Maria Korsnick
Site Vice President

R.E. Ginna Nuclear Power Plant, LLC
1503 Lake Road
Ontario, New York 14519-9364
585.771.3494
585.771.3943 Fax
maria.korsnick@constellation.com

Constellation Energy
Generation Group

December 22, 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 Topics Described by Letter Dated November 10, 2005

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. To complete its review, by letter dated November 10, 2005, (TAC NO. MC7382), the Nuclear Regulatory Commission (NRC) staff requested additional information.

Attachment 1 contains the Ginna LLC response to the November 10th request for additional information. The response includes one new regulatory commitment; on, or before, May 1, 2006 Ginna will submit a license amendment request which will propose to revise the Technical Specification (TS) requirements related to steam generator tube integrity consistent with NRC-approved Revision 4 to Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-449, "Steam Generator Tube Integrity." The availability of this TS improvement was announced in the Federal Register on May 6, 2005 (70 FR 24126) as part of the consolidated line item improvement process (CLIIP).

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

A001

100456

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 22 day of DECEMBER, 2005.

WITNESS my Hand and Notarial Seal: Michalene A. Bunts
Notary Public

My Commission Expires:

MICHALENE A BUNTS
Notary Public, State of New York
Registration No. 01BU6018576
Monroe County
Commission Expires Jan 11, 2007

Attachments

Cc: S. J. Collins, NRC
P. D. Milano, NRC
Resident Inspector, NRC

Mr. Peter R. Smith
New York State Energy, Research, and Development Authority
17 Columbia Circle
Albany, NY 12203-6399

Mr. Paul Eddy
NYS Department of Public Service
3 Empire State Plaza, 10th Floor
Albany, NY 12223-1350

By letter to the Nuclear Regulatory Commission (NRC) dated July 7, 2005 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML051950123), as supplemented by letters dated August 15 and September 30, 2005 (ADAMS Nos. ML052310155 and ML052800223, respectively), R.E. Ginna Nuclear Power Plant, LLC submitted an application requesting authorization to increase the maximum steady-state thermal power level at the R.E. Ginna Nuclear Power Plant (Ginna) from 1520 megawatts thermal (MWt) to 1775 MWt, which is a 16.8 percent increase. This requested change is commonly referred to as an extended power uprate (EPU). To complete its review, by letter dated November 10, 2005, the NRC staff requested the following information:

PROTECTIVE COATING SYSTEMS (PAINTS) - ORGANIC MATERIALS

1. The Licensing Report (Attachments 5 and 7 to the July 7 applications for proprietary and non-proprietary versions) refers several times to "coating systems" inside the containment at Ginna. According to the temperature evaluation in Section 2.1.7.2.3, however, only one system was evaluated for compatibility (Carbozinc-11 primer and Phenoline 305 top coat). Are the evaluations bounding for other coating systems at EPU conditions?

   Response

   The Licensing Report Section 2.1.7.2.3 listed Carbozinc-11 primer and Phenoline 305 top coat as coatings compatible with post-accident conditions. These particular coatings were cited as examples, since they constitute the majority of Ginna in-containment applications by surface area. However, as noted in our December 1, 1998 response to Generic Letter 98-04, item (ii), the results of protective coatings evaluation showed that several inorganic zincs, modified phenolics, and epoxy coatings are resistant to the post-accident environment. These protective coatings comprise virtually all of the protective coatings used in the Ginna containment. The small quantities of unqualified coatings in the Ginna containment are currently accounted for as a factor in the debris source term in our sump blockage calculations, and are included in our post-EPU assessment discussed in 2. below.

   As noted in the Licensing Report, EPU post-accident conditions are not more severe than pre-EPU post-accident design basis conditions, except for radiation. Significant margin exists for the qualified radiation levels of 10^9 rads vs. the calculated post-accident levels of 10^7-10^8 rads.

