October 25, 2005

Mrs. Mary G. Korsnick
Vice President R.E. Ginna Nuclear Power Plant
R.E. Ginna Nuclear Power Plant, LLC
1503 Lake Road
Ontario, NY 14519

SUBJECT: R.E. GINNA NUCLEAR POWER PLANT - REQUEST FOR ADDITIONAL INFORMATION RE: EXTENDED POWER UPRATE LICENSE AMENDMENT (TAC NO. MC7382)

Dear Mrs. Korsnick:

By letter to the Nuclear Regulatory Commission (NRC) dated July 7, 2005, as supplemented by letters dated August 15 and September 30, 2005, 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 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).

The NRC staff is reviewing your submittal and has determined that additional information is required to complete the EPU review. The specific information requested is addressed in the enclosure to this letter, and was sent to your staff by e-mail on October 5, 2005. During a telephone discussion with your staff on October 5, 2005, it was agreed that your response would be provided 45 days from the date of this letter. In addition to this request, the NRC staff is scheduled to issue a second set of questions concerning the EPU in mid-November.

The NRC staff considers that timely responses to requests for additional information help ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources. If circumstances result in the need to revise the requested response date, please contact John Stang at (301) 415-1345.

Sincerely,

/RA/

Patrick D. Milano, Sr. Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-244

Enclosure: As requested

cc w/encl: See next page

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Enclosure: As requested
cc w/encl: See next page
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R.E. Ginna Nuclear Power Plant

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REQUEST FOR ADDITIONAL INFORMATION

REGARDING THE EXTENDED POWER UPRATE LICENSE AMENDMENT

R.E. GINNA NUCLEAR POWER PLANT

DOCKET NO. 50-244

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 (the licensee) 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, the NRC staff requests the following information:

FIRE PROTECTION

1. NRR RS-001, Rev. 0, "Review Standard for Extended Power Uprates," Attachment 1 to Matrix 5, "Supplemental Fire Protection Review Criteria, Plant Systems," states that "...power uprates typically result in increases in decay heat generation following plant trips. These increases in decay heat usually do not affect the elements of a fire protection program related to (1) administrative controls, (2) fire suppression and detection systems, (3) fire barriers, (4) fire protection responsibilities of plant personnel, and (5) procedures and resources necessary for the repair of systems required to achieve and maintain cold shutdown. In addition, an increase in decay heat will usually not result in an increase in the potential for a radiological release resulting from a fire. However, the licensee's application should confirm that these elements are not impacted by the extended power uprate..."

   The NRC staff notes that Section 2.5.1.4, "Fire Protection," of Attachment 5 (licensing report) to the Ginna amendment application does not address item (5) above, and it does not address the subject concerning radiological release. Provide a discussion that addresses these two items.

2. Attachment 1 to Matrix 5 of NRR RS-001 states that "...where licensees rely on less than full capability systems for fire events..., the licensee should provide specific analyses for fire events that demonstrate that (1) fuel integrity is maintained by demonstrating that the fuel design limits are not exceeded and (2) there are no adverse consequences on the reactor pressure vessel integrity or the attached piping."

   The NRC staff notes that Section 2.5.1.4 of the licensing report does not address these two items. Provide a discussion that addresses these two items.

Enclosure

3. The NRC staff notes that discussion in Section 2.5.1.4 of the licensing report is identical to Section 2.7.1.1, “Fire Protection.” Explain why they are identical. Also, Section 2.7.1.1 is not listed in the Table of Contents.

HEALTH PHYSICS

1. On page 2.10.1-6, the licensing report states that the “radiation level near the condensate polishing system may increase slightly greater than the percentage of EPU due to the increased steam flow rate and moisture carryover fraction associated with EPU.” Using the expected increase in steam flow rates and moisture carryover fractions, calculate the expected percentage increase in dose rates near the condensate polishing system and describe any additional controls that may need to be implemented in this area following EPU to control personnel access for ALARA purposes. Describe any other plant areas which may experience radiation level increases greater than the percentage of the EPU and describe any additional controls to limit personnel access to these areas following an EPU.

