

May 16, 2007

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 - AMENDMENT RE: TECHNICAL SPECIFICATION 3.7.8 REGARDING SERVICE WATER SYSTEM PUMPS (TAC NO. MD3118)

Dear Mrs. Korsnick:

The Commission has issued the enclosed Amendment No. 102 to Renewed Facility Operating License No. DPR-18 for the R.E. Ginna Nuclear Power Plant. This amendment is in response to your application dated September 29, 2006, as supplemented by letters dated December 7, 2006, and February 12, 2007.

The amendment revises Technical Specification 3.7.8, "Service Water (SW) System," from an electrical train-based specification to a pump-based specification. Revisions to the Limiting Conditions for Operation, Required Actions, Completion Times, and Surveillance Requirements have been made to require a specific number of SW water pumps to be operable rather than SW trains.

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Douglas V. Pickett, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-244

Enclosures:

1. Amendment No. 102 to Renewed License No. DPR-18
2. Safety Evaluation

cc w/encls: See next page

May 16, 2007

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 - AMENDMENT RE: TECHNICAL SPECIFICATION 3.5.1 REGARDING EMERGENCY CORE COOLING SYSTEM ACCUMULATORS (TAC NO. MD0686)

Dear Mrs. Korsnick:

The Commission has issued the enclosed Amendment No. 102 to Renewed Facility Operating License No. DPR-18 for the R.E. Ginna Nuclear Power Plant. This amendment is in response to your application dated September 29, 2006, as supplemented by letters dated December 7, 2006, and February 12, 2007.

The amendment revises Technical Specification 3.7.8, "Service Water (SW) System," from an electrical train-based specification to a pump-based specification. Revisions to the Limiting Conditions for Operation, Required Actions, Completion Times, and Surveillance Requirements have been made to require a specific number of SW water pumps to be operable rather than SW trains.

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,
/RA/
Douglas V. Pickett, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
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Amendment No.: ML071090238
Tech Spec No.: ML

NRR-058

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R.E. GINNA NUCLEAR POWER PLANT, LLC

DOCKET NO. 50-244

R.E. GINNA NUCLEAR POWER PLANT

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 102
Renewed License No. DPR-18

1. The Nuclear Regulatory Commission (the Commission or the NRC) has found that:
 - A. The application for amendment filed by the R.E. Ginna Nuclear Power Plant, LLC (the licensee) dated September 29, 2006, as supplemented by letters dated December 7, 2006, and February 12, 2007, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance: (I) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-18 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 102, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Mark G. Kowal, Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the License and Technical
Specifications

Date of Issuance: May 16, 2007

ATTACHMENT TO LICENSE AMENDMENT NO. 102

RENEWED FACILITY OPERATING LICENSE NO. DPR-18

DOCKET NO. 50-244

Replace the following page of the Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove

3

Insert

3

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

3.7.8-1

3.7.8-2

Insert

3.7.8-1

3.7.8-2

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 102 TO RENEWED FACILITY

OPERATING LICENSE NO. DPR-18

R.E. GINNA NUCLEAR POWER PLANT, LLC

R.E. GINNA NUCLEAR POWER PLANT

DOCKET NO. 50-244

1.0 INTRODUCTION

By letter dated September 29, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML062780221), as supplemented by letters dated December 7, 2006 (ADAMS Accession No. ML063480085) and February 12, 2007 (ADAMS Accession No. ML070470644), R.E. Ginna Nuclear Power Plant, LLC (the licensee) submitted a risk-informed request to change Technical Specification (TS) 3.7.8, "Service Water (SW) System," from an electrical train-based specification to a pump-based specification for the R.E. Ginna Nuclear Power Plant. Currently, Limiting Condition for Operation (LCO) 3.7.8 requires two SW trains and the SW loop header to be operable. The trains are defined by the pumps' electrical power supplies with two pumps per train. The proposed change would modify LCO 3.7.8 to require a specific number of SW pumps to be operable, with associated Required Actions and Completion Times (CTs). The licensee provided engineering and risk analyses in support of this change request. In addition, Surveillance Requirement (SR) 3.7.8.2 would also be modified to remove the reference to "train" for consistency in wording.

