado.

Seismic Qualification

The steel hatch assembly is designed to Seismic Category I criteria. The occurrence of a seismic event while the hatch is closed will not affect the ability of the hatch to perform its function. Should a seismic event occur while the hatch is open, the possibility exists that the ability to close the hatch will be affected. Since no radioactive release is postulated to occur concurrent with a seismic event, this situation is no different than a failure of the hatch for any other reason. If the hatch cannot be repaired within the 24-hour timeframe specified in TS 3.6.15, Condition A, then the requirements of Condition C of this TS will be met.

Unplanned Releases

During use of the penetration, temporary radiation monitoring equipment will be provided near the penetrations as directed by TVA Radiological Control (RADCON) group to provide monitoring in the event of an unplanned/ unanticipated release. This provision does not prevent unplanned or unanticipated releases, but allows monitoring in the event of an unplanned/unanticipated release.

Use of Hatch Assemblies

Prior to entering Mode 4 following installation of the hatch assemblies, the assemblies were locked closed with a Security Access only padlock and a metal strap welded across the face to prevent opening. The hatches will remain locked and welded closed while in Modes 1-4 until NRC approval of the Technical Specification change described herein, is received. Security personnel will monitor personnel and movement of material through an open penetration when it is in use. The hatch assemblies will be locked closed with a Security Access Only padlock when not in use.

System operating procedures for the annulus vacuum control system and EGTS will be modified as required to describe controls for these systems when one of the hatch assemblies is opened in Modes 1-4. Continued operation of the annulus vacuum control system while the hatch is open has been evaluated and will have little if any maintenance impact on annulus vacuum control system dampers or fans.

Following closure of a hatch assembly, the assembly will be locally leak tested to verify it is adequately sealed. Local leak testing will not be required if the hatch assembly is closed as a result of direction from the Control Room during an event or if it will only be closed briefly and then reopened.

Provisions will be provided to protect the SCV and other SSCs required to be operable in Modes 1-4 from impact during handling of material through an open penetration and inside the annulus. Once inside the Annulus, materials not in use will be stored on and secured to the existing platform around the perimeter of the SCV dome. The materials will be secured in a manner that will preclude impact on safety-related SSCs in the Annulus. The quantity of materials stored on the platform will be controlled such that the load capacity of the platform is not exceeded. Netting will be used beneath the platforms for protection from dropped small items and hand tools. Equipment protection as prescribed by operations will be installed for sensitive components in the work vicinity.

5. REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

TVA is submitting a request for a temporary amendment to the Watts Bar Nuclear Plant (WBN) Unit 1 Operating License NPF-90 and Technical Specifications (TSs). The proposed amendment would allow the annulus negative pressure to be outside the limits specified in TS 3.6.15, *Shield Building*, when a penetration in the Shield Building dome is temporarily opened in support of the pre-outage activities for the steam generator replacement and allow containment pressure relative to the annulus be briefly challenged per TS 3.6.4, *Containment Pressure*.

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

1. **Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?**

Response: No.

The bounding transients and accidents (i.e., loss-of-coolant-accident (LOCA), tornado, and earthquake) that are potentially affected by the assumptions associated with the use of one of the Shield Building dome penetrations have been evaluated/analyzed. Weather and seismic related events are determined by regional conditions. Therefore, the probability of a tornado or earthquake is not affected by the use of one of the Shield Building dome penetrations. Failure of the Shield Building or emergency gas treatment system (EGTS) is not an initiator of any of the accidents and transients described in the Updated Final Safety Analysis Report (UFSAR). Therefore, since no initiating event mechanisms are being changed, the use of one of the Shield Building dome penetrations will not result in an increase in the probability of any previously evaluated accident.