2. On page 2.1.7-4, the Licensing Report states that clogging of containment emergency sumps is not "addressed as a power uprate issue in this report," and resolution is ongoing between the licensee and the NRC (see NRC Generic Letter 2004-02). Confirm that your resolution of the containment sump clogging issue is addressing EPU conditions.

   Response

   Ginna confirms that the site specific resolution of Generic Letter (GL) 2004-02 will address any adverse impact that EPU conditions have on containment sump clogging. The on-going Ginna engineering activities to address resolution of GL 2004-02 include a review of the EPU containment results for impact on debris generation calculations and proposed engineering solutions. This includes using EPU values for post-LOCA containment atmosphere pressure/temperature profiles, containment sump temperatures, water pH levels and containment radiation levels as design inputs required for the resolution of GL 2004-02.

3. In Section 2.1.7.1 on the Current Licensing Basis, the discussion refers to quality assurance requirements for "new coatings and coating configuration changes." Provide examples to explain the meaning of coating configuration changes. Are the evaluations for coating configuration changes bounding for EPU conditions?

   Response

   "New coatings and coating configuration changes" refers to the use of coatings not identical to the currently installed coatings. The exact formulation of the original plant paint and primer are no longer produced – however, comparable product lines are still available from Carboline. Ginna's QA program relative to these coatings is described in our December 1, 1998 response to GL 98-04, item (1), and is summarized herein:

   > Containment coatings are subject to the requirements of Ginna Station procedure GC-76.11, "Painting Application and Inspection". They are procured from a vendor with a quality assurance program meeting the applicable requirements of 10 CFR Part 50, App. B. Acceptance activities are conducted in accordance with ANSI N45.2 requirements relative to receipt inspection and source surveillance. Also, the vendor is subject to periodic Quality Control Procurement Audits.

> The specification of required technical and quality requirements, combined with appropriate acceptance activities, provide assurance that the coatings received are of the desired constitution.

EPU conditions are bounded by pre-EPU accident post-accident conditions except for radiation, where there is substantial margin to the 10^9 qualification testing levels.

4. Section 2.1.7.2.1 of the Licensing Report states that preventative actions are taken to remove and replace degraded paint, but it does not indicate how long degraded areas are allowed to remain in service before repair. Discuss your requirements for removing and replacing degraded paint, and any effects of EPU conditions on these requirements.

   Response

   Ginna Station personnel perform visual inspections inside containment during each refueling outage prior to containment closure, per Ginna Procedure A-3.1. Also, general conditions, including coating conditions, are observed during the VT-2 leakage examination of Class 1 components and piping prior to startup after each refueling outage and during the VT-2 leakage examination of Class II and III piping, supports, and attachments every period. General walkdowns by Operations, Performance Monitoring, Systems Engineering, Radiation Protection, and Maintenance personnel, as well crane inspections prior to refueling outages, ensure a general awareness of conditions by a variety of observers. If a localized area of degraded coating is identified, that area is evaluated and scheduled for repair or replacement, as necessary. Loose coatings are removed, though replacement of coatings is an evaluated future activity. As noted earlier, EPU conditions have virtually no effect on containment coating qualification parameters.

5. Section 6.1.2.9 of the Ginna Updated Final Safety Analysis Report (UFSAR), Revision 18, states that organic materials would generate insignificant quantities of organic gases and hydrogen under design-basis accident conditions. Has this evaluation been performed, and the same conclusion reached, for EPU conditions?

   Response

   EPU post-accident design basis conditions are bounded by the qualification testing levels used for both protective coatings and 10 CFR 50.49 EQ organic equipment, such as cables. As such, the same conclusion has been reached for EPU conditions.

FLOW-ACCELERATED CORROSION (FAC)

1. If a component is considered susceptible to FAC under EPU conditions but cannot be inspected, how will it be evaluated?