The supplemental letters dated December 7, 2006 and February 12, 2007, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the Nuclear Regulatory Commission (NRC) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on November 7, 2006 (71 FR 65144).

2.0 REGULATORY EVALUATION

The NRC staff evaluated the licensee's request utilizing the following:

- General guidance for evaluating the technical basis for proposed risk-informed changes is provided in Standard Review Plan (SRP) Chapter 19.0, "Use of Probabilistic Risk Assessment (PRA) in Plant-Specific, Risk-Informed Decisionmaking: General Guidance." Guidance on evaluating PRA technical adequacy is provided in SRP Section 19.1, "Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities." Chapter 19.0 of the SRP states that a risk-

informed application should be evaluated to ensure that the proposed changes meet the following key principles:

- The proposed change meets the current regulations, unless it explicitly relates to a requested exemption or rule change.
 - The proposed change is consistent with the defense-in-depth philosophy.
 - The proposed change maintains sufficient safety margins.
 - When proposed changes increase core damage frequency or risk, the increase(s) should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.
 - The impact of the proposed change should be monitored using performance measurement strategies.
- More specific guidance related to risk-informed TS changes is provided in SRP Section 16.1, "Risk-Informed Decisionmaking: Technical Specifications," which includes CT changes as part of risk-informed decisionmaking. Another consideration that is listed in Sections II.A and III.A of SRP Section 16.1 is the need for and adequacy of the proposed change.
 - Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," describes a risk-informed approach, acceptable to the NRC, for assessing the nature and impact of proposed permanent licensing-basis changes by considering engineering issues and applying risk insights. This RG also provides risk acceptance guidelines for evaluating the results of such evaluations.
 - RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," describes an acceptable risk-informed approach specifically for assessing proposed permanent TS changes in allowed outage times (AOTs). This RG also provides risk acceptance guidelines for evaluating the results of such assessments. RG 1.177 identifies a three-tiered approach for the licensee's evaluation of the risk associated with a proposed CT TS change, as discussed below (note that the phrase "completion time" or CT used in the licensee's request is equivalent to the phrase "allowed outage time" used in RG 1.177):
 - Tier 1 assesses the risk impact of the proposed change in accordance with acceptance guidelines consistent with the Commission's Safety Goal Policy Statement, as documented in RG 1.174 and RG 1.177. The first tier assesses the impact on operational plant risk based on the change in core damage frequency (Δ CDF) and change in large early release frequency (Δ LERF). It also evaluates plant risk while equipment covered by the proposed CT is out-of-service, as represented by incremental conditional core damage probability (ICCDP) and incremental conditional large early release probability (ICLERP).
 - Tier 1 also addresses PRA quality, including the technical adequacy of the

licensee's plant-specific PRA for the subject application. Cumulative risk of the present TS change in light of past related applications or additional applications under review are also considered along with uncertainty/sensitivity analysis with respect to the assumptions related to the proposed TS change.