The use of one of the Shield Building dome penetrations affects the integrity of the Shield Building and the ability of the EGTS to maintain the annulus at a negative pressure relative to the outside atmosphere such that the function in mitigating the radiological consequences of an accident is affected. TVA's evaluation documents the radiological consequences of a LOCA assuming the open penetration is closed within fifteen minutes and the mission dose

an individual may receive during ingress from the Auxiliary Building roof to the Shield Building dome, closure of the steel hatch assembly, and egress from the Shield Building dome. The LOCA radiological consequences with the penetration open for fifteen minutes are higher than those described in the UFSAR, however, the offsite and Control Room doses remain within the limits of 10 CFR 100, *Reactor Site Criteria*, and 10 CFR 50, Appendix A, General Design Criteria (GDC) 19, *Control Room*, respectively. The calculated mission doses are also less than the limits of GDC 19. Therefore, since the increase in radiological consequences of the previously evaluated LOCA remains bounded by the applicable regulatory limits, the increased consequences are not considered significant.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

Loss of Shield Building integrity or EGTS failure is not an initiator of any of the accidents and transients described in the UFSAR. A loss of Shield Building integrity during Modes 1-4 puts the plant into a Limiting Condition for Operation (LCO) situation and requires that the plant initiate shutdown within a specified timeframe if Shield Building integrity cannot be restored within the specified timeframe. The steel hatch assembly over each Shield Building dome penetration performs the same function as the concrete it replaces. Similar to a failure of the Shield Building, a failure of the steel hatch assembly will not initiate any of the accidents and transients described in the UFSAR. Postulated failures of the steel hatch assembly are degradation/damage to the seal or damage to the hatch hinges. Like any other Shield Building failure, these postulated steel hatch assembly failures result in a loss of Shield Building integrity and require that the failed component be repaired or replaced within a specified timeframe or that plant shutdown be initiated.

Therefore, a failure of a steel hatch assembly during use of the Shield Building dome penetration will not initiate an accident nor create any new failure mechanisms. The changes do not result in any event previously deemed incredible being made credible. The use of the Shield Building dome penetration is not expected to result in more adverse conditions in the annulus and is not expected to result in any increase in the challenges to safety systems.

Manual action is required to close an open Shield Building dome penetration and to configure the EGTS control loops following the opening and closing of a Shield Building dome penetration such that the EGTS will respond as designed. NRC Information Notice (IN) 97-78, *Crediting of Operator Actions in Place of Automatic Actions and Modifications of Operator Actions, Including Response Times*, and ANSI/ANS-58.8, *Time Response Design Criteria for Safety-related Operator Actions*, provide guidance for consideration of safety-related operator actions.

The manual actions implemented as a result of this change can be completed within the guidance and criteria provided in IN 97-78 and ANSI/ANS-58.8. Consequently, the manual actions can be credited in the mitigation of events that require Shield Building integrity. With credit for the manual actions to close an open Shield Building dome penetration and configure the EGTS control loops subsequent to an event, the types of accidents currently evaluated in the UFSAR remains the same.

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

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The manual actions to close an open Shield Building dome penetration and to configure the EGTS control loops following the opening and closing of a Shield Building dome penetration ensure that the EGTS will respond as designed. Safety-related instrumentation is available to inform operators that a reactor trip has occurred, and dedicated trained individuals will be positioned to close an open Shield Building dome penetration, should an accident occur. The manual actions meet the criteria for safety-related operator actions contained in NRC IN 97-78 and ANSI/ANS-58.8. The use of manual actions maintains the margin of safety by assuring compliance with acceptance limits reviewed and approved by the NRC. The appropriate acceptance criteria for the various analyses and evaluations have been met; therefore, there has not been a reduction in any margin of safety.

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

Based on the above, TVA concludes that the proposed amendment presents no 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.