   Response

   Those components that are susceptible to Flow Accelerated Corrosion (FAC) under EPU but can not be inspected are analytically evaluated using EPRI CHECKWORKS Model Pass 2 Runs. The analytical predictions are then compared to actual wear rate results for actually inspected, usually adjacent, components which have the same geometry and fluid conditions. If the analytical results are conservative compared to the adjacent measured rates, they are used to trend the un-inspected component. However, if the analytical results are less conservative than the results for the adjacent component, the measured wear rate for the adjacent component are used to trend the un-inspected component. Additionally, if an opportunity where access to the component becomes available when the system is opened up, a remote internal visual inspection of the component would be considered to validate the inner surface conditions.

2. Describe a sample of the most recent repairs and replacements performed as a result of FAC. Include in the description: the component replaced, the type of degradation, actions to prevent recurrence, and how this experience was used to update the FAC program for existing and EPU conditions.

   Response

   An example of a recent FAC replacement / repair occurred during the 2005 Refueling Outage (RFO). During this RFO Ginna replaced piping on the extraction steam line to Feedwater Heater (FWHTR) 4B. The piping replaced was just upstream of the FWHTR 4B steam inlet nozzle. Based on previous inspection results and the extrapolation of erosion rate as predicted by the CHECWORKS Program, it was determined that the piping component should be replaced prior to start-up from the RFO. The degradation identified was localized erosion downstream of a piping weld joint. The degradation was the result of geometric conditions combined with the fluid velocity of the two-phase steam in the extraction piping. To prevent re-occurrence of the degradation mechanism, the original A106 carbon steel piping was replaced with chrome-moly piping material and the FWHTR 4B inlet nozzle was overlaid with 8018 (chrome-molly) rod material. Due to the conditions identified on the FWHTR 4B extraction steam piping, the corresponding piping on FWHTR 4A is scheduled to be replaced during the upcoming 2006 RFO.

3. On Page 2.1.8-5, the Licensing Report defines t_{min}. as "the calculated minimum allowable wall thickness." In the "Component Repair/Replacement" discussion on Page 2.1.8-8, a structural integrity evaluation is described for instances where the measured wall thickness (t_{meas}) is less than t_{min}. Evaluating a component in this condition appears to contradict the definition t_{min} as a minimum allowable wall thickness. In Electric Power Research Institute (EPRI) Report NSAC-202L-R2, suitability for continued service is based on a current wall thickness, acceptable wall thickness, and predicted wall thickness at the time of the next inspection (all at a given location). Clarify the definition of t_{min}, how it is determined, and how it is used in evaluating inspection results.

Response

The definition of t_{min} used on p. 2.1.8-5 is the calculated minimum allowable wall thickness as determine by the piping code. The value of t_{min} used is the larger of the code required minimum wall thickness for either bending or hoop stress as described in the first bullet on page 2.1.8-8. The following sentence on page 2.1.8-8,

> "The following factors are considered in the calculation of t_{min}:"

describes a conservative representation t_{min} calculation. This definition of t_{min} is not the code required t_{min}; it is actually the minimum acceptable wall thickness for the NDE inspection of the component. As such it is a value that is greater then the piping code t_{min}. The actual minimum value specified for the NDE inspection (t_{screen}) is the code t_{min} plus the predicted component wear for the operating time to the next refueling outage. Any measured thicknesses that are less than or equal to the NDE minimum allowable value (t_{screen}) results in the enty into the corrective action process and receives corresponding structural assessment as described on page 2.1.8-8 of the EPU Licensing Report. Therefore, the reference to t_{meas} less than t_{min} in the last bullet on page 2.1.8-8 of the Licensing Report is subject to misinterpretation since the reference should be a comparison between t_{meas} and t_{screen}.

4. According to Page 2.1.8-8 of the Licensing Report, if t_{meas} is less than t_{min} ,a structural integrity evaluation is performed on the component, and this structural evaluation is continued if the predicted minimum thickness is less than or equal to 87.5% and greater than 30% of nominal wall thickness. Describe these structural evaluations and the acceptance criteria.

