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Constellation Energy
Generation Group

March 24, 2006

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 BOP Systems Questions Discussed on March 2, 2006 Conference Call

By letter dated July 7, 2005, as supplemented by letters dated August 15 and September 30, 2005, R.E. Ginna Nuclear Power Plant, LLC (Ginna LLC) submitted an application requesting authorization to increase the maximum steady-state thermal power level at the R.E. Ginna Nuclear Power Plant from 1520 megawatts thermal (MWt) to 1775 MWt.

The purpose of this letter is to provide formal documentation of any outstanding requests received to date as well as our response. Our responses are contained in Attachment 1.

Attachment 1 contains the questions and answers from a March 2, 2006 conference call regarding BOP Systems.

The responses include two new regulatory commitments.

- Incorporate power uprate licensing basis changes into the Updated Final Safety Analysis Report within six months of implementing uprate.
- Submit a license amendment request to revise plant Technical Specifications to limit the number of fuel assemblies stored in the pool to 1321 prior to the startup implementing uprate.

If you have any questions, please contact Robert Randall at (585) 771-3734 or Robert.Randall@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 24 day of March, 2006.

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
Registration No. 01MI6017755
Monroe County
Commission Expires December 21, 20 06

Attachments

Cc: S. J. Collins, NRC
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ATTACHMENT 1
QUESTIONS AND ANSWERS FROM MARCH 2, 2006 REGARDING BOP SYSTEMS

The BOP Branch has revised its questions in order to be more clear about what the specific issues are.

2.5.1.2.1 Internally Generated Missiles

NRC Question #1:

1. Identify any SSC's important to safety that could be impacted by missiles due to a failure of the high pressure air accumulator for the MFIV's, and explain why missiles do not pose a problem for these SSC's. Similarly, explain why the missiles from the main turbine do not pose a problem for SSC's important to safety.

Ginna Response:

The SSC's important to safety that could be impacted by missiles due to a failure of the high pressure air accumulator for the MFIVs include the Main Feedwater Lines, the Main Steam Lines, MSIVs, some Auxiliary Feedwater piping, associated piping supports, and the Containment Wall.

The high pressure air accumulators are passive components designed and built to ASME Section VIII as safety related components and are equipped with overpressure protection which will be tested in accordance with ASME XI. Therefore, catastrophic failure of an accumulator or attached tubing/components and associated missile generation is a highly unlikely event. Nonetheless, an evaluation of the effect of postulated HELBs from these accumulators has shown that they are bounded by previous evaluations.

The 200 gallon accumulators will normally operate at a pressure of approximately 342 psig. They have a finite amount of contained energy, as the makeup from Instrument Air is through air intensifiers which restrict flow. These new accumulators are located in the Intermediate Building in the proximity of Main Steam and Feedwater Lines containing significantly higher energy steam and feedwater with significantly greater available energy. These high energy lines have previously been evaluated with respect to generation of missiles (valve bonnets, hardware retaining bolts, relief valve parts, instrument wells) and susceptibility to missiles in the NRC Systematic Evaluation Program Topic III-4.C, Internally Generated Missiles – RE Ginna, dated 2/17/1982.

The conclusion of that review is that the Main Steam System, of the Main Feedwater System, the Auxiliary Feedwater System, and the Standby Auxiliary Feedwater System are capable of performing their design functions to deliver required feedwater to the Steam Generators to safely shutdown the plant, even considering, the effects of internally generated missiles.

Furthermore, the Safety Related Equipment required for safe shutdown is equipped with missile barriers for postulated tornado events which result in missiles in the Intermediate Building. These existing missile barriers are robust and will protect the safety related equipment for postulated missiles generated by the accumulators. The tornado missile analyses assumed design basis missiles of 1" Steel Rod weighing 8 lbs at a speed of 116 ft/s impacting equipment. As a result of the analysis in response to SEP Topic III-4.A, as part of the Structural Upgrade Program, the facility was modified to provide adequate tornado protection for those systems required to perform the safety functions. This analysis bounds any credible internally generated missile threats caused by the installation and physical location of these new accumulators.

A postulated internally generated missile could disable the new actuators; in that case, the redundant Feedwater Regulating Valve located in the Turbine Building could be relied upon to perform the isolation function, if necessary; and the AFW system or the SAFW System would be available to deliver the required feedwater. Furthermore, since the design function of these actuators is to isolate feedwater during a steam line break inside containment only, no internally generated missile is postulated for an event requiring these valves to close.

The probability and postulated trajectory of turbine generated missiles is not adversely affected by uprate. The acceptability of this arrangement was previously reviewed in SEP Topic III-4.B, "Turbine Missiles", February 19, 1982.

NRC Question #2:

2. Describe why fast-acting valves do not result in additional and/or more serious missile consequences (given the higher system flow rates). Similarly, explain why fast-acting valves do not affect the locations and consequences of postulated high energy pipe breaks.