5.2 Applicable Regulatory Requirements/Criteria

Regulatory requirements and criteria applicable to the design bases for the Shield Building include NRC's 10 CFR 50 Appendix A GDCs, such as GDC-2, *Design Bases for Protection Against Natural Phenomena*, GDC-16, *Containment Design*, GDC-41, *Containment Atmosphere Cleanup*, GDC-50, *Containment Design Basis*, and GDC-60, *Control of Releases of Radioactive Materials to the Environment*, and NRC's Standard Review Plan (SRP)-3.8.4, *Other Seismic Category I Structures*. Applicable codes, standards, and specifications to the design bases for the Shield Building are provided in the WBN UFSAR Section 3.8.1.2, *Applicable Codes, Standards and Specifications*.

TVA evaluated the use of safety-related operator actions against the guidance for consideration in NRC IN 97-78 and ANSI/ANS-58.8. Based on this evaluation, the implementation of manual actions to close an open Shield Building dome penetration and to configure the EGTS control loops following the opening and closing of a Shield Building dome penetration ensure that the Shield Building boundary is maintained and that the EGTS will respond as designed. Procedures will be revised and training completed to implement these manual actions. These actions are considered safe and meet the applicable regulatory requirements.

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.

6.0. ENVIRONMENTAL IMPACT 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 (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be

released offsite, or (iii) 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.

7.0 REFERENCES

1. TVA Calculation TI-ANL-166, "Annulus Pressure Control During a Loss of Coolant Accident (LOCA)," Revision 11.

2. TVA Calculation TI-RPS-197, "Offsite Doses Due to a Regulatory Guide 1.4 Loss of Coolant Accident," Revision 16.

3. TVA Calculation TI-RPS-198, "Dose to Control Room Personnel Due to a Regulatory Guide 1.4 Loss of Coolant Accident," Revision 16.

4. TVA Calculation WBNAPS3-112, "Offsite and Control Room Doses Following a LOCA with a Temporary Hole in the Shield Building," Revision 1.

5. TVA Calculation WBNAPS3-115, "Mission Dose for Personnel Closing Access Opening of Shield Building Dome," Revision 0.

6. TVA Calculation WBNTSR-089, "Time Dependent Dose Rates from Airborne Radioactivity in the Auxiliary Building after a LOCA," Revision 4.

7. TVA Calculation WBNAPS3-121, "Offsite and Control Room Doses Following a LOCA With a Temporary Hole in the Shield Building Using Regulatory Guide 1.183 Assumptions," Revision 0.

8. Computer Code STP, Revision 6.

9. Computer Code FENCDOSE, Revision 4.

10. Computer Code COROD, Revision 6.

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
LICENSE AMENDMENT CHANGE WBN-TS-04-17

PROPOSED TECHNICAL SPECIFICATION CHANGES (MARK-UP)

I. AFFECTED PAGE LIST

3.6.15
3.6-40

II. MARKED PAGES

See attached.

3.6 CONTAINMENT SYSTEMS

3.6.4 Containment Pressure

LCO 3.6.4 Containment pressure shall be ≥ -0.1 and ≤ +0.3 psid relative to the annulus.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment pressure not within limits.	A.1 Restore containment pressure to within limits.	1 hour
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1	Verify containment pressure is within limits.	12 hours

NOTE – When opening or closing Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building Dome during Cycle 7 operation, time is allowed for Containment Annulus pressure equalization to occur.

3.6 CONTAINMENT SYSTEMS

3.6.15 Shield Building

LCO 3.6.15 The shield building shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION		REQUIRED ACTION		COMPLETION TIME
A.	Shield building inoperable.	A.1	Restore shield building to OPERABLE status.	24 hours
B.	----------NOTE---------- Annulus pressure requirement is not applicable during venting operations, required annulus entries, or Auxiliary Building isolations not exceeding 1 hour in duration. ---------- Annulus pressure not within limits.	B.1	Restore annulus pressure within limits.	8 hours
C.	Required Action and associated Completion Time not met.	C.1 <u>AND</u> C.2	Be in MODE 3. Be in MODE 5.	6 hours 36 hours

INSERT:
or while Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building dome is open until annulus pressure is restored.*

ADD to Bottom of page:

*1. The combined opening time of Penetrations 1-EQH-271-0010 or 1-EQH-271-0011 is limited to a total time of five hours a day, six days a week during Cycle 7 operation.
2. Penetrations 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building Dome may not be opened if in Action Conditions LCO 3.6.9A or 3.8.1B.
3. Upon opening Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building Dome, both EGTS control loops shall be placed in the A-Auto Stand-by position and returned to normal position following closure of penetration.

