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FEB 2_ 1989

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

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328
	)	50-390
	)	50-391

TVA'S 90-DAY RESPONSE TO GENERIC LETTER 88-17, LOSS OF DECAY HEAT REMOVAL, FOR THE SEQUOYAH AND WATTS BAR NUCLEAR PLANTS

Enclosed is TVA's 90-day response to generic letter 88-17 as committed in my letter dated January 6, 1989. Enclosure 1 is TVA's response to the programmed enhancement recommendations of the generic letter for Sequoyah. Enclosure 2 is the response to both the expeditious and programmed enhancement recommendations in the generic letter for Watts Bar. As described in my January 6, 1989 letter, TVA's action in response to the generic letter at Watts Bar will be implemented in a single-phased program.

The commitments made in this submittal are delineated in enclosure 3. If there are any questions concerning this issue, please telephone M. K. Brandon at (615) 751-8076.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

Ralph H. Shell

for R. Gridley, Manager
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Enclosures
cc: See page 2

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ENCLOSURE 1

SEQUOYAH NUCLEAR PLANT
RESPONSE TO
PROGRAMMED ENHANCEMENTS
OF
GENERIC LETTER 88-17

ITEM 1. "Instrumentation

Provide reliable indication of parameters that describe the state of the RCS and the performance of systems normally used to cool the RCS for both normal and accident conditions. At a minimum, provide the following in the CR:

(a) two independent RCS level indications.

(b) at least two independent temperature measurements representative of the core exit whenever the RV head is located on top of the RV (We suggest that temperature indications be provided at all times.)

(c) the capability of continuously monitoring DHR system performance whenever a DHR system is being used for cooling the RCS

(d) visible and audible indications of abnormal conditions in temperature, level, and DHR system performance"

RESPONSE:

A. There are five methods presently being considered for monitoring reactor coolant system (RCS) level. A combination of two or more of these methods will be used to provide visible indications of the RCS level and at least one audible alarm of an abnormal level. The methods chosen will provide the accuracy required to ensure safe operation in the reduced inventory condition. The methods, and a brief description of each, are listed below:

(1) Site Gauge - A permanently installed site gauge with wide-range local indication. The range will extend from above the vessel flange to the bottom of the hot leg. The site gauge will be vented to containment atmosphere or the pressurizer. This system can provide very accurate level indication over a wide range, but it cannot provide an alarm function.

(2) Ultrasonic Level Measurement System (ULMS) - An ultrasonic device that measures the RCS level in the residual heat removal (RHR) suction hot leg. Its range will extend through the inside diameter of the hot leg. This device is in the developmental stage. This device would be permanently installed and would provide highly accurate indication and alarm functions in the main control room (MCR).

(3) Liquid Level System (LLS) - A resistance thermometer device (RTD)-based level instrument that measures the RCS level in a reactor thimble guide tube using a microprocessor to determine level based on heat transfer to the RCS. The range of the LLS will extend from above the top of the hot leg to below the bottom of the hot leg and will provide indication and alarm functions in the MCR. The thimble guide tube will be vented to the pressurizer or to the containment atmosphere. This device is in the developmental stage.

(4) Reactor Vessel Level Indication System (RVLIS) - The RCS level is inferred from the sensing of the differential pressure between the hot leg and the top of the reactor vessel head. However, this system will be referenced to the containment atmosphere during head disassembly.

(5) Differential Pressure (DP) Transmitter - A DP cell will be tapped into a thimble guide tube and vented to the pressurizer or containment atmosphere to measure the RCS level. This DP cell will have wide-range capabilities and will provide indication and alarm functions in the MCR.

Indication of water level in the reactor vessel while in a reduced inventory condition will be continuously provided. These instruments will provide adequate range and accuracy for controlling the RCS level.

B. Two independent temperature indications will be provided when the reactor vessel head is in place as described in my letter dated January 6, 1989, in response to the expeditious actions of this generic letter. Because of Sequoyah's design, the incore thermocouples must be removed just before the head can be removed, and there is not a practical way of providing this monitoring capability during the time that the incore thermocouple system will be disconnected. It should be noted that the time periods during which the RCS may be in a reduced inventory condition without this monitoring capability will be minimal.

C. Sequoyah currently has adequate RHR monitoring capabilities in the MCR with the RHR system controls. These parameters are the RHR pump flow rate, the pump motor current, and the pump discharge pressure. The feasibility and usefulness of providing an alarm function from one of these parameters are being evaluated. The results of this evaluation will be provided by August 1989. An alternative of proceduralizing enhanced monitoring in abnormal situations is also being considered.

D. Design changes will be implemented to provide alarm functions for high RCS temperatures and off-normal RCS levels during mid-loop operations and for visible indication of RCS level and temperature. Visible indication of RHR system performance already exists in the MCR.

A complete description of the instrumentation system developed as a part of this programmed enhancement will be provided by August 1989.

The selected permanent systems will be installed in unit 1 by the end of the unit 1 cycle 4 refueling outage currently scheduled to begin in April 1990 and in unit 2 by the end of the unit 2 cycle 4 refueling outage currently scheduled to begin in August 1990.

ITEM 2. "Procedures

Develop and implement procedures that cover reduced inventory operation and that provide an adequate basis for entry into a reduced inventory condition. These include:

(a) procedures that cover normal operation of the NSSS, the containment, and supporting systems under conditions for which cooling would normally be provided by DHR systems.

(b) procedures that cover emergency, abnormal, off-normal, or the equivalent operation of the NSSS, the containment, and supporting systems if an off-normal condition occurs while operating under conditions for which cooling would normally be provided by DHR systems.

(c) administrative controls that support and supplement the procedures in items (a), (b), and all other actions identified in this communication, as appropriate."

RESPONSE:

Normal and abnormal operating procedures and other administrative procedures have been written to address operation of the nuclear steam supply system (NSSS) when in a reduced RCS level condition. These procedures include guidance for controlling containment penetrations for the purpose of ensuring containment closure as well as for actions to be taken in an off-normal situation as discussed in the January 6, 1989 response to the expeditious actions of this generic letter. Future procedural enhancements will be made based on guidance provided by the Westinghouse Owners Group and the experience gained when using the procedure changes implemented as part of Sequoyah's expeditious actions.

ITEM 3. "Equipment

(a) assure that adequate operating, operable, and/or available equipment of high reliability is provided for cooling the RCS and for avoiding a loss of RCS cooling.

(b) maintain sufficient existing equipment in an operable or available status so as to mitigate loss of DHR or loss of RCS inventory should they occur. This should include at least one high pressure injection pump and one other system. The water addition rate capable of being provided by each equipment item should be at least sufficient to keep the core covered.

(c) provide adequate equipment for personnel communications that involve activities related to the RCS or systems necessary to maintain the RCS in a stable and controlled condition."

RESPONSE:

At least two additional sources of coolant will be kept operable or available when in a reduced inventory condition as discussed in the response to item 6 of the expeditious actions in TVA's response dated January 6, 1989. Other equipment such as communication devices will be made available as needed to support the commitments made to the recommendations in the expeditious actions.

ITEM 4. "Analyses

Conduct analyses to supplement existing information and develop a basis for procedures, instrumentation installation and response, and equipment/NSSS interactions and response. The analyses should encompass thermodynamic and physical (configuration) states to which the hardware can be subjected and should provide sufficient depth that the basis is developed. Emphasis should be placed upon obtaining a complete understanding of NSSS behavior under nonpower operation."

RESPONSE:

Analyses will be performed, as needed, to support the further procedure development for responding to abnormal situations and for providing guidance to determine alarm settings. In addition, an analysis will be performed to evaluate containment performance in a severe accident scenario initiated from a mid-loop condition. The need for hydrogen and containment pressure control systems will be evaluated. This analysis will be completed and implemented by May 3, 1990. Equipment will be kept available to control hydrogen burns and containment pressure if this analysis shows that there is a significant benefit provided by this equipment and the occurrence of the initiating event (i.e., loss of RHR during mid-loop) is not appreciably reduced by recommendations of this generic letter. The benefit provided by the upper containment coolers will also be evaluated. This analysis will be completed and implemented by May 3, 1990. If justified by this analysis, Sequoyah will not maintain a train of upper containment coolers available as committed in my January 6, 1989 letter. Additional analyses will be performed as needed to support the potential technical specification changes discussed below.

ITEM 5. "Technical Specifications

Technical specifications (TSs) that restrict or limit the safety benefit of the actions identified in this letter should be identified and appropriate changes should be submitted."

RESPONSE:

Two technical specification requirements have been identified as having the potential for conflicting with actions associated with the recommendations of the generic letter. These are:

A. The RHR interlock that is designed to isolate the RHR system from the RCS to protect the RHR system from overpressurization. Spurious actuation of this interlock would perturb the RHR system. Sequoyah is evaluating the deletion of this interlock and will request a technical specification change by January 15, 1990, if it is justified.

B. While there is no minimum RHR flow requirement for mode 5, there is a minimum flow specified for mode 6. The basis for this flow requirement in mode 6 is being investigated, and justification for reducing this flow rate is being sought. If appropriate, a technical specification change will be requested to reduce this flow rate by January 15, 1990.

In addition, TVA will systematically review the Sequoyah technical specifications to identify any other appropriate changes. If any are identified, a technical specification change will be requested by January 15, 1990.

ITEM 6. "RCS perturbations

Item (5) of the expeditious actions should be reexamined and operations refined as necessary to reasonably minimize the likelihood of loss of DHR."

RESPONSE:

Sequoyah will review its experience during the current unit 2 outage in light of the changes made to address the expeditious actions of the generic letter. Any additional procedure changes or evaluations that are needed for reliable and safe operation will be identified and implemented by May 3, 1990.

ENCLOSURE 2

WATTS BAR NUCLEAR PLANT
RESPONSE TO
EXPEDITIOUS ACTIONS AND PROGRAMMED ENHANCEMENTS
OF
GENERIC LETTER 88-17

INTRODUCTION

The following is TVA's response to the expeditious actions and programmed enhancement items of Generic Letter 88-17. Since Watts Bar is currently in the construction status, TVA's action in response to the generic letter will be implemented in a one-phase program. The program to implement the recommendations, as committed in the responses below, will be completed before fuel load at Watts Bar.

EXPEDITIOUS ACTIONS

ITEM 1. "Discuss the Diablo Canyon event, related events, lessons learned, and implications with appropriate plant personnel. Provide training shortly before entering a reduced inventory condition."

RESPONSE:

The training specified in the generic letter will be provided to the Watts Bar Operations personnel during the 1989 Requalification Training classes.

ITEM 2. "Implement procedures and administration controls that reasonably assure that containment closure will be achieved prior to the time at which a core uncovery could result from a loss of DHR coupled with an inability to initiate alternate cooling or addition of water to the RCS inventory. Containment closure procedures should include consideration of potential steam and radioactive material release from the RCS should closure activities extend into the time boiling takes place within the RCS. These procedures and administrative controls should be active and in use:

A. Prior to entering a reduced RCS inventory condition for NSSSs supplied by Combustion Engineering or Westinghouse, and

B. Prior to entering an RCS condition wherein the water level is lower than four inches below the top of the flow area of the hot legs at the junction of the hot legs to the RV for NSSSs supplied by Babcock and Wilcox.

and should apply whenever operating in those conditions. If such procedures and administrative controls are not operational, then either do not enter the applicable condition or maintain a closed containment."

RESPONSE:

Procedures and administrative controls will be developed and procedure changes will be made to reasonably assure containment closure can be achieved within the time at which a core uncovery could result from a loss of RHR coupled with an inability to initiate alternate cooling or addition of water to the RCS inventory. These procedures will establish a single containment barrier. The number of containment penetrations open during the reduced inventory phase of the outage will be held to the minimum needed to support necessary activities. Any work that involves an open penetration will have a predetermined action plan for reestablishing containment closure.

Any containment closure activity that requires work to be performed inside containment will be performed in an expeditious manner. If RHR cooling is lost, no cooling can be restored, and the duration of the containment closure activities is longer than the time to RCS boiling, then precautions will be taken to facilitate habitation in the expected environment. These precautions include the dispatching of radiological personnel to provide monitoring and guidance on appropriate radiation protection measures. An analysis will be performed to determine the need of additional measures such as upper containment coolers for maintaining habitability. Other closure activities that can be performed outside containment will be commenced on a schedule which will provide closure before core uncovery.

Watts Bar will be taking an exception to the containment closure requirements when the reactor vessel head is being reinstalled after refueling. The exception has been discussed with the Reactor Systems Branch of NRC. To minimize the potential of degradating the sealing system between the reactor vessel and its head, Westinghouse has recommended that the RCS level be lowered to four to five feet below the flange before reinstalling the head. This Westinghouse recommendation is applicable to those plants like Watts Bar that have an "inverted top hat" style of upper reactor internals. Since the definition for reduced inventory in the generic letter is three feet below the reactor vessel flange, the installation of the vessel head, in accordance with Westinghouse's recommendation, would put Watts Bar into a reduced inventory status. It is TVA's understanding that reduced inventory was defined as such to allow licensees to engage in head removal and installation activities without invoking the generic letter recommendations. Therefore for the purpose of reinstalling the vessel head after refueling, Watts Bar will not implement the above described administrative controls for containment closure as long as the RCS level does not drop below five feet of the reactor vessel flange.

ITEM 3. "Provide at least two independent, continuous temperature indications that are representative of the core exit conditions whenever the RCS is in a mid-loop condition and the reactor vessel head is located on top of the reactor vessel. Temperature indications should be periodically checked and recorded by an operator or automatically and continuously monitored and alarmed. Temperature monitoring should be performed either:

A. By an operator in the control room (CR), or

B. From a location outside of the containment building with provision for providing immediate temperature values to an operator in the CR if significant changes occur. Observations should be recorded at an interval no greater than 15 minutes during normal conditions."

RESPONSE:

At least two incore thermocouples will be maintained available at all times (except as noted below) when the RCS is in a reduced inventory condition and the reactor head is in place with irradiated fuel in the reactor vessel.

Monitoring of the core exit temperature will be procedurally controlled. The core exit temperature is accessible from the plant computer in the main control room (MCR). Abnormal temperature indications will be visually and audibly alarmed in the MCR. The options for providing this information are still under consideration, and an update will be provided by May 31, 1989. Temperature readings will be monitored more frequently during an off-normal situation.

Because the thermocouples at Watts Bar are connected through the vessel head, there will be time periods prior to head removal and after head replacement when incore temperature monitoring will not be available. The controlling procedure will be written to minimize the time that this condition will exist.

ITEM 4. "Provide at least two independent, continuous RCS water level indications whenever the RCS is in a reduced inventory condition. Water level indications should be periodically checked and recorded by an operator or automatically and continuously monitored and alarmed. Water level monitoring should be capable of being performed either:

A. By an operator in the CR, or

B. From a location other than the CR with provision for providing immediate water level values to an operator in the CR if significant changes occur. Observations should be recorded at an interval no greater than 15 minutes during normal conditions."

RESPONSE:

There are five methods presently being considered for monitoring RCS level. A combination of two or more of these methods will be used to provide visible and audible alarms of abnormal level. The methods chosen will provide the accuracy required to ensure safe operation in the reduced inventory condition. Since information is still being put together on the availability and effectiveness of some of these systems, an update on Watts Bar's plan to address this will be provided by May 31, 1989. The methods, and a brief description of each, are listed below:

A. Sight Gauge - A permanently installed sight gauge with wide range local indication. The range will extend from above the vessel flange to below the bottom of the hot leg. The sight gauge will be vented to the pressurizer or to containment atmosphere.

B. Ultrasonic Level Measurement System (ULMS) - An ultrasonic device which measures the RCS level in the RHR suction hot leg. Its range will extend through the inside diameter of the hot leg. This device is in the development stage. This device would be permanently installed and would provide highly accurate indication and alarm functions in the MCR.

C. Liquid Level System (LLS) - A resistance temperature detector (RTD)-based level instrument which measures the RCS level in a reactor thimble guide tube using a microprocessor to determine level based on heat transfer to the RCS. The range of the LLS will extend from above the top of the hot leg to below the bottom of the hot leg and will provide indication and alarm functions in the MCR. The thimble guide tube will be vented to the pressurizer or the containment atmosphere. This device is in the developmental stage.

D. Reactor Vessel Level Indication System (RVLIS) - The RCS level is inferred from the sensing of the differential pressure between the hot leg and the top of the reactor vessel head. RVLIS will provide alarm and indication functions in the MCR.

E. Differential Pressure (DP) Transmitter - A DP cell will be tapped into a thimble guide tube and vented to the pressurizer or containment atmosphere to measure the RCS level. This DP cell will have wide range capabilities and will provide indication and alarm functions in the MCR.

ITEM 5. "Implement procedures and administrative controls that generally avoid operations that deliberately or knowingly lead to perturbations to the RCS and/or to systems that are necessary to maintain the RCS in a stable and controlled condition while the RCS is in a reduced inventory condition.

If operations that could perturb the RCS or systems supporting the RCS must be conducted while in a reduced inventory condition, then additional measures should be taken to assure that the RCS will remain in a stable and controlled condition. Such additional measures include <u>both</u> prevention of loss of DHR <u>and</u> enhanced monitoring requirements to ensure timely response to a loss of DHR should such a loss occur."

RESPONSE:

Watts Bar utilizes a dedicated group that plans and schedules all activities. The procedures by which they plan and schedule these activities will be written to include precautions on scheduling activities that could lead to perturbations to the RCS or the RHR system while the RCS is in a reduced inventory condition. All work scheduled during the reduced inventory phase will be reviewed in light of the above concern. No work will be scheduled which could perturb the RCS or RHR systems, unless increased monitoring and enhanced communication is in place.

ITEM 6. "Provide at least two available or operable means of adding inventory to the RCS that are in addition to pumps that are a part of the normal DHR systems. These should include at least one high pressure injection pump. The water addition rate capable of being provided by each of the means should be at least sufficient to keep the core covered. Procedures for use of these systems during loss of DHR events should be provided. The path of water addition must be specified to assure the flow does not bypass the reactor vessel before exiting any opening in the RCS."

RESPONSE:

Two available or operable means will be provided for adding inventory to the RCS at all times when the RCS is in a reduced inventory condition. Administrative controls will be implemented to ensure the required means for adding inventory are maintained during a reduced inventory condition. Procedures for use of these systems in the event of a loss of RHR will be in place. Procedures will be revised to provide information on the use of these systems in the event of a loss of RHR.

Calculations will be performed to determine the flow rate necessary to make up the boiloff which would occur following loss of RHR with no additional means for cooling. TVA will verify that the means selected to provide this function can provide adequate flow to prevent core uncovery.

Two of the following six sources will be used to provide makeup. These sources are two Safety Injection pumps, two Centrifugal Charging pumps, gravity feed from the Refueling Water Storage Tank (RWST), or possibly some other source, provided that the flow from the selected source is adequate and a reasonably reliable flow path is available. The selection of these sources will depend on the scheduling of activities which would impact the availability of the source.

A safety analysis will be performed to justify having two injection pumps available and to determine the impact on the Watts Bar Final Safety Analysis Report and the Watts Bar Technical Specifications.

ITEM 7. ". . . Implement procedures and administrative controls that reasonably assure that all hot legs are not blocked simultaneously by nozzle dams unless a vent path is provided that is large enough to prevent pressurization of the upper plenum of the RV. See references 1 and 2."

RESPONSE:

Procedures will be written to require verification of adequate RCS hot side ventilation before installing each hot leg nozzle dam and to ensure administrative controls exist to maintain the vent path(s) open.

Anytime when nozzle dams are installed or there is an opening (greater than one square inch) in the cold side of the RCS, an adequate vent will be provided to prevent pressurization of the upper plenum of the reactor vessel. TVA will calculate the vent sizes needed to prevent upper plenum pressurization which could lead to premature core uncovery when a cold side opening exists in the RCS. Watts Bar may also consider evaluating the acceptability of taking credit for the reactor vessel head as a vent path when the head has been detensioned and nozzle dams are installed.

ITEM 8. ". . . Implement procedures and administrative controls that reasonably assure that all hot legs are not blocked simultaneously by closed stop valves unless a vent path is provided that is large enough to prevent pressurization of the RV upper plenum or unless the RCS configuration prevents RV water loss if RV pressurization should occur. Closing cold legs by nozzle dams does not meet this condition."

RESPONSE:

The Watts Bar nuclear steam supply system design does not employ loop stop valves; therefore, this recommendation is not applicable.

PROGRAMMED ENHANCEMENTS

ITEM 1. "Instrumentation

Provide reliable indication of parameters that describe the state of the RCS and the performance of systems normally used to cool the RCS for both normal and accident conditions. At a minimum, provide the following in the CR:

A. Two independent RCS level indications.

B. At least two independent temperature measurements representative of the core exit whenever the RV head is located on top of the RV. (We suggest that temperature indications be provided at all times.)

C. The capability of continuously monitoring DHR system performance whenever a DHR system is being used for cooling the RCS.

D. Visible and audible indications of abnormal conditions in temperature, level, and DHR system performance."

RESPONSE:

Watts Bar's planned actions for providing independent temperature and level indication is discussed in the responses to expeditious action item numbers 3 and 4, respectively. Because of the relatively long schedule available to Watts Bar for studying, designing, and implementing these systems, all recommendations provided in the generic letter will be considered in developing the permanent instrumentation to be used at Watts Bar.

In addition to the instrumentation discussed before, Watts Bar is evaluating an RHR monitoring system. The parameters under consideration to be monitored are:

A. RHR pump discharge flow

B. RHR pump motor current

C. RHR pump discharge pressure

D. RHR pump suction pressure

An update on Watts Bar's plan to address this issue will be provided by May 31, 1989.

ITEM 2. "Procedures

Develop and implement procedures that cover reduced inventory operation and that provide an adequate basis for entry into a reduced inventory condition. These include:

A. Procedures that cover normal operation of the NSSS, the containment, and supporting systems under conditions for which cooling would normally be provided by DHR systems.

B. Procedures that cover emergency, abnormal, off-normal, or the equivalent operation of the NSSS, the containment, and supporting systems if an off-normal condition occurs while operating under conditions for which cooling would normally be provided by DHR systems.

C. Administrative controls that support and supplement the procedures in items A, B, and all other actions identified in this communication, as appropriate."

RESPONSE:

Before fuel load, normal and abnormal operating procedures and other administrative procedures will be written to address operation of the NSSS when reducing the RCS level and during the mid-loop condition. These procedures will include guidance for controlling containment penetrations for the purpose of ensuring containment closure as well as for actions to be taken in an off-normal situation as discussed in the response to item 2 of the expeditious actions.

ITEM 3. "Equipment

A. Assure that adequate operating, operable, and/or available equipment of high reliability is provided for cooling the RCS and for avoiding a loss of RCS cooling.

B. Maintain sufficient existing equipment in an operable or available status so as to mitigate loss of DHR or loss of RCS inventory should they occur. This should include at least one high pressure injection pump and one other system. The water addition rate capable of being provided by each equipment item should be at least sufficient to keep the core covered.

C. Provide adequate equipment for personnel communications that involve activities related to the RCS or systems necessary to maintain the RCS in a stable and controlled condition."

RESPONSE:

At least two additional sources of coolant will be kept operable or available when in a reduced inventory condition as discussed in the response to item 6 of the expeditious actions. Other equipment will be made available as needed to support the commitments made to the recommendations in the expeditious actions.

ITEM 4. "Analyses

Conduct analyses to supplement existing information and develop a basis for procedures, instrumentation installation and response, and equipment/NSSS interactions and response. The analyses should encompass thermodynamic and physical (configuration) states to which the hardware can be subjected and should provide sufficient depth that the basis is developed. Emphasis should be placed upon obtaining a complete understanding of NSSS behavior under nonpower operation."

RESPONSE:

Analyses will be performed as needed to support the procedures developed to respond to abnormal situations, to provide guidance for determining alarm settings and actions for establishing containment closure. In addition, an analysis will be performed to evaluate containment performance in a severe accident scenario initiated from the mid-loop condition. The need for containment hydrogen and pressure control systems will be evaluated. If this analysis shows that there is a significant benefit provided by this equipment and the occurrence of initiating events (i.e., loss of RHR during mid-loop) is not appreciably reduced by recommendations of this generic letter, then equipment will be maintained in an available status to control hydrogen burns and containment pressure.

ITEM 5. "Technical Specifications

Technical specifications (TSs) that restrict or limit the safety benefit of the actions identified in this letter should be identified, and appropriate changes should be submitted."

RESPONSE:

Two technical specification requirements have been identified as having the potential for conflicting with actions associated with the recommendations of the generic letter. These are:

A. The RHR interlock which is designed to isolate the RHR system from the RCS to protect the RHR system from overpressurization. Spurious actuation of this interlock would perturb the RHR system. Watts Bar is evaluating the deletion of this interlock and will request a technical specification change if it is justified.

B. While there is no minimum RHR flow requirement for mode 5, there is a minimum flow of 2500 gpm for mode 6. The basis for this flow requirement in mode 6 is being investigated, and justification for reducing this flow rate is being sought. An analysis will be performed to letermine if the flow rate can be reduced to minimize the potential for pump cavitation. Watts Bar intends to request a technical specification change if the analysis supports a reduced flow rate.

It should also be noted that currently the technical specifications only allow for one CCP and one RHR pump to be operable when the RCS temperature is less than 350°F. This conflict can possibly be resolved by an administrative requirement. NRC is aware of this conflict and NRC should try to resolve it on a generic basis.

ITEM 6. "RCS Perturbations

Item 5 of the expeditious actions should be reexamined and operations refined as necessary to reasonably minimize the likelihood of loss of DHR."

RESPONSE:

The guidance provided by NRC with this recommendation will be considered in Watts Bar's implementation of the response to expeditious item number five. Since Watts Bar is implementing all actions associated with the generic letter in a single-phased, programmed manner, the reexamination requested in this item is not necessary.

ENCLOSURE 3

LIST OF COMMITMENTS
REGARDING GENERIC LETTER 88-17
FOR THE
SEQUOYAH AND WATTS BAR NUCLEAR PLANTS

Sequoyah Nuclear Plant

1. The feasibility and usefulness of providing an alarm function from one of the RHR system parameters are being evaluated. The results of this evaluation will be provided by August 1989.

2. Design changes will be implemented to provide at least two permanent and independent level indication systems and to provide alarm functions for high RCS temperatures and off-normal RCS levels during mid-loop operations. This will be completed by the end of the cycle 4 refueling outage for each unit.

3. A complete description of the instrumentation system developed as a part of the instrumentation programmed enhancement will be provided by August 1989.

4. An analysis will be performed to evaluate containment performance in a severe accident scenario initiated from a mid-loop condition. The need for hydrogen and containment pressure control systems will be evaluated. This analysis will be completed and implemented by May 3, 1990.

5. The benefit provided by the upper containment coolers will also be evaluated. If justified by this analysis, Sequoyah will not maintain a train of upper containment coolers available as committed in my January 6, 1989 letter. This analysis will be completed and implemented by May 3, 1990.

6. Sequoyah is evaluating the deletion of RHR closure interlock and will request a technical specification change by January 15, 1990, if it is justified.

7. If appropriate, a technical specification change will be requested by January 15, 1990, to reduce the minimum RHR flow rate.

8. TVA will systematically review the Sequoyah technical specifications to identify any other appropriate changes. If any are identified, a technical specification change will be requested by January 15, 1990.

9. Sequoyah will review its experience during the current unit 2 outage in light of the changes made to address the expeditious actions of the generic letter. Any additional procedure changes or evaluations that are needed for reliable and safe operation will be identified and implemented by May 3, 1990.

Watts Bar Nuclear Plant

1. The training specified in the generic letter will be provided to the Watts Bar Operations personnel during the 1989 Requalification Training classes.

2. Procedures and administrative controls will be developed and procedure changes will be made to reasonably assure containment closure can be achieved within the time at which a core uncovery could result from a loss of RHR coupled with an inability to initiate alternate cooling or addition of water to the RCS inventory. These procedures will establish a single containment barrier.

3. Any work that involves an open penetration will have predetermined action plan for reestablishing containment closure.

4. If RHR cooling is lost, no cooling can be restored, and the duration of the containment closure activities is longer than the time to RCS boiling, then precautions will be taken to facilitate habitation in the expected environment. These precautions include the dispatching of radiological personnel to provide monitoring and guidance on appropriate radiation protection measures.

5. An analysis will be performed to determine the need of additional measures such as upper containment coolers for maintaining habitability.

6. At least two incore thermocouples will be maintained available at all times (except as noted) when the RCS is in a reduced inventory condition and the reactor head is in place with irradiated fuel in the reactor vessel.

7. Monitoring of the core exit temperature will be procedurally controlled. Temperature readings will be monitored more frequently during an off-normal situation.

8. Abnormal temperature indications will be visually and audibly alarmed in Main Control Room (MCR). The options for providing this information are still under consideration and an update will be provided by May 31, 1989.

9. Because the thermocouples at Watts Bar are connected through the vessel head, there will be time periods prior to head removal and after head replacement when incore temperature monitoring will not be available. The controlling procedure will be written to minimize the time that this condition will exist.

10. There are five methods presently being considered for monitoring RCS level. Since information is still being put together on the availability and effectiveness of some of these systems, an update on Watts Bar's plan to address this will be provided by May 31, 1989.

11. The procedures by which they plan and schedule these activities will be written to include precautions on scheduling activities that could lead to perturbations to the RCS or the RHR system while the RCS is in a reduced inventory condition. All work scheduled during the reduced phase will be reviewed. No work will be scheduled which could perturb the RCS or RHR systems, unless increased monitoring and enhanced communication is in place.

12. Two available or operable means will be provided for adding inventory to the RCS at all times when the RCS is in a reduced inventory condition.

13. Administrative controls will be implemented to ensure the required means for adding inventory are maintained during a reduced inventory control.

14. Procedures will be revised to provide information on the use of these systems in the event of a loss of RHR.

15. Calculations will be performed to determine the flow rate necessary to make up the boil-off which would occur following loss of RHR which no additional means for cooling.

16. TVA will verify that the means selected to provide this function can provide adequate flow to prevent core uncovery.

17. A safety analysis will be performed to justify having two injection pumps available and to determine the impact on the Watts Bar Final Safety Analysis Report and the Watts Bar Technical Specifications.

18. Procedures will be written to require verification of adequate RCS hot side ventilation before installing each hot leg nozzle dam and to ensure administrative controls exist to maintain the vent path(s) open.

19. TVA will calculate the vent sizes needed to prevent upper plenum pressurization which could lead to premature core uncovery when a cold side opening exists in the RCS. Watts Bar may also consider evaluating the acceptability of taking credit for the reactor vessel head as a vent path when the head has been detensioned and nozzle dams are installed.

20. Watts Bar is evaluating an RHR monitoring system. An update on Watts Bar's plan to address this issue will be provided by May 31, 1989.

21. Before fuel load, normal and abnormal operating procedures and other administrative procedures will be written to address operation of the NSSS when reducing the RCS level and during the mid-loop condition.

22. Analyses will be performed as needed to support the procedures developed to respond to abnormal situations, to provide guidance for determining alarm settings, and actions for establishing containment closure.

23. An analysis will be performed to evaluate containment performance in a severe accident scenario initiated from the mid-loop condition.

24. The need for containment hydrogen and pressure control systems will be evaluated.

25. The RHR interlock which is designed to isolate the RHR system from the RCS to protect the RHR system from overpressurization. Spurious actuation of this interlock would perturb the RHR system. Watts Bar is evaluating the deletion of this interlock and will request a technical specification change if it is justified.

26. An analysis will be performed to determine if the flow rate can be reduced to minimize the potential for pump cavitation. Watts Bar intends to request a technical specification change if the analysis supports a reduced flow rate.