Ginna Response:

These valves are not fast-acting (<2 sec stroke, per NUREG 1482, para 4.2.2). They have been designed to have a stroke time range of 10-25 seconds and have an analytical limit of 5-30 seconds. The low end of the range is intentionally set to prevent a waterhammer type event in the Feedwater system. Dynamic loads associated with a conservatively postulated 5 second closure of the FRVs have been analyzed and these piping/support stresses have been determined to be acceptable. Note that the modification includes upgrading several FW piping supports as a result of the piping analyses performed to evaluate this modification. Thus the new valve operations have no adverse effect on the postulated locations and consequences of High Energy Line Breaks are not impacted by the addition of the air actuators on the FWIVs.

2.5.4.1 Spent Fuel Pool Cooling System

NRC Question #3:

3. The SFP re-rack submittal indicated that there are two make-up sources each with a capacity that is greater than the spent fuel boil-off rate that could occur if all spent fuel pool cooling should be lost. Contrary to this, the EPU submittal indicates that the boil-off rate for a full core offload can exceed the makeup rate of one of the makeup sources. The licensee's response to RAI 1 (page 70), discussed why it was considered to be acceptable to start the off-load time while the alternate make-up source can't provide sufficient make-up flow for boil-off. However, this does not satisfy the existing licensing basis for spent fuel pool makeup capability. The licensee performs cycle-specific analysis before every full-core offload, and it is possible to delay the off-load time until the boil-off rate drops to below the make-up capability that exists, thereby maintaining the existing licensing basis capability. Alternatively, a change could be proposed to the spent fuel pool makeup capability, along with appropriate justification. Additional information is required to adequately address this issue.

Ginna Response:

The licensing basis (UFSAR) for Ginna will be updated consistent with the EPU LAR and subsequent RAI responses within six months of implementing the EPU.

NRC Question #4:

4. Because the licensee's evaluation for EPU is based upon the worst-case decay heat load that is generated from 1321 fuel assemblies and on-site dry cask storage will be used for the remaining (older) fuel assemblies, it is necessary revise the TS number of fuel assemblies that are allowed to be stored in the SFP to 1321 in order to be consistent with the analysis that has been completed.

Ginna Response:

Ginna will submit a LAR to revise the TS number of fuel assemblies that are allowed to be stored in the SFP to 1321 prior to the startup for EPU.

2.5.5.4 Condensate and Feedwater

NRC Question #5:

5. Substantial modifications to the condensate and feedwater system (CFS) are necessary in order to provide the required feedwater flow for EPU operation. Following EPU implementation, a trip of a condensate booster pump, feedwater pump, or feedwater heater drain pump could result in a total loss of feedwater flow and increased challenges to safety systems as a consequence of fluid flow instabilities. While various setpoint changes will be made to address this concern, the nature and extent of CFS modifications introduces substantial uncertainty in the analytical results. Consequently, it is necessary to demonstrate that the CFS will function as expected following the trip of a feedwater pump, a condensate booster pump, and a heater drain pump (each one taken individually). Accordingly, discuss how the transient test program will be modified to demonstrate acceptable performance of the CFS in this regard.

   In addressing our last question, in addition to discussing how the testing that is being done will be used to confirm the validity of their modeling and analysis of the condensate and feedwater system (CFS), it would help if the licensee would discuss what the worst-case scenario would be if the CFS does not work as expected during the loss of a condensate booster pump or heater drain pump, and to what extent data would be available from the event to enable the necessary setpoint adjustments to be made so that the reliability of the CFS will continue to be assured.

Ginna Response

EPU Overall Design Objective

An overriding design objective of the EPU was to maintain or improve overall plant reliability as compared to the pre-EPU condition. To that end, the condensate and feedwater systems (CFS) were modified to maintain the current operating configuration to the extent possible. As an example, the condensate booster pump (CBP) impellers and motors and main feedwater pump (MFP) impellers and motors are being replaced to increase pump capacity commensurate with the EPU. This will allow full power EPU operation with the same overall pump configuration as exists currently at full power. As a result of this, the plant response to pump trip transients will be very similar to the plant response experienced in the past. In addition, although the CFS protection and control settings are being optimized for the EPU operating condition, there are no new protective or control functions that are being implemented for EPU.

BOP Pump Reliability

One historical cause of pump trips is motor failure. Ginna has an ongoing inspection and maintenance program to maintain the reliable operation of BOP pump motors. As a result of this program the condensate (CNP) motors were replaced in 2005 and the heater drain pump (HDP) motors were replaced in 1996 and 2005. With these ongoing maintenance activities and the EPU modifications that will replace the MFP and CBP motors, the BOP pump motors will operate very reliably. The trip of one of these pumps will be an unlikely occurrence.

Testing to Validate the Model

A detailed thermal-hydraulic model of the CFS was developed for the EPU analysis. This model was benchmarked against system pressure drops and flow rates for the current plant operating conditions. Excellent agreement between the model output and actual plant data was obtained.

The thermal-hydraulic model of the CFS was then modified to represent the EPU condition by inserting the design pump curves for the pumps that will be modified. Factory testing of the new pump impellers will validate the fact that the design curves accurately represent impeller performance. The

Feed Regulating Valve (FRV) modeling was updated to reflect the valve replacements that will be undertaken for these valves for EPU. There is no other significant valve, component or piping modification to the CFS that will affect system performance. Consequently, there is high confidence that the EPU thermal-hydraulic model of the CFS accurately reflects the post-EPU performance.

The CFS thermal-hydraulic model was used to analyze numerous normal and off-normal EPU conditions, including the normal full power condition and conditions resulting from trips of the CNP, CBP, HDP and MFP. In addition, the expected consequential condition resulting from these pump trips was analyzed (after proper operation of automatic design features) as well as the condition that would result assuming failure of the automatic design features to operate. The results of this suite of analyses was used to establish the proper protection and control settings and provide operating procedure input for both normal and off-normal conditions, including pump trip scenarios.

One of the three new CBP was installed in the 2005 refueling outage. Post-modification testing of this new pump was performed during operation that demonstrated pump performance was as expected when compared to the CFS model predictions.

During the power escalation test program data will be taken for the BOP at various power levels to validate actual CFS performance as compared to predicted performance. If significant disagreements exist between actual test data and the predicted performance, this will be addressed either by adjustments to the model, or changes to the plant procedures or control settings.

In addition to the steady state testing discussed above, transient testing of the digital feedwater control system will be performed during the power escalation at both 30% and 100% power to confirm proper operation of feedwater control in response to a +/-5% change in steam generator level demand. Data from this test will be used to confirm the dynamic response of the CFS and digital feedwater control to a steam generator level transient.

Expected Response and Worst-Case Scenario

MFP Trip:

For a trip of the MFP at full power operators are directed to manually trip the reactor as recovery of the BOP in response to this transient is not expected. This procedure will not change from the pre-EPU condition to the post-EPU condition.

CBP Trip:

For a trip of the CBP the expected plant response is a decrease in CBP discharge pressure that will cause an auto-start of the standby CBP with no time delay. This function is not changing for EPU. With proper start of the standby CBP operators will see very little perturbation in plant operation. Assuming failure of the standby CBP to auto-start, the low pressure feedwater heater (LPFWH) bypass valve will open on a 10-second time delay to restore pressure to the MFP suction. This automatic LPFWH bypass function exists now, prior to EPU, except that the time delay setting is being adjusted to ten seconds from one second to assure standby CBP auto-start prior to LPFWH bypass. Post-maintenance testing (PMT) will be performed prior to EPU restart to verify the time delay setting. Should both automatic features fail to function after a CBP trip, operators would take manual action to reduce reactor power to restore suction pressure to the MFP. In the very unlikely scenario that both the automatic features fail to function and operators fail to take timely action, a manual or automatic reactor trip may occur as a result of reduced feedwater flow to the steam generators.

HDP Trip:

A trip of the HDP will cause a decrease in CNP discharge pressure due to the increased CNP flow to make up for the lost HDP flow. The expected plant response would be the auto-start of the standby CNP. This design function is not being modified for EPU. In addition, the LPFWH bypass valve will also automatically open to restore MFP suction pressure. With the proper functioning of these automatic design functions the plant would experience a controllable reactivity transient due to the reduction in feedwater temperature to the steam generator caused by the heater bypass. Operator manual action and/or automatic runback action to reduce reactor power (to 60%-70% power) will be required. Assuming failure of one or both of the automatic functions, additional rapid operator manual action would be required to reduce power. In the worst case a manual or automatic reactor trip may result.

CNP Trip:

For a trip of the CNP the expected plant response is a decrease in CNP discharge pressure that will cause an auto-start of the standby CNP with no time delay. With proper start of the standby CNP operators will see very little perturbation in plant operation. If the standby CNP fails to start rapid operator action would be required to reduce reactor power. In the worst case a manual or automatic reactor trip may result.

Summary of Why Pump Trip Testing is Not Required

The overall operating configuration of the CFS is not changing for EPU. The protection and control functions for the CFS are also not changing for EPU. Extensive modeling of the CFS has been performed to predict CFS performance at EPU conditions. This model has been benchmarked against pre-EPU CFS performance. All of the pump trip conditions have been analyzed including conditions that would result from failure of automatic functions. These results have been used to optimize protective and control settings and procedures. In addition, reliable operation of the CFS pumps will be ensured by the ongoing inspection and maintenance programs at Ginna. Trip testing of the CFS pumps was not performed for the original plant startup test program. As a result, transient testing for CFS pumps is not required for the Ginna EPU.