SURVEILLANCE REQUIREMENTS (continued)

ENCLOSURE 3

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
LICENSE AMENDMENT CHANGE WBN-TS-04-17

PROPOSED TECHNICAL SPECIFICATION CHANGES (REVISED)

I. AFFECTED PAGE LIST

3.6.15
3.6-40

II. REVISED PAGES

See attached.

3.6 CONTAINMENT SYSTEMS

3.6.4 Containment Pressure

LCO 3.6.4 Containment pressure shall be ≥ -0.1 and ≤ +0.3 psid relative to the annulus.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- When opening or closing Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building Dome during Cycle 7 operation, time is allowed for Containment Annulus pressure equalization to occur. ---------- Containment pressure not within limits.	A.1 Restore containment pressure to within limits.	1 hour
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1	Verify containment pressure is within limits.	12 hours

3.6 CONTAINMENT SYSTEMS

3.6.15 Shield Building

LCO 3.6.15 The Shield Building shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION		REQUIRED ACTION		COMPLETION TIME
A.	Shield building inoperable.	A.1	Restore shield building to OPERABLE status.	24 hours
B.	----------NOTE---------- Annulus pressure requirement is not applicable during venting operations, required annulus entries, or Auxiliary Building isolations not exceeding 1 hour in duration or while Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building dome is open until annulus pressure is restored.* ---------- Annulus pressure not within limits.	B.1	Restore annulus pressure within limits.	8 hours
C.	Required Action and associated Completion Time not met.	C.1 AND C.2	Be in MODE 3. Be in MODE 5.	6 hours 36 hours

*1. The combined opening time of Penetrations 1-EQH-271-0010 or 1-EQH-271-0011 is limited to a total time of five hours a day, six days a week during Cycle 7 operation.

2. Penetrations 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building Dome may not be opened if in Action Conditions LCO 3.6.9A or 3.8.1B.

3. Upon opening Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building Dome, both EGTS control loops shall be placed in the A-Auto Stand-by position and returned to normal position following closure of penetration.

ENCLOSURE 4

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
LICENSE AMENDMENT CHANGE WBN-TS-04-17

PROPOSED TECHNICAL SPECIFICATION BASES CHANGES

I. AFFECTED PAGE LIST

B 3.6-30
B 3.6.57
B 3.6-96

II. REVISED PAGES

See attached.

BASES

ACTIONS

A.1

When containment pressure is not within the limits of the LCO, it must be restored to within these limits within 1 hour. The Required Action is necessary to return operation to within the bounds of the containment analysis. The 1 hour Completion Time is consistent with the ACTIONS of LCO 3.6.1, "Containment," which requires that containment be restored to OPERABLE status within 1 hour. **When opening or closing Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building Dome, the differential pressure between the Containment and the Annulus may exceed the equal to or greater than -0.1 and equal to or less than +0.3 psid requirement. During this operation, time is allowed for Containment/Annulus pressure equalization to be re-established.**

ADD BOLDED

B.1 and B.2

If containment pressure cannot be restored to within limits within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.4.1

Verifying that containment pressure is within limits ($\geq$ -0.1 and $\leq$ +0.3 psid relative to the annulus, value does not account for instrument error, Ref. 3) ensures that plant operation remains within the limits assumed in the containment analysis. The 12 hour Frequency of this SR was developed based on operating experience related to trending of containment pressure variations during the applicable MODES. Furthermore, the 12 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal containment pressure condition.