2. On page 2.10.1-7, the licensing report states that radiation dose rates in the areas near the reactor vessel are expected to increase by a factor of approximately 1.19 due to the proposed EPU. The report also states that the plant shield design is based on a reactor power of 1520 MWt and the power following the proposed EPU will be 1811 MWt, which is greater than the power level on which the original plant shielding design was based. The licensing report further states, under the subsection “Reactor Primary Shield,” that the “Ginna staff reviewed the fluence calculations and confirmed that the original design calculations remain bounding for the EPU conditions.” Explain how the original design calculations can remain bounding when the proposed new power level of 1811 MWt is 19 percent higher than the plant power level on which the original plant shielding design was based.

   The licensing report states that Ginna will continue the use of low leakage fuel management. Discuss what effect the use of low leakage fuel management will have on the estimated dose rates adjacent to the reactor vessel/primary wall following the proposed EPU.

3. On page 2.10.1-7, the licensing report states that the secondary shield was designed to limit the full power dose rate outside the containment building to less than 1 mr/hr. It further states that the current secondary shield is determined to be adequate for continued safe operation following the EPU. State how you expect the average dose rate levels measured outside the containment building at full power following EPU to compare with the current average measured dose rate levels at full power.

4. On page 2.10.1-7, the licensing report states that the current spent fuel shielding is determined adequate for continued safe operation following the EPU. Discuss any effects that the storage of the higher irradiated (due to the longer fuel cycle and increased core flux) spent fuel assemblies in the spent fuel pool (SFP) may have on dose rates in accessible areas adjacent to the sides or bottom of the SFP. Discuss any plans that you may have (such as shuffling of spent fuel assemblies in the SFP so that the older assemblies are located at the perimeter of the SFP) to minimize the effects of

the storage of the higher irradiated spent fuel assemblies in the SFP on dose rates in areas surrounding the SFP.

5. Regarding the information presented In Table 2.10.1-1 of the licensing report:

   a. Modify Table 2.10.1-1 to include a listing of all vital areas (including those that require continuous occupancy, such as the control room and technical support center). Include in this listing the accident mitigation function for each vital area as well as the other information currently listed in Table 2.10.1-1.

   b. Modify Table 2.10.1-1 to include estimated occupancy times for vital areas H and I and the resulting EPU total mission dose for these vital areas. If the dose rate in vital area H is 3.3 R/hr, state why the dose to access this area would be negligible.

   c. Provide layout maps showing the access routes to all vital areas listed.

   d. Verify that the scaling factors shown in Note 2 apply to the doses/dose rates shown for vital areas G, H, and I.

6. On page 2.10.1-17, the licensing report states that "the pre-EPU annual direct shine dose ranges from 7.9 to 10.1 mrem during the five year period evaluated, as compared to the regulatory limit established by 40 CFR Part 190 which is 25 mrem/yr." The report also states that the direct shine dose would increase by approximately 21% following the EPU. From reading the licensing report statement quoted above, it would appear that only the dose from direct shine is being compared against the 40 CFR Part 190 limit of 25 mrem/yr. The 40 CFR Part 190 whole body dose limit of 25 mrem to any member of the public includes contributions from direct radiation (including skyshine) from contained radioactive sources within the facility, as well as doses from liquid releases and doses to individuals via airborne pathways. Clarify the wording in the licensing report to state that the estimated dose contributions from both the direct shine dose and dose contributions from liquid and airborne pathways following the EPU will be within the 40 CFR Part 190 dose limits. Provide a listing of the estimated annual dose contributions from both the direct shine dose and dose contributions from liquid and airborne pathways following the EPU.