Response

Typically the values of t_{min} used for components in a system are based on bounding assumptions. Therefore, for assessing the t_{meas} for a specific location, the component specific structural evaluation reviews actual component stresses. If t_{min} is based on bending stress, the actual bending stresses for the component may be lower than that assumed in the initial determination of t_{min}. Therefore, for these instances where a lower component specific value of t_{min} may be justified, repair or replacement of the component may be deferred to a later time. If the structural evaluation determines that a significant reduction of t_{min} due to the component calculated stress level can not be justified, the component would be either repaired or replaced. Although the structural evaluation could utilize alternate ASME code case requirements (N-480 and N-597) for assessing degraded components, these alternate ASME code cases have not been used to date by the Ginna Erosion/Corrosion Program.

5. Regarding the Small Bore Erosion/Corrosion (E/C) Program, Page 2.1.8-9 of the Licensing Report states the elements of the E/C are applicable to small bore piping with some exceptions. The same page also has a statement that the criteria for repair/replacement of piping are consistent with the EPRI NSAC-202L-R2 guidelines. Appendix A7.0 (Evaluating Inspection Results) of NSAC-202L-R2 notes that wear-rate predictions in small bore piping are unreliable if the operating conditions are not known and constant, and it recommends making repair/replacement decisions based on the inspection results for that outage. Since the Component Repair/Replacement section in the Licensing Report outlines a process and criteria based on wear-rate predictions, it is not clear that repair/replacement decisions for small bore piping are consistent with the EPRI guidelines. Clarify this aspect of your Small Bore E/C Program.

   Response

   The Ginna Small Bore (SB) components included in the scope of the Erosion/ Corrosion (E/C) Program are primarily based on a review of industry experience, Ginna specific operating experience, and the judgment of the Ginna E/C Engineer. Typically, 120 SB components are chosen for NDE examination every Refueling Outage. Measured thickness values can be used to determine SB component wear rates. Decisions to repair or replace these SB components are based solely on the measured wear rate data. Additionally, if a degraded SB component requiring replacement is identified, sections of the adjacent piping are replaced along with parallel SB lines. However, there are some SB components that are susceptible to FAC, and, are therefore included in the Ginna CHECWORKS model. For example the 1" piping components associated with the Moisture Separator Reheater (MSR) 4th Pass drain lines are part of the Ginna CHECWORKS database. For these components repair / replacement decisions are based on the measured data as well as the CHECWORKS predicted wear rates.

6. According to the E/C program description on Page 2.1.8-4 of the Licensing Report, piping with a nominal diameter less than 3/4 inch (other than service water piping) is excluded from the program. Explain the basis for this exclusion.

   Response

   In general plant piping and tubing less than 3/4" in size is excluded from the Small Bore (SB) Program since they do not create any safety or operational concerns that require them to be monitored. This exclusion is supported by inspections of opportunity and plant operating experience. As with the case of service water, accrued operating experience provides important data which is used to adjust inspection boundaries.

STEAM GENERATOR (SG) TUBE INSERVICE INSPECTION

1. The SG design criteria include requirements (see Appendix G to Part 50 of Title 10 of the *Code of Federal Regulations*, and American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code)) relating to fracture toughness. Confirm that the SG materials will have the required fracture toughness under EPU conditions.

   Response

   Ginna LLC had the replacement steam generator vendor perform a structural evaluation of the steam generators at EPU conditions. This evaluation, which used classical and finite-element analysis methods, concluded that the replacement steam generators will continue to satisfy ASME code structural requirements for Design, Test, and Level A, B, C, and D service conditions following EPU. The evaluation also concluded that the original analysis for non-ductile fracture remained valid since the impact of the EPU on the design conditions for the steam generators occurs at high temperatures where non-ductile fracture would not occur.

2. Confirm that the evaluation of the effect of EPU conditions on the SGs addresses the current condition of the SGs, such as tube plugs and any modifications to the as-built configuration.

   Response

   The evaluation of EPU conditions on the steam generators addressed the current condition of the steam generators. The evaluations were done assuming tube plugging between 0% and 10%. There is currently one (1) plugged tube in SGA and five (5) plugged tubes in SGB. Ginna LLC has not made modifications to the as-built configuration of the replacement steam generators

3. Since loose parts may affect tube integrity, discuss the presence of loose parts in the SGs, and if loose parts are present, discuss the evaluations to demonstrate that the parts will not compromise tube integrity for the period of time between inspections under the EPU conditions.

   Response

   Ginna LLC performs loose part inspections at the steam generator tubesheet elevation during outages in which steam generator maintenance is performed. There is one known loose part in SGB at this time which is firmly wedged between two peripheral tubes below the first lattice grid support. The object was discovered by ECT, although no wear was noted on either contacted tube. Attempts to remove the object during the 2005 refueling outage were unsuccessful and four (4) tubes were preventatively plugged.

On, or before, May 1, 2006 Ginna will be submitting a Technical Specification amendment request. The proposed amendment would revise the TS requirements related to steam generator tube integrity consistent with NRC-approved Revision 4 to Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-449, "Steam Generator Tube Integrity." The availability of this TS improvement was announced in the Federal Register on May 6, 2005 (70 FR 24126) as part of the consolidated line item improvement process (CLIIP).

The amended Technical Specifications will require that a Steam Generator Program be established in accordance with NEI 97-06 addressing steam generator tube integrity. This program will require that an operational assessment be performed to determine the acceptable operating interval to the next inspection due to all degradation mechanisms, including loose parts. Note that Ginna already has such a program in place.

The EPRI Steam Generator Management Project (SGMP) is taking a proactive approach to assessing the impact of loose parts since these are expected to be one of the major degradation mechanisms in replacement steam generators. The SGMP is currently funding a project to provide utilities with guidance on predicting wear damage from foreign objects in steam generators and a "foreign object handbook" is expected to be a 2006 deliverable

4. Confirm the 40% through-wall plugging limit for tubes remains appropriate for EPU conditions according to Regulatory Guide (RG) 1.121 analysis.

   Response

   Recent conservative calculations performed as part of steam generator degradation assessments have confirmed that the 40% through-wall plugging limit remains appropriate at current conditions based on a pressure difference equal to three (3) times the normal operating pressure differential. The EPU results in a net reduction in the pressure difference across the steam generator tubes at normal operating conditions since the steam pressure will increase. Since the tube material conditions and burst correlations used in these evaluations are quite conservative at both current and EPU conditions, the 40% through-wall plugging limit remains appropriate.

5. The NRC staff notes that Technical Specification 5.5.8.b permits tube sleeving in the replacement SGs. Confirm that the analysis previously submitted to support sleeving specifically addressed the replacement SGs, and provide the reference for this analysis. If the analysis did not address sleeving for the replacement SGs, discuss your plans to either remove the sleeving option from the TSs or submit the relevant analysis for staff review and approval (or the basis for why staff review and approval is not required).

Response

As stated in the answer to SG ISI RAI # 3 above, Ginna will be submitting a Technical Specification amendment related to steam generator tube integrity consistent with NRC-approved Revision 4 to Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-449, and "Steam Generator Tube Integrity."

The Technical Specification amendment request will remove references to sleeving. Ginna LLC has no plans to install sleeves in the replacement steam generators at this time.

6. Identify the material specifications for the SG closure bolting (e.g., handhole and manway studs), and confirm that the materials comply with Sections II and III of the ASME Code.

   Response

   All manway, handhole, and inspection port studs are made from SA-193 Gr. B7 material, which complies with Sections II and III of the ASME Boiler and Pressure Vessel Code.