REFERENCES

1. Watts Bar FSAR, Section 6.2.1, "Containment Functional Design."
2. Title 10, Code of Federal Regulations, Part 50, Appendix K, "ECCS Evaluation Models."
3. Watts Bar Drawing 1-47W605-242, "Electrical Tech Spec Compliance Tables."

BASES

APPLICABLE SAFETY ANALYSES (continued)

within 18 seconds (20 seconds from the initiating event.) This does not include 10 seconds for diesel generator startup. The analysis shows that the annulus pressure will rise to a value above the EGTS negative pressure control setpoint (become less negative) but will not go positive.

The EGTS satisfies Criterion 3 of the NRC Policy Statement.

LCO

In the event of a DBA, one EGTS train is required to provide the minimum particulate iodine removal assumed in the safety analysis. Two trains of the EGTS must be OPERABLE to ensure that at least one train will operate, assuming that the other train is disabled by a single active failure.

ADD → **See TS Bases 3.6.15, Shield Building, for additional information on EGTS.**

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could lead to fission product release to containment that leaks to the shield building. The large break LOCA, on which this system's design is based, is a full power event. Less severe LOCAs and leakage still require the system to be OPERABLE throughout these MODES. The probability and severity of a LOCA decrease as core power and Reactor Coolant System pressure decrease. With the reactor shut down, the probability of release of radioactivity resulting from such an accident is low.

In MODES 5 and 6, the probability and consequences of a DBA are low due to the pressure and temperature limitations in these MODES. Under these conditions, the Filtration System is not required to be OPERABLE (although one or more trains may be operating for other reasons, such as habitability during maintenance in the shield building annulus).

ACTIONS

A.1

With one EGTS train inoperable, the inoperable train must be restored to OPERABLE status within 7 days. The components in this degraded condition are capable of providing 100% of the iodine removal needs after a DBA. The 7 day Completion Time is based on consideration of such factors as the availability of the OPERABLE redundant EGTS train and the low probability of a DBA occurring during

(continued)

BASES

APPLICABILITY (continued)

required in MODES 1, 2, 3, and 4 when DBAs could release radioactive material to the containment atmosphere.

In MODES 5 and 6, the probability and consequences of these events are low due to the Reactor Coolant System temperature and pressure limitations in these MODES. Therefore, Shield Building OPERABILITY is not required in MODE 5 or 6.

ACTIONS

A.1

In the event Shield Building OPERABILITY is not maintained, Shield Building OPERABILITY must be restored within 24 hours. Twenty-four hours is a reasonable Completion Time considering the limited leakage design of containment and the low probability of a Design Basis Accident occurring during this time period.

B.1

With annulus pressure not within limits during normal operation, the initial conditions of the accident analysis are not met. The Completion Time of 8 hours is based on engineering judgment. A Note has been provided which makes the requirement to maintain the annulus pressure within limits not applicable during venting operations, required annulus entries, or Auxiliary Building isolations not exceeding 1 hour in duration **or while Penetration 1-EQH-271-0010 or 1-EQH-271-0011 in the Shield Building dome is open until annulus pressure is restored. Allowing one of the Shield Building dome penetrations to be open is based on provisions being in place to close it within fifteen minutes of LOCA initiation. Limiting the time for opening either of the penetrations to a combined total of five hours a day, six days a week keeps the amount of time the Shield Building is inoperable to approximately 60 percent of the eight hour completion time for LCO B.**

INSERT BOLDED

During normal plant operation, the Annulus is maintained at a negative pressure equal to or more negative than -5 inches water gauge (wg) by the Annulus Vacuum Control subsystem (non-safety related) of the Emergency Gas Treatment System (EGTS). One train (loop) of the Annulus Vacuum Control subsystem is operating (controls in A-Auto) and one train is in standby (controls in A-Auto Stand-by). Opening Shield Building dome Penetration 1-EQH-271-0010 or 1-EQH-271-0011 during Modes 1-4 will result in the Annulus pressure becoming more positive than the –5 inches wg required by Technical Specification 3.6.15. When the Annulus pressure becomes more positive than -0.812 inches wg, the EGTS control system perceives that the loop in A-Auto (i.e., the operating train) has failed. Control of Annulus pressure is then transferred to the loop in A-Auto Stand-by (i.e., the train in standby). Since the loop originally controlling Annulus pressure is perceived to have failed, only one control loop (the controller originally in A-Auto Stand-by) remains functional. If a single failure of the remaining control loop were to occur, this would result in both control loops failing and would render the safety-related portion of EGTS inoperable. To prevent this situation, operator action will be taken to place both EGTS control loops in the A-Auto Stand-by position when the annulus differential pressure is more positive than a -5 inches wg. If EGTS is subsequently initiated in this configuration, both trains of EGTS will start. Absent a single failure, one EGTS control loop train will manually be returned to the A-Auto position when the Annulus differential pressure becomes more

(continued)

BASES

ACTIONS

B.1 (continued)

negative than -0.812 inches wg. In addition, the remaining EGTS control loop train will be turned off, then immediately placed in the A-Auto Stand-by position (i.e., the associated isolation valves shall be closed by means of the MCR hand switch). This action is in the design and is necessary to restore the EGTS to the normal operational configuration and to prevent excess EGTS exhaust and Annulus in-leakage.

Additional assurance is administratively provided of support system operability by restricting the opening of Penetration 1-EQH-271-0010 or 1-EQH-271-0011 if in Actions for LCO 3.6.9.A *EGTS*, or 3.8.1.B, *AC Sources – Operating*. If a hatch is opened and one of the above systems becomes inoperable, the hatch will be closed.

C.1 and C.2

If the shield building cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.15.1

Verifying that shield building annulus negative pressure is within limit (equal to or more negative than -5 inches water gauge, value does not account for instrument error, Ref. 2) ensures that operation remains within the limit assumed in the containment analysis. The 12 hour Frequency of this SR was developed considering operating experience related to shield building annulus pressure variations and pressure instrument drift during the applicable MODES.

SR 3.6.15.2

Maintaining shield building OPERABILITY requires maintaining each door in the access opening closed, except when the access opening is being used for normal transient entry and exit. The 31 day Frequency of this SR is based on engineering judgment and is considered adequate in view of the other indications of door status that are available to the operator.

SR 3.6.15.3

This SR would give advance indication of gross deterioration of the concrete structural integrity of the shield building. The Frequency of this SR is the same as that of SR 3.6.1.1. The verification is done during shutdown.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.15.4

The EGTS is required to maintain a pressure equal to or more negative than -0.50 inches of water gauge ("wg) in the annulus at an elevation equivalent to the top of the Auxiliary Building. At elevations higher than the Auxiliary Building, the EGTS is required to maintain a pressure equal to or more negative than -0.25 "wg. The low pressure sense line for the pressure controller is located in the annulus at elevation 783. By verifying that the annulus pressure is equal to or more negative than -0.61 "wg at Elevation 783, the annulus pressurization requirements stated above are met.

The ability of a EGTS train with final flow $\geq$ 3600 and $\leq$ 4400 cfm to produce the required negative pressure during the test operation provides assurance that the building is adequately sealed. The negative pressure prevents leakage from the building, since outside air will be drawn in by the low pressure at a maximum rate $\leq$250 cfm. The 18 month Frequency on a STAGGERED TEST BASIS is consistent with Regulatory Guide 1.52 (Ref. 1) guidance for functional testing.

REFERENCES

1. Regulatory Guide 1.52, Revision 2, "Design, Testing and Maintenance Criteria for Post Accident Engineered-Safety-Feature Atmospheric Cleanup System Air Filtration and Adsorption Units of Light-Water Cooled Nuclear Power Plants."

2. Watts Bar Drawing 1-47W605-242, "Electrical Tech Spec Compliance Tables."