7. On page 2.10.1-8, the licensing report states that the normal operation radiation levels in most of the plant area are expected to increase by approximately 19 percent. Describe what measures will be taken (e.g., special surveys of area radiation levels) during the initial power ascension to 19 percent above the current 100 percent power level to assure that all radiation areas are properly designated, posted, and controlled, in a timely manner, as required by 10 CFR Part 20 and plant technical specifications.

8. On page 2.10.1-8 of the licensing report, Ginna's annual collective dose over the past 10 years has generally been less than the national average for pressurized-water reactors (PWRs). The licensing report states that the exposure to plant personnel and to the offsite public is expected to increase by approximately 19 percent (the commensurate percentage of the core uprate). On the basis of this statement and on data gathered from other plants that have performed power uprates, describe what

effect you expect the proposed EPU will have on the annual collective dose at Ginna. Provide an estimate of the occupational dose that will result from the plant modifications that will be needed to support the implementation of the proposed EPU.

9. Section 2.10.1.2.4 of the licensing report (page 2.10.1-15) regarding normal operation radwaste effluents discusses the use of scaling factors to calculate the impact of the EPU on radwaste releases. In addition to the increase in offsite doses due to the increase in the radioactivity concentration in the wastes, discuss any effects that the EPU may have on the actual volumes of wastes released. For example, the increased radioactivity concentration in the liquid waste stream could result in the faster loading of demineralizers and filters, thereby necessitating more frequent backwashing of these demineralizers (increasing the volume of the liquid waste) and the increased use of filters (increasing the solid waste volume).

OPERATOR TRAINING/OPERATOR ACTIONS/ PROCEDURES

Changes in Emergency and Abnormal Operating Procedures

1. In part (a) of item 1 of Section 2.11.1.1 of the licensing report, a Westinghouse Owners Group initiative is referenced as being part of the effort to streamline the E-0 automatic action verification steps in order to meet assumed operator action timelines for specific accident scenarios. What is this initiative and how does streamlining the E-0 automatic action verification steps affect the assumed operator action timelines for this proposed EPU request?

2. In part (b), what will be the new time to initiate the functional restoration procedure for the standby auxiliary feedwater system and how will this impact the operator's other actions during the high energy line break scenario?

3. In part (d), if the main feedwater isolation valves are inoperable, how much time will the operator have to isolate the main feedwater manually?

4. In part (g), what will be the contingency action to cool down the pressurizer when the residual heat removal is not available? Will this be an operator manual action?

5. In parts (b, d, and e), enhancements are being made to existing systems to reduce operator action times in the accident scenarios provided in those sections. What will be the operator response times as a result of these enhancements and how have these reduced operator action times been demonstrated to be both feasible and reliable (reproducible by more than one operator/crew)?

6. In part (h), how will the minor modifications for Appendix R local operating stations benefit operator response times overall? Also, are the modifications listed in this section the only changes being considered for the local operating stations?

Changes to Operator Actions Sensitive to Power Uprate

7. In part (a) of item 2, what will be the reduced time for the concurrent initiation of hot and cold-leg recirculation and how does this affect the operator actions for a large break loss-of-coolant accident (LOCA)?

8. In part (e), what is the change regarding the initiation of the standby auxiliary feedwater to reflect the reduced time of steam generator dry out due to EPU? Please describe what operator actions will be affected as a result of the change and how they will be affected.

Changes to Control Room Controls, Displays and Alarms

9. In part (e) of item 3, what type of digital technology will be used to acquire the data? How will this new technology affect the operators in the control room?

Changes to the Operator Training Program and the Control Room Simulator

10. Although it is stated that there are training cycles planned to address the EPU modifications, is there a timeline established for the operator training as well as the control room simulator modifications in accordance of implementing the EPU in 2006? If not, when will one be developed?

POWER ASCENSION AND TESTING PLAN

1. Standard Review Plan (SRP) Section 14.2.1, "Generic Guidelines for Extended Power Uprate Testing Programs," specifies in Part III.C, the guidance and acceptance criteria the licensee should use to provide justification for a test program that does not include all of the power-ascension testing that would normally be considered for inclusion in the EPU test program. Previous operating experience should be considered, as applicable, when justifying elimination of power-ascension tests.

   In Section 2.12, "Power Ascension and Testing Plan," of the licensing report, the licensee stated that "operating experience has been incorporated into the proposed test plan."

   However, the licensee has not provided information of specific operating experience incorporated into their proposed test plan. Provide additional information regarding specific examples of operating experiences incorporated into the proposed test plan.

2. SRP Section 14.2.1 specifies, in Part III.A, the guidance and acceptance criteria which the licensee should use to compare the proposed EPU testing program to the original power-ascension test program performed during initial plant licensing. The licensee shall adequately justify proposed deviations from the initial power-ascension test program.

   In Table 2.12-3, "Comparison of Proposed EPU Tests to Original Startup Tests," of the licensing report, Startup Test Number SU 4.2.7, "Pressurizer Level Control Test," states

that this test is not planned for the proposed EPU startup test plan. This test verifies the setpoints of the pressurizer level control system and determines how the system responds to system level and Tavg variation. The licensee is changing the level setpoints of the pressurizer as part of the plant modifications that will be implemented in order to achieve the EPU rated power. The licensee stated that "the new setpoints will be verified by instrument calibration checks prior to startup. In addition, performance of the level control system with changes in power level will be verified during power escalation and transient tests." The NRC staff requests the licensee to provide additional justification, as to why the "Pressurizer Level Control Test" does not need to be performed as part of the EPU startup test plan. Specifically, provide additional justification for:

a. which transient tests will be performed, and

b. how those tests verify the performance of the level control system with changes in power level?

3. SRP Section 14.2.1 specifies, in Part III.A, the guidance and acceptance criteria which the licensee should use to compare the proposed EPU testing program to the original power-ascension test program performed during initial plant licensing. The licensee shall adequately justify proposed deviations from the initial power-ascension test program.

   In Table 2.12-3 of the licensing report, Startup Test Number SU 4.9.2, "Steam Dump Test," states that this test is not planned for the proposed EPU startup test plan. This test optimizes the setting of the steam dump controller. The licensee is changing the steam dump setpoints as part of the plant modifications that will be implemented in order to achieve the EPU-rated power. The licensee stated that the new setpoints will be verified by instrument calibration checks prior to startup. In addition, the licensee states that performance of the steam dump system will be verified during transient tests. The NRC staff requests the licensee to provide additional justification, as to why the "Steam Dump Test" does not need to be performed as part of the EPU startup test plan. Specifically, provide additional justification for:

   a. which transient test will be performed, and

   b. how those tests verify the performance of the steam dump system?

4. SRP Section 14.2.1 specifies, in Part III.A, the guidance and acceptance criteria which the licensee should use to compare the proposed EPU testing program to the original power-ascension test program performed during initial plant licensing. The licensee shall adequately justify proposed deviations from the initial power-ascension test program.

   In Table 2.12-3 of the licensing report, Startup Test Number SU 4.6.2, "Liquid Waste Processing Test," mentioned that the system operates at 1.5 gallons per minute (gpm) versus the 2.0 gpm that the system was designed for. The licensee also stated:

> The power uprate impacts these systems [waste disposal system including the waste evaporator] by increasing the amount of activity processed through them. However, the basic function of the system is not impacted and the capacity of the system remains acceptable.

Provide additional information regarding the waste disposal system capability to operate at the higher EPU flow rate. Also, provide additional information demonstrating that the amount of increased activity processed is acceptable.

5. SRP Section 14.2.1 specifies, in Part III.B, the guidance and acceptance criteria which the licensee should use to assess the aggregate impact of EPU plant modifications, setpoint adjustments, and parameter changes that could adversely impact the dynamic response of the plant to abnormal operational occurrences (AOOs).

   In Table 2.12-5, "Post Modification Testing," the licensee stated that replacement of the main transformer bushing will be implemented in order to achieve the EPU-rated power. As an EPU startup testing for this replacement, the licensee stated bushing temperature would be monitored during EPU power ascension. In addition, the licensee mentioned that this testing was completed in 2005. Explain how this testing was completed before an approval of the EPU.

6. SRP Section 14.2.1 specifies, in Part III.B, the guidance and acceptance criteria which the licensee should use to assess the aggregate impact of EPU plant modifications, setpoint adjustments, and parameter changes that could adversely impact the dynamic response of the plant to AOOs.

   In Table 2.12-5 of the licensing report, the licensee stated that replacement of the main transformer bushing will be implemented in order to achieve the EPU-rated power. As part of the post modification tests for this replacement, the licensee stated a "hydro test fire suppression system" was performed. Provide details of why this test is part of the post modification tests when no modification description is given for this system.

7. SRP Section 14.2.1 specifies in Part III.B, the guidance and acceptance criteria which the licensee should use to assess the aggregate impact of EPU plant modifications, setpoint adjustments, and parameter changes that could adversely impact the dynamic response of the plant to AOOs.

   In Table 2.12-5 of the licensing report, the licensee stated that installation of three generator monitoring instrumentation systems will be implemented in order to achieve the EPU-rated power. As an EPU startup test for this modification, the licensee stated that the installed generator instruments will be monitored during EPU power ascension. However, the licensee stated that this testing was completed in 2005. Explain how this testing was completed before implementation of the EPU startup testing.

8. SRP Section 14.2.1 specifies, in Part III.C, the guidance and acceptance criteria the licensee should use to provide justification for a test program that does not include all of the power-ascension testing that would normally be considered for inclusion in the EPU test program. Plant staff familiarization with facility operation and trial use of operating and emergency operating procedures should be considered, as applicable, when

justifying elimination of power-ascension tests.

In Section 2.12 of the licensing report, the licensee has not provided information on plant staff familiarization with facility operation and trial use of operating and emergency operating procedures (EOPs). Provide information on any plant staff familiarization with facility operation and trial use of operating and EOPs associated with the proposed EPU test program.

9. SRP Section 14.2.1 specifies, in Part III.C, the guidance and acceptance criteria the licensee should use to provide justification for a test program that does not include all of the power-ascension testing that would normally be considered for inclusion in the EPU test program.

   In Section 2.12 of the licensing report under the specific justification for not performing "Manual Turbine Trip from 100% Power Test," the licensee referenced Section 2.4.2, "Plant Operability," of the license amendment. The licensee stated that Section 2.4.2 described an analysis of a turbine trip from 100 percent EPU power using the LOFTRAN code.

   However, the NRC staff reviewed Section 2.4.2 and did not find information relating to the manual turbine trip from 100 percent power test. Provide information on the description of analyses and evaluations relating to the manual turbine trip from 100 percent power.

MATERIALS

1. The licensee is scheduled to withdraw surveillance capsule N at 29.2 effective full power years (EFPY). What will be the estimated fluence at that time if its withdrawal and what is the estimated time of withdrawal?

2. The licensee is planning to use the current pressure/temperature limits for 28 effective full-power years (EFPY). Based on the EPU, what will be the projected fluence at 28 EFPY?

3. In Section 2.1.2.2.5 of the licensing report, the licensee predicted that the upper shelf energy for the intermediate-to-lower shell girth weld and intermediate-to-nozzle shell girth weld will fall below 50 ft-lbs. The licensee stated that they updated the previously published (BAW 2425, Revision 1, "Low Upper-Shelf Toughness Fracture Mechanics Analysis of Reactor Vessel of R.E. for Extended Life Through 54 Effective Full Power Years," June 2002) equivalent margins analysis (EMA) to reflect EPU conditions. Submit the updated EMA that was performed to demonstrate compliance with the USE requirements of Appendix G to 10 CFR Part 50.

4. Table Matrix-1 of RS-001, Revision 0, provides the NRC staff's basis for evaluating the potential impacts of an EPU and subsequent aging effects. In Table Matrix-1, the NRC staff states that, in addition to the SRP guidance on the neutron irradiation-related threshold levels inducing irradiation assisted stress corrosion cracking (IASCC) in reactor vessel internal components, additional guidance is given in WCAP-14577,

Revision 1-A. WCAP-14577, Revision 1-A establishes a threshold of 1 X 10 ^{21} n/cm^2 (E $ 0.1 MeV) for the initiation of IASCC, loss of fracture toughness, and/or void swelling in PWR reactor vessel internal components made from stainless steel (including cast austenitic stainless steels) or Alloy 600/82/182 materials. In Table Matrix-1 of RS-001, the NRC staff established guidance that plants exceeding this threshold of neutron irradiation would either have to establish plant-specific degradation management programs for managing the aging effects associated with their reactor vessel internals or indicate that they would participate in industry programs designed for investigating and managing age-related degradation in the reactor vessel internal components. Provide the peak end of license neutron fluence value for the Ginna internals (E $ 0.1 MeV) after the implementation of the EPU. Also, discuss the inspection program that will be implemented by Ginna if the peak neutron fluence value exceeds 1 X 10^{21} n/cm^2 (E $ 0.1 MeV) threshold prior to the end of the facilities operating license.

CONTAINMENT

1. On page 2.6.1-9 and 2.6.1-13 of the licensing report, it states that injection of accumulator nitrogen during a LOCA event is modeled as a boundary condition. Describe how the GOTHIC computer code used for the containment response analysis considers injection of accumulator nitrogen into containment following the postulated LOCA.

2. Describe the GOTHIC recirculation model.

3. Describe the containment model used for determining the net positive suction head of the containment spray and other emergency core cooling system pumps.

4. The long-term post one hour mass and energy release calculations are performed through user defined functions in GOTHIC which incorporate sump water cooling. Section 2.6.1.2.3.1 states that this is consistent with Westinghouse methods. Describe or provide a reference to these methods.

5. Section 2.6.1.2.3.1 states that the heat removal rate of the containment fan cooler given in Table 2.6.1-2 is given as a function of the containment steam saturation temperature. Explain how this is derived.

6. Describe how the containment spray temperature of 104 EF was obtained and why this is conservative.

7. Describe the GOTHIC LOCA long-term mass and energy release model. What verification or benchmarking is done of this model? List the conservatisms included in the long-term calculation to ensure a conservative time-temperature prediction for environmental qualification.

8. Provide a description of how Ginna complies with Generic Letter 96-06 at EPU conditions.

9. Describe modeling of the containment fan coolers, spray water system, and residual heat removal system heat exchangers for containment heat removal. Describe the plant

program(s) which ensure that these heat exchangers will maintain the effectiveness assumed in the calculations.

RISK EVALUATION

1. Information presented in Table 2.13-16 of the licensing report regarding key initiating event sensitivity shows the frequencies for the initiating events (IEs) increase from 10 percent to 40 percent for seven listed initiators as a result of EPU (see 4th column of table). It also shows what seems to be the corresponding EPU delta core damage frequency (ΔCDF) for the IEs in its last column. In Section 2.13.1.2.4-1, the licensee states that the last column in the table represents the CDF increase to the EPU delta risk resulting from doubling the post-EPU frequency for the seven listed IEs in the table. Clarify the apparent difference between the table and text. Provide the formula and an example calculation that shows the ΔCDF associated with the percent increase in IE frequency expected and the ΔCDF for the case where the IE frequency is doubled. A similar situation exists with Table 2.13-17. Modify Tables 2.13-16 and 17 to show both the ΔCDF associated with the percent increase in IE frequency and the ΔCDF when the IE frequency is doubled.