7. Confirm that your evaluation has concluded the tube material will be compatible with the primary and secondary coolant at EPU conditions.

   Response

   The EPU evaluations were performed for a range of RCS hot and cold leg temperatures which bound the temperatures that are expected to be seen in service. The expected temperatures are also bounded by operating experience at other pressurized water reactor plants with Alloy 690TT tube material. No change in primary or secondary chemistry strategies are planned as part of the EPU.

   Therefore the Alloy 690TT tube material will be compatible with the primary and secondary coolant at EPU conditions.

8. The SG thermal-hydraulic, tube vibration, and wear analyses were performed for 0% and 10% tube plugging. Is 10% tube plugging equal to or greater than that assumed in your currently approved accident analyses?

   Response

   The currently approved accident analyses assume a steam generator tube plugging of 15%. The 10% tube plugging selected for the EPU evaluations was felt to be a conservative upper bound for end-of-life tube plugging based on current projections for Alloy 690TT tube material.

STEAM GENERATOR BLOWDOWN SYSTEM

1. According to Section 2.1.10.2.1 in the Licensing Report, the SG blowdown system is designed for periodic surge rate of up to 150 gallons per minute (gpm) for each SG, and that the anticipated blowdown flow under EPU conditions will be 40 to 100 gpm. Section 10.7.5.1 of the Ginna UFSAR, Revision 18, describes the ability to blow down both SGs through a single cross-tie when one of the flow control valves is under maintenance. This suggests that a flow rate through some components may be 80 to 200 gpm at EPU conditions. Clarify this aspect of the system, and confirm that EPU conditions for the SG blowdown system components remain bounded by design conditions during periods when blowdown from both SGs is routed through a single line.

   Response

   The portion of the Ginna SG blowdown system that is located outside containment was modified in the later 1980s and early 1990s to accommodate flows of up to 300 gpm per SG. Therefore, the SG blowdown system components located downstream of the cross-tie are within their design basis for total blowdown flows up to 200 gpm. Although the component design can accommodate this high flow rate when the cross-tie is open, the Ginna operating procedures require that the total blowdown flow should not exceed 60 gpm per SG when the SG blowdown cross-tie valve is open. Consequently, the maximum flow downstream of the cross-tie that would be expected to occur at EPU conditions is 120 gpm when the cross-tie is open.

2. Section 10.7.5.1 of the Ginna UFSAR, Revision 18, states the blowdown system is designed for a periodic surge rate of 150 gpm per SG. Section 10.7.5.3 of the U FSAR states that both SG blowdown lines are designed for a short-duration surge of 300 gpm. Clarify the apparent discrepancy between these surge-rate design values.

   Response

   The 300 gpm short duration surge capacity stated in UFSAR Section 10.7.5.3 applies only to the A loop. The SG blowdown system was modified in the late 1980s and early 1990s to provide short term surge capability of 300 gpm per SG. The SG piping and components outside containment and the SG A piping inside containment were modified to support this design flow; however, the modifications to the SG B piping inside containment were not implemented. This was based on a decision that the plant did not need to have 300 gpm surge capability. Therefore, the SG B blowdown piping is not designed to accommodate a short duration surge flow of 300gpm. A Condition Report has been prepared identifying this issue and a UFSAR Change Notice has been initiated to revise the UFSAR Section 10.7.5 description to be consistent with the existing design basis of the SG blowdown system.

Additionally, it is noted that although UFSAR Section 10.7.5.1 discusses a design blowdown surge rate of 150 gpm per SG; existing plant operating procedures limit the maximum SG blowdown flow for any mode of operation to 125 gpm per SG. Regardless, for all possible modes of operation, the EPU will not cause actual SG blowdown flows to be any higher than the flows that have been used historically at Ginna for the existing rated power level. Maximum continuous SG flow at EPU for normal plant operation would not exceed 100 gpm per SG blowdown which is the existing design basis flow for the Ginna SG blowdown system.