- Tier 2 identifies and evaluates any potential risk-significant plant equipment outage configurations that could result if equipment, in addition to that associated with the proposed license amendment, are taken out-of-service simultaneously, or if other risk-significant operational factors, such as concurrent system or equipment testing, are also involved. The purpose of this evaluation is to ensure that there are appropriate restrictions in place such that risk-significant plant equipment outage configurations will not occur when equipment associated with the proposed CT is implemented.
- Tier 3 addresses the licensee's overall configuration risk management program (CRMP) to ensure that adequate programs and procedures are in place for identifying risk-significant plant configurations resulting from maintenance or other operational activities and appropriate compensatory measures are taken to avoid risk significant configurations that may not have been considered when the Tier 2 evaluation was performed. Compared with Tier 2, Tier 3 provides additional coverage to ensure risk-significant plant equipment outage configurations are identified in a timely manner and that the risk impact of out-of-service equipment is appropriately evaluated prior to performing any maintenance activity over extended periods of plant operation. Tier 3 guidance can be satisfied by the Maintenance Rule (10 CFR 50.65(a)(4)), which requires a licensee to assess and manage the increase in risk that may result from activities such as surveillance testing and corrective and preventive maintenance, subject to the guidance provided in RG 1.177, Section 2.3.7.1, and the adequacy of the licensee's program and PRA model for this application. The CRMP is to ensure that equipment removed from service prior to or during the proposed extended CT will be appropriately assessed from a risk perspective.

3.0 TECHNICAL EVALUATION

3.1 Background

The SW system (SWS) for the Ginna plant takes suction from Lake Ontario and provides essential cooling to safety-related equipment and also provides cooling to non-safety-related auxiliary components that are used in normal plant operation. The SWS consists of four service water pumps in two discharge headers, a single SW loop header, isolation valves, and a normal and standby discharge header. Two service water pumps from each Class 1E electrical train are aligned to each of the two discharge headers (i.e., two trains), which supply the SW loop header. The safety function of the SWS is to provide sufficient cooling water flow to critical plant loads for mitigating abnormal and accident conditions.

TS 3.7.8, "Service Water (SW) System," currently requires two SWS trains to be operable. If one SW train becomes inoperable, the TS requires that the inoperable train be restored to operability within 72 hours. The TS Bases currently defines the trains by electrical power supply to the pumps, with the A and C pumps in one train and the B and D pumps in the

opposite train. Since the flow loops are operated in a cross-connected configuration, the TS addresses them as a single loop, which carries its own Required Action.

By letter dated July 11, 2006 (ADAMS Accession No. ML061380103), the NRC staff issued License Amendment No. 97 to the Ginna facility approving the licensee's application for extended power uprate (EPU). The EPU, which was fully implemented by the licensee during their fall 2006 refueling outage, represented a 16.8 percent power uprate. At the former licensed power level, only one SW pump was required to remove the heat loads from the containment atmosphere and sump in the recirculation phase of a LOCA. However, analysis performed for operation at EPU conditions has demonstrated that at the maximum design lake temperature, one SW pump is not sufficient following a large-break LOCA due to reduced flow from potential flashing downstream of the containment fan coolers. Analysis performed by the licensee demonstrates that two SW pumps are required to provide adequate flow at EPU conditions.

As discussed above, two SW pumps are now necessary to support post-accident mitigation under EPU conditions. Considering that a single active failure of a DG would prevent operation of two SW pumps, the licensee would not be able to meet its post-accident design basis with a single SW pump out-of-service. Therefore, the licensee is proposing to modify TS 3.7.8 from an electrical train-based specification to a pump-based specification. The licensee has proposed to modify TS 3.7.8 to require four SW pumps be operable in lieu of two SW trains, with a decreasing CT as the number of operable pumps decrease. With the proposed changes, Ginna will be in a 14-day CT with any one SW pump inoperable, a 72-hour CT with any two pumps inoperable, and LCO 3.0.3 will apply when three pumps are inoperable. In addition, SR 3.7.8.2 would also be modified to remove the reference to "train" for consistency in wording.

As an interim measure prior to the proposed TS being approved and implemented, the licensee has implemented a TS Bases change requiring both SW pumps in an electrical train to be operable. TS Bases 3.7.8 has been modified to include the following:

In the event of a DBA, one SW train and the loop header is required to be OPERABLE to provide the minimum heat removal capability to ensure that the system functions to remove post accident heat loads as assumed in the safety analyses. To ensure this requirement is met, two trains of SW and the loop header must be OPERABLE (see Figure B 3.7.8-1). At least one SW train will operate assuming that the worst case single active failure occurs coincident with the loss of offsite power. A SW train is defined based on electrical power source such that SW Pumps A and C form one train and SW Pumps B and D form the second train. A SW train is considered OPERABLE when both pumps in the train are OPERABLE and the OPERABLE pumps are capable of taking suction from the screenhouse and providing cooling water to the loop header as assumed in the accident analyses. This includes consideration of available net positive suction head (NPSH) to the SW pumps and the temperature of the suction source.

The licensee has determined that the changes discussed in its amendment request will provide the necessary operational flexibility for unexpected equipment failures while ensuring adequate equipment redundancy and safety margins for continued operation.

3.2 Deterministic Evaluation

The engineering evaluation presented below addresses the first three key principles of the NRC staff's philosophy of risk-informed decisionmaking that are listed above in Section 2.0. In addition, the NRC staff evaluated the need for and adequacy of the proposed change.

3.2.1 Key Principle 1: Compliance with Current Regulations

The licensee does not propose to deviate from existing regulatory requirements and compliance with existing regulations is maintained by the proposed TS changes. Therefore, with respect to compliance with current regulations, the NRC staff considers the proposed TS changes to be acceptable.

3.2.2 Key Principle 2: Evaluation of Defense-in-Depth Attributes

The NRC staff requested that the licensee fully address the defense-in-depth attributes in accordance with the guidance that is specified by RG 1.177 for making risk-informed changes to TS requirements. By letter dated February 12, 2007 (ADAMS Accession No. ML070470644), the licensee responded to the NRC staff's request. The NRC staff has reviewed the information that was provided and an evaluation of the defense-in-depth attributes is provided below:

- A reasonable balance among prevention of core damage, prevention of containment failure, and consequence mitigation is preserved.

The primary safety functions of the SW system are to provide cooling for safety related equipment, mitigate the containment response effects of a Main Steam Line Break (MSLB) and design-basis LOCA, and provide long-term containment cooling and core cooling in the event of a LOCA. The most limiting phase of either accident for SW availability is the recirculation phase of the design-basis LOCA. Two SW pumps are required for this phase to ensure appropriate SW flow to all components. Enclosure 1, Table 3 of the licensee's letter dated September 29, 2006, demonstrates that the proposed TS changes will continue to assure that two SW pumps will be available for accident mitigation using industry accepted single failure assumptions. Therefore, the NRC staff finds that a reasonable balance among the prevention of core damage, prevention of containment failure, and consequence mitigation is preserved by the proposed TS changes.

- Over-reliance on programmatic activities to compensate for weaknesses in plant design is avoided.

The proposed changes to TS 3.7.8 will not result in any new programmatic activities or credit any new operator actions for assuring that the SWS is capable of performing its safety functions. Therefore, the NRC staff finds that this criterion is satisfied by the proposed TS changes.

- System redundancy, independence, and diversity are preserved commensurate with the

expected frequency, consequences of challenges to the system, and uncertainties (e.g., no risk outliers).

While the proposed pump based AOT are different in format from the train based AOT that are specified in NUREG-1431, "Standard Technical Specifications Westinghouse Plants," Rev. 3.0 (W-STs), the proposed AOT are consistent with the NRC policy as reflected in the W-STs. The operable SW pumps will continue to be capable of performing the necessary safety functions consistent with accident analysis assumptions. In the event that two SW pumps are inoperable (the equivalent of a "train"), the proposed AOT of 72 hours is the same as contained in the W-STs. The additional 14-day AOT that is proposed for a single inoperable pump is appropriate because the additional pump provides additional capability beyond what is specified by the W-STs for the 72 hour-AOT. The NRC does not consider the proposed 14-day AOT to be excessive provided that the risk considerations specified in RG 1.177 are satisfied. Therefore, the NRC staff finds that this criterion is satisfied by the proposed TS changes.

- Defense against potential common cause failures is preserved, and the potential for the introduction of new common cause failure mechanisms is assessed.

Neither the method or mode of operation, nor the configuration of the SW system is changed by the proposed TS changes. The system will continue to be operated, maintained and tested in the same manner as before. Therefore, the NRC staff finds that this criterion is satisfied by the proposed TS changes.

- Independence of barriers is not degraded.

The relationship of the SW system to individual barriers will not change as a result of the proposed TS changes. The system will continue to support core cooling and containment cooling as before; and Enclosure 1 of the licensee's letter dated September 29, 2006, demonstrates that adequate SW will continue to be available in support of system safety functions. Therefore, the NRC staff finds that this criterion is satisfied by the proposed TS changes.

- Defense against human errors is preserved.

Any minor procedure changes that are necessary for converting from the train-based to the pump-based approach will be addressed, and appropriate training conducted, as part of the change implementation process. Operator response is not expected to change during normal, abnormal or emergency operating conditions. Therefore, the NRC staff finds that this criterion is satisfied by the proposed TS changes.

- The intent of the General Design Criteria (GDC) in Appendix A to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, is maintained.

The licensee reviewed the following GDC to ensure the intent of each criterion is maintained considering the proposed amendment:

Criterion 34 – Residual Heat Removal (RHR)
Criterion 35 – Emergency Core Cooling System (ECCS)

- Criterion 38 – Containment Heat Removal
- Criterion 44 – Cooling Water
- Criterion 45 – Inspection of Cooling Water System
- Criterion 46 – Testing of Cooling Water System

The SW system indirectly supports RHR and directly supports ECCS and containment heat removal. Analyses performed by the licensee demonstrated that two SW pumps are required to satisfy accident analyses and normal cooling water demands under EPU conditions. The licensee further demonstrated that the SW system will satisfy these requirements during both accident and normal operating conditions, including loss of power and single failure assumptions. Additionally, the proposed TS change does not involve any physical changes to the SW system. Thus, the ability to inspect, the frequency or method of inspection, the ability to test, and the frequency or method of testing the SW system are not affected by the proposed TS changes. Therefore, the NRC staff finds that this criterion is satisfied by the TS changes that are proposed.

Based on a review of defense-in-depth attributes as discussed above, the NRC staff finds that defense-in-depth will be maintained by the proposed risk informed TS changes.

3.2.3 Key Principle 3: Evaluation of Safety Margins

The proposed changes to TS 3.7.8 do not modify or otherwise impact codes and standards that are applicable to the SWS. The SWS is not being physically modified, and the proposed AOT are consistent with the standard set forth in the W-STS. Also, the assessment summarized in Attachment 1, Table 3 of the licensee's letter dated September 29, 2006, demonstrates that the minimum number of SW pumps that are assumed to be operating in the Ginna accident analyses (2) are assured to be operable by the proposed TS changes consistent with NRC policy as reflected in the W-STS. Therefore, the NRC staff finds that this criterion is satisfied by the proposed TS changes.

3.2.4 Need For and Adequacy of Proposed Change

Prior to EPU, Ginna could operate indefinitely with one SW pump in each train (two pumps total) out of service and not enter an LCO Required Action. Considering a LOCA with a loss of offsite power and the worst single failure being a DG failure, one SW pump remains available for post-LOCA recovery operations. At the pre-EPU power level, one SW pump was sufficient to accommodate the assumed heat loads. However, now that EPU has been implemented, analysis performed by the licensee indicates that, with maximum allowed lake temperature, one SW pump is not sufficient due to reduced flow from potential flashing downstream of the containment fan coolers. Local operator action to isolate the non-functioning fan coolers (those powered from the failed DG) could mitigate this effect. However, these operator actions would be in a high radiation area causing unnecessary dose, and they would place additional demands on plant operators. Therefore, the licensee is proposing that TS 3.7.8 be modified to require all four SW pumps to be operable, with decreasing AOT as the number of operable pumps decrease. The licensee determined that the proposed change will provide the

necessary operational flexibility for unexpected equipment problems while ensuring adequate equipment redundancy and availability for continued operation.

The NRC staff agrees that the proposed changes are warranted in order to provide operational flexibility so that unnecessary reactor shutdowns can be avoided, and the NRC staff considers the proposed TS changes to be adequate in this regard.

3.3 Risk-Informed Evaluation

Per SRP Chapter 19 and SRP Section 16.1, the NRC staff reviewed the submittal using the three-tiered approach and principles four and five of the five key principles of risk-informed decision making presented above in Section 2.0.

3.3.1 Key Principle 4: Evaluation of Increase in CDF or Risk

The evaluation presented below addresses the NRC staff's philosophy of risk-informed decision making, i.e., when the proposed changes result in a change in CDF or risk, the increase should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.

3.3.1.1 Tier 1: PRA Capability and Insights

The first tier evaluates the impact of the proposed changes on plant operational risk. The Tier 1 NRC staff review involves two aspects: (1) evaluation of the validity of the Ginna PRA models and their application to the proposed changes, and (2) evaluation of the PRA results and insights based on the licensee's proposed application.

PRA Quality

The objective of the PRA quality review is to determine whether the Ginna PRA used in evaluating the proposed changes to TS 3.7.8 CTs is of sufficient scope, level of detail, and technical adequacy for this application. The NRC staff review evaluated the PRA quality information provided by the licensee in their submittal, including industry peer reviews results.

The Ginna level 1 and level 2 PRA model was initially developed in response to NRC Generic Letter 88-20 to provide an individual plant examination (IPE). Since the original IPE submittal, the PRA model has undergone several model revisions to incorporate improvements and maintain consistency with the as-built, as-operated plant.

In May 2002, the Westinghouse Owners Group performed a peer review of the Ginna PRA model (Revision 4.1). The peer review final report was issued in December 2002. The report identified 40 facts and observations (F&Os) of significance level A or B. Since the completion of the peer review, all 6 of the level A and 34 of 36 of the level B F&Os have been addressed. The licensee provided all 40 level A and B F&Os and their resolution, including a disposition of the two outstanding level B F&Os not yet resolved.

The NRC staff reviewed the information provided regarding the resolution of F&Os and the two outstanding F&Os not yet fully resolved. For the resolved items, the NRC staff found that the items either were appropriately addressed or would not be expected to have any substantive impact on this application. The two level B F&Os not yet completed were dispositioned as follows:

- F&O AS-13 identified the complexity of the Ginna PRA model and identified logical

errors discovered during the peer review. The item recommended simplification of the fault tree and a systematic review of all logic structures. The licensee identified that significant reviews of the model logic were made during recent model revisions and checks made of the fault tree logic for portions of the model which are associated with the SW AOT extension. Further, the licensee stated that results were evaluated to ensure expected cutsets were present and were logically correct.

- F&O DE-01 identified documentation issues and some modeling issues associated with internal flooding analyses. The licensee stated that the modeling issues have been corrected and the remaining items are solely related to documentation but have no impact on the model results.

The licensee stated that, subsequent to the peer review, revisions have been made to the Ginna PRA model. Revision 5.0 involved extensive revision of the human reliability analysis, enhancements to the thermal-hydraulic analysis, fire modeling, station blackout modeling, steam generator tube rupture modeling, and an update to the reactor coolant pump seal LOCA model. Revision 5.2 includes higher loss of grid frequencies recommended in NUREG/CR-INEEL/Ext-04-02525, Station Blackout Risk Evaluation for Nuclear Power Plants. Revision 6.x model series parallels the revision 5.x development and addresses the post-EPU plant configuration. Model revision 6.2 was identified as that used to support this request.

The licensee stated that the configuration of the Ginna PRA model is procedurally controlled such that plant changes are monitored for impact on the PRA model, along with areas for improvement. Issues requiring action are entered into a tracking database. The licensee did not identify any open issues that could have a potential impact on the proposed change to TS 3.7.8 CTs.

The licensee identified unavailability data and unreliability parameters associated with the SW pumps. All planned maintenance of the SW pumps occurred online, since the current TS allows a single SW pump to be removed from service indefinitely, provided the other pump powered by the same electrical train is operable. Since all planned maintenance is currently performed online, no increase in online SW pump unavailability is planned or anticipated. Additionally, it is anticipated that future unavailability will not increase, given the new limit on out-of-service time for a single pump while on line. The licensee identified the plant-specific failure data associated with the SW pumps and confirmed that the failure rates used in the Ginna PRA, which are based on generic Bayesian data updated with plant experience, are in close agreement. The licensee did not identify any expected change in SW pump unreliability associated with the changes to TS 3.7.8, nor were any changes to current maintenance practices identified. Therefore, the unreliability of the SW pumps would not increase due to implementation of the proposed TS change.

Common cause failures are included for the SW pumps using factors from NUREG/CR-5497, "Common Cause Failure Parameter Estimations," October 1998.

The licensee identified assumptions related to repair of SW pumps used in the calculation of the risk impact of this proposed TS change. The licensee stated that repairs to a failed SW pump are only credited in their PRA model for the loss of SW initiating event. No credit is taken for repair to a failed SW pump in the post-trip models for mitigation of an initiating event. In the analyses used to support this proposed change, no credit was taken for repairs of a failed SW

pump for either the initiating event model or the post-trip mitigation model.

Based on review of the above information, the NRC staff finds that the licensee has satisfied the intent of RG 1.177 (Sections 2.3.1, 2.3.2, and 2.3.3), RG 1.174 (Section 2.2.3 and 2.5), and SRP Section 19.1, and that the quality of the Ginna PRA is sufficient to support the risk evaluation provided by the licensee in support of the proposed license amendment.

PRA Results and Insights

The risk metrics were determined by adjusting the “average” PRA model, (i.e., a PRA model that includes contributions from nominal equipment maintenance unavailability). Since all planned maintenance is currently performed online, no increase in online SW pump unavailability is planned or anticipated. Therefore, the proposed change would not increase CDF or LERF. The estimates for ICCDP and ICLERP were also based on a nominal maintenance model, but incorporating the proposed 14-day and 72-hour duration of the CTs for one or two unavailable SW pumps, respectively.

The licensee’s methodology is consistent with the guidance of RG 1.177, Section 2.3.4 and Section 2.4 and is, therefore, acceptable to the NRC staff.

The licensee’s estimates for both preventive and corrective maintenance are given below in Table 1.

Table 1: Risk Results for Out-of-Service SW Pumps

SW Pump(s) Out-of-Service	ICCDP	ICLERP
A (14 days)	1.006E-08	8.887E-11
B (14 days)	9.977E-09	8.882E-11
C (14 days)	1.006E-08	8.887E-11
D (14 days)	9.977E-09	8.882E-11
A and B (72 hours)	5.416E-08	6.740E-10
A and C (72 hours)	5.088E-08	6.329E-10
A and D (72 hours)	5.416E-08	6.740E-10
B and C (72 hours)	5.416E-08	6.740E-10
B and D (72 hours)	5.088E-08	6.321E-10
C and D (72 hours)	5.416E-08	6.740E-10

The above risk impacts are bounding for the case of unplanned SW pump unavailability using assumptions with regards to increased common-cause failure (CCF) probabilities of the remaining operable pumps during corrective maintenance. The probability of CCF for the SW pumps to start was increased to the conditional CCF to start, given that either one or two SW pumps have already failed resulting in entry into the LCO Required Action. Similarly, the

probability of CCF for the SW pumps to run was increased when one pump is out of service for planned maintenance, or when two pumps are out of service where one is for planned maintenance. This is conservative, since the analysis effectively increases the CCF probabilities of both the failure to start and the failure to run simultaneously.

The licensee identified that if the LCO Required Action is entered due to equipment failure of a single SW pump, and a second SW pump fails before the first pump is repaired due to a run failure, their risk analyses can only support continued operation for about 33 hours before reaching the limits for ICCDP and ICLERP in RG 1.177. The licensee has committed that the remaining two operable SW pumps will be evaluated for common cause and an operability determination completed within 24 hours after the failure of the second pump. Therefore, an increased CCF to run is applicable only for 24 hours, after which the nominal CCF rates would apply or the unit would be shut down within the time limits of TS LCO 3.0.3. This conservative treatment of CCF, in combination with the licensee commitment to evaluate CCF vulnerability within 24 hours for two pumps failed, is consistent with the guidance of RG 1.177 Appendix A (Section A.1.3.2).

The risk impacts for the proposed changes to TS 3.7.8 CTs were found to be within the RG 1.177 acceptance guideline of less than $5E-7$ for ICCDP, and $5E-8$ for ICLERP. Since there is no impact on SW pump unavailability or unreliability due to the proposed TS change, there is no increase in average annual CDF or LERF. Therefore the risk impacts of the proposed changes are within the RG 1.174 acceptance guidelines.

Therefore, the NRC staff finds that the licensee has satisfied the intent of RG 1.177 (Sections 2.4), RG 1.174 (Section 2.2.4 and 2.2.5), and SRP Section 19.1.

External Events

The licensee stated that the Ginna PRA model is a full scope (internal and external events) model. The risk impact of the proposed change is due to the potential for inadequate SW capability following a large-break LOCA with a loss of offsite power due to reduced flow from potential flashing downstream of the containment fan coolers. Therefore, initiating events which cannot result in a large-break LOCA (identified in the submittal as equivalent to a 2-inch diameter break) would not have any risk impact.

The licensee evaluated external flood events qualitatively, since these external events are not included in their PRA model, and determined that these events cannot cause the large-break LOCA scenario which challenges the SW capability.

The licensee identified that fire risk has only a very small contribution to the configuration-specific risk analyses supporting this proposed change (i.e., less than 1% of the overall ICCDP and ICLERP).

Seismic contributions to the risk analyses considered the frequency of seismic events which result in a loss of offsite power (assumed non-recoverable) and a loss of reactor coolant system integrity. The licensee stated that their analysis was based on conservative modeling, and that seismic events contributed approximately 9 - 17% of the configuration risk.

Based on the risk analysis results which demonstrate margin to the RG 1.177 guidelines, the

NRC staff finds that the licensee has satisfied the intent of RG 1.177 (Section 2.3.2), RG 1.174 (Section 2.2.3), and SRP Section 19.1.

Shutdown and Transition Risk

The licensee did not provide an assessment of shutdown or transition risk. Because TS 3.7.8 is not applicable in modes 5 and 6, shutdown risk is not relevant to the proposed change. The risk analysis presented in the LAR used an at-power PRA model, which assumes mode 1 operation. Although the proposed changes to TS 3.7.8 CTs are also applicable in modes 2 - 4, the plant does not typically operate in these modes for extended periods, and is in these modes only during transition from power operations to outage conditions and return to service following outages. Based on the reduced time spent in these transition modes, a detailed transition risk analysis of SW pump unavailability is not required.

3.3.1.2 Tier 2 - Avoidance of Risk-Significant Plant Configurations

The second tier requires a licensee to provide reasonable assurance that risk-significant plant equipment outage configurations will not occur when specific plant equipment is taken out-of-service in accordance with the proposed TS change.

The licensee identified that an opposite train DG should not be taken out-of-service coincident with an SW pump. An evaluation of the TS requirements of TS 3.8.1, "AC Sources," was provided to demonstrