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Constellation Energy
Generation Group

November 21, 2005

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

ATTENTION: Document Control Desk

SUBJECT: **R.E. Ginna Nuclear Power Plant**
Docket No. 50-244

Response to Requests for Additional Information Regarding Main Feedwater Isolation Valves

By letter dated April 29, 2005, as supplemented on July 1, 2005 (Agency wide Documents Access and Management System Accession Nos. ML051260236 and ML051920360, respectively), R.E. Ginna Nuclear Power Plant, LLC (the licensee) submitted an application to amend the technical specifications (TSs) for the R.E. Ginna Nuclear Power Plant (Ginna). Specifically, the licensee proposed changes that would allow the use of the main feedwater isolation valves (MFIVs), in lieu of the main feedwater pump discharge valves, to provide isolation to the steam generators in the event of a steam line break. To complete its review, by letter dated October 19, 2005, (TAC NO. MC6857), the Nuclear Regulatory Commission (NRC) staff requested additional information. Attachment I contains the NRC's questions and Ginna's response. The responses do not include any new regulatory commitments.

If you have any questions, please contact George Wrobel at (585) 771-3535 or george.wrobel@constellation.com.

Very truly yours,

Mary G. Korsnick

Mary G. Korsnick

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STATE OF NEW YORK :
: TO WIT:
COUNTY OF WAYNE :

I, Mary G. Korsnick, being duly sworn, state that I am Vice President – R.E. Ginna Nuclear Power Plant, LLC (Ginna LLC), and that I am duly authorized to execute and file this response on behalf of Ginna LLC. To the best of my knowledge and belief, the statements contained in this document are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other Ginna LLC employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.

Mary G. Korsnick

Subscribed and sworn before me, a Notary Public in and for the State of New York and County of MONROE, this 21 day of November, 2005.

WITNESS my Hand and Notarial Seal: Sharon L. Miller
Notary Public

My Commission Expires:
12-21-06

SHARON L. MILLER
Notary Public, State of New York
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Commission Expires December 21, 2006

Attachments

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Attachment 1

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING MAIN FEEDWATER ISOLATION VALVES

1. In its discussion responding to question 1 of Section 5.1, "No Significant Hazards Consideration," the licensee states that "[t]he proposed changes cannot affect the probability of an accident occurring since they reflect a change in plant design consistent with current design which is not an accident initiator." The NRC staff understands that the proposed modification adds automatic air-operated actuators to the manual block valves that isolate main feedwater. These actuators would be designed to fail closed, shutting the valves. Therefore, failure of this added equipment could cause a loss of feedwater event.

   Explain how the proposed change would not increase the probability of a loss of feedwater event.

   Response:

   It is recognized that the modifications to the main feedwater system (e.g., changes to the Condensate Booster Pump and Main Feedwater Pump motors and impellers, reduced frictional pressure drop across the Feedwater Regulating Valves, addition of a fail-closed actuator into the feedwater line where a normally open manual valve existed, etc.) could cause some increase in the frequency of a loss of feedwater event. The statement that, "[t]he proposed changes cannot affect the probability of an accident occurring since they reflect a change in plant design consistent with current design which is not an accident initiator" is intended to indicate that, in the context of the Ginna UFSAR analyses, the loss of feedwater event will remain a Moderate Frequency Event. The qualitative probability of a loss of feedwater event, which is the Licensing Basis, will not change, even given the minor increase in loss of feedwater frequency associated with power uprate. Thus, the loss of feedwater event remains a Moderate Frequency Event as presently analyzed.

   The impact of the change in the frequency of a loss of feedwater event is evaluated in Section 2.13 of the submittal, which contains the risk evaluation of the EPU. Section 2.13.1.2.1.1.4 assesses transient initiators to determine what component or system changes could impact the likelihood of a reactor trip. As discussed under the "Main Feedwater" heading of section 2.13.1.2.1.1.4, and shown in table 2.13-5, the loss of main feedwater initiating event was increased to account for all changes to the main feedwater system. With these changes included, the risk evaluation concluded that the extended power uprate poses a small and acceptable risk based on Regulatory Guide 1.174 Category II criteria (see Section 2.13.1.2.6 of the submittal).

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2. Discuss the qualification of the structural capability of the MFIVs to perform their new safety function.

   Response:

   The specified safety function of the FWIVs is to isolate feedwater in the event of a steam line break inside containment. The Feedwater piping system containing these valves is Seismic Category 1. The new actuators have been procured Seismic Category 1. The valve manufacturer will provide a qualification analysis of the valve evaluating the loads associated with the new actuator. The actuator manufacturer will provide a seismic qualification analysis for the actuator. The piping system is being reanalyzed for new loads associated with the actuator. The only specified safety related active function for the valves is to close in the event of a steam line break inside containment. Load combinations used for design are consistent with the Ginna licensing basis, as previously reviewed by the NRC in conjunction with Bulletins 79-04 and 79-12 as well as SEP topic III-7.B.

3. Discuss the calculation of the thrust necessary to operate the MFIVs under the pressure and flow conditions for their new safety function.

   Response:

   The thrust necessary to operate the MFIVs has been calculated by the valve manufacturer based upon the worst case differential pressure and flow conditions provided in the specification of 450 psid and 8,000,000 lbs/hr. The manufacturer determines required thrusts to overcome friction based upon industry experience, and to overcome the pressure and forces due to flow acting on the valve plug and stem. The specified differential pressure of 450 psid is selected consistent with the differential pressure for the Feedwater Pump Discharge valves which presently are credited to perform this isolation function. This differential pressure bounds the worst case condition for the design event of a faulted steam generator at atmospheric pressure and pump shutoff head for the Condensate Pumps. Consistent with the current licensing basis, it is assumed that the SI signal which initiates the valve closure trips the Feedwater Pumps and that the Condensate Booster Pumps trip, as designed, due to high Condensate Header Pressure. The 8,000,000 lb/hr flow rate assumes that MSIV closure stops all flow to the intact steam generator and all feedwater flow is to the faulted Steam Generator through one FWIV.

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4. Discuss the qualification of the actuators to be installed on the MFIVs to perform the new safety function.

   Response:

   The valve actuators will be certified in accordance with the criteria described in 10CRF50 appendix B by the actuator manufacturer to be capable to perform their specified function. The manufacturer, Hiller, has many years of experience providing Safety Related Air Actuators for use in the US nuclear industry. The actuators themselves and the associated pilot valves and solenoid valves, etc. will be procured safety related and are selected based on historical reliable performance. The actuators will be installed using safety related work control documents by qualified individuals, including vendor representatives from both the valve and actuator manufacturers, as needed. The Intermediate Building where these valves are located will not experience a harsh environment during the steam line break inside containment for which these valves are credited. Thus, these valves are not required to operate in a harsh environment. Appropriate preventive maintenance will be applied to the valves to ensure reliable operation. The valves will be periodically tested in accordance with Technical Specifications and corresponding ASME Inservice Testing Program.

5. Discuss the monitoring and surveillance of the performance of the MFIVs as part of the Inservice Testing Program at Ginna.

   Response:

   The valves will be stroke time tested and position indication verified during Cold Shutdown in accordance with the IST Program. The valves will be included in the Air Operated Valve Program and base-lined and monitored for degradation to ensure reliable performance.

6. Describe the control room alarms that are being provided to alert the operators that the air pressure in the MFIV accumulators is low? At the low air pressure value, will the MFIV still be able to perform its safety function (close-open-close)? Discuss the reason for not including a TS surveillance requirement for the accumulator air pressure.

   Response:

   There will be two alarms, both set at a pressure such that the valve will be capable to perform its close function. The first alarm (Lo) will indicate a slow leak condition and allow operators to take action. The second alarm (Lo Lo) will indicate that pressure is critically low and that the valve function is in jeopardy. A lo-lo alarm will initiate entry into the Technical Specification Action Statement for an inoperable valve. The alarm functions are the reason that a Technical Specification Surveillance in not required. Daily rounds will include recording tank pressure such that a degrading condition would be identified. The tank is sized to accommodate a close-open-close cycle; however, the safety function is to close only. Procedures will include precautions stating that the valve should not be opened, if closed, if an air pressure alarm is in.

7. Items (e) and (f) in Section 2.0, "Proposed Changes," in the April 29 application, what are the safety and operational implications of closing an MFIV in compliance with proposed TS 3.7.3, Required Actions A.1 and A.2?

   Response:

   The operational implications of closing one of the MFIVs will require an orderly reduction in power and shutdown to Mode 3 where Steam Generator inventory is maintained by Auxiliary Feedwater. The safety implications of closing an MFIV is that the valve is in its safe position (closed) and will not be required to change state in order to perform its specified function of isolating feedwater flow to containment in the event of a postulated steam line break in containment.

8. The proposed change to TS 3.7.3, Required Action A.1 requires that the MFIVs be closed or isolated if one or more MFIVs is inoperable. Describe how the isolation would be accomplished and the effect on plant operation?

   Response:

   An orderly shutdown will commence, and once the steam generator on the affected train is being supplied Auxiliary Feedwater sufficient to maintain level, the valve will be isolated.

9. Will the function of the auxiliary feedwater (AFW) system be affected by the proposed change to main feedwater line isolation? If so, describe how it is affected.

   Response:

   There will be no impact to the function of the Auxiliary Feedwater System. A check valve is located in each line immediately upstream of the isolation valve and the Auxiliary Feed line connections. Presently, when Auxiliary Feedwater is in service, the check valve is closed. If the FWIV is open, the configuration is equivalent to the current configuration, if the FWIV is closed, the flow path for Auxiliary Feedwater is not impacted since the FWIV and check valve are in series.

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING MAIN FEEDWATER ISOLATION VALVES

10. Discuss how the proposed change will affect the containment isolation of the feedwater lines. What valves in the feedwater lines are containment isolation valves?

    Response:

    The containment isolation boundary does not change. The check valves described in item #9 are designated as the containment isolation valves. The piping, including the subject FWIVs, between the check valves and the containment, is considered part of the containment boundary.

11. As discussed in Section 4.2of Enclosure 1 to the July 1, 2005, letter, provide the steam generator nominal level at the power levels at which the steam line break accident is analyzed (i.e., 0%, 30%, 70%, 100%) to verify that the 52% nominal narrow range span for steam generator level is conservative.

    Response:

    As stated in Section 4.2 of Enclosure 1, the nominal SG level is 52% narrow range span (NRS) at all power levels. However, the nominal level was not used in the steamline break mass/energy release inside containment analysis. As noted in Section 4.2 of Enclosure 1, a measurement uncertainty and measurement bias were considered, resulting in an initial level of 60% NRS for all power levels. This is conservative because it maximizes the initial SG water inventory, which directly leads to a higher steam release to the containment.

12. What is the peak containment temperature for the limiting main steam line break accident? What is the effect of the proposed changes on environmental qualification of equipment within the containment?

    Response:

    The limiting containment pressure case (vital bus failure initiated from 70% power) results in a peak containment air temperature of 354°F. However, as described in UFSAR Section 3.11.3.1.2 SLB temperatures, although calculated to be higher than those from a LOCA, are not the basis for environmental qualification of equipment at Ginna. This is due to the lower heat transfer coefficient for superheated steam and the relatively short duration of the event.

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13. Describe how feedwater flow is assumed to vary with MFRV or FWIV closure.

    Response:

    MFRV or FWIV closure will terminate all pumped main feedwater addition to the faulted SG. The closure of the faulted loop MFRV is credited after a 2 second delay and a 10 second valve stroke time. The closure of the MFIV is credited after a 2 second delay and a 30 second valve stroke time. The MFIV is only credited when the MFRV is postulated to fail open. The faulted loop MFRV or FWIV is assumed to be fully open until it instantly closes at the end of the valve stroke time. However, the MFW flowrate does decrease due to the trip of the main feedwater pumps.

    The MFRV on the intact loop is assumed to close at the time the closure signal is generated with no delays. This is conservative because it forces more MFW to the faulted SG.

14. TS Figure B 3.7.3-1 shows bypass valves associated with the MFIVs. Explain why there is no CONDITION associated with the ACTIONS for TS 3.7.3 for the MFIV bypass valves similar to CONDITION C for inoperable MFRV bypass valves.

    Response:

    These 1" NPS valves are manual valves maintained closed during normal operations and would be opened only for maintenance purposes. In the case of the MFRVs, the bypass valves are 4" NPS air operated regulating valves.

15. Verify that the MFRV modeling up to the reactor trip following a postulated main steam line break accident is as described in the Ginna Updated Final Safety Analysis Report (see page 49/334 of Revision 18).

    Response:
    The UFSAR description remains applicable, except the faulted loop MFRV is assumed to ramp fully open in 2 seconds rather than the 5 seconds described in the UFSAR.

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REGARDING MAIN FEEDWATER ISOLATION VALVES

16. For the mass and energy release portion of the main steam line break in the containment analysis:

    (a) Describe how reactor coolant system metal heat capacity is modeled in the main steam line break accident calculation.

    Response:

    Heat conductor nodes are defined in the RETRAN deck to model the energy input from the RCS metal as the coolant cools down. There are 16 heat conductors per loop and 3 more for the upper head and lower/upper plenum mixing volumes. The surface area and volume associated with the RCS metal is specified for each conductor.

    (b) Is manual operation assumed for the rod control system?

    Response:

    No rod control is assumed for this event. It is noteworthy that the SI setpoint that causes reactor trip is reached in the first 0.05 seconds of the event.

17. Describe how the analyses of the feedwater line break accident and other non-loss-of-coolant accidents are affected by the proposed change? The Bases for TS 3.7.3 of the Improved Standard TSs (see page B 3.7.3-2 in NUREG 1431, Revision 3) states that the design-basis for the MFIV is also influenced by the large main feedwater line break accident. Explain this in terms of the Ginna design basis.

    Response:

    The new MFIV provides an alternate means of isolating feedwater. As such, it can not have an adverse impact on any accident analysis. Following is a discussion of the non-LOCA analyses that model or assume feedwater isolation and the assumptions made.

    In the feedwater line break (core response) analysis, feedwater is conservatively assumed to be lost coincident with the break. Thus, feedwater isolation and the MFIV have no impact on the feedwater line break results.

    The steamline break (core response) analysis credits feedwater isolation to limit the cool down associated with the steamline break. In the steamline break analysis, no credit is taken for the faster acting main feedwater regulating valves (12 second closure time). Feedwater isolation is accomplished via the MFIVs with a closure delay of 32 seconds. Thus, it is conservative to model the new MFIVs rather than the existing main feedwater regulating valves.

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The only other non-LOCA event that models feedwater isolation is the feedwater malfunction event. However, feedwater isolation on high steam generator water level does not latch - the valves can reopen when the high level signal clears. Thus, the assumption that is made in the analysis is that the flow decreases just enough to hold the steam generator mass constant at essentially a full steam generator. This conservatively maintains heat transfer at the highest possible rate to exacerbate the resulting cooldown. Thus, this analysis is unaffected by the new MFIV.

With respect to the bases for TS 3.7.3, the statement on Page B 3.7.3-2 is correct. The valves need to close to limit the mass and energy delivered to the containment. The new MFIV does not render that statement incorrect but provides an alternate means of satisfying the statement. The containment response to a FWLB is bounded by the containment response to a SLB due to the temperature and quality of the discharge. Providing feedwater isolation to limit the mass and energy delivered to the containment during a FWLB ensures that the SLB remains bounding.

18. The Bases for TS 3.7.3 of the Improved Standard TSs (see pages B 3.7.3-3 and B3.7.3-4 in NUREG 1431, Revision 3) states that the 7-day verification that the MFIVs and MFRVs are closed or isolated is acceptable based on valve status indication in the control room and other administrative controls. Describe the indications of valve status that will be available in the Ginna control room? What administrative controls are relevant to verification of valve status?

    Response:

    Valve position indication and a control switch will be provided on the control board. The control switch indicates the closed or open position desired. The position indication lights indicate actual valve position. When a valve is closed in accordance with a TS Action statement, administrative controls are applied to the control switch to control the status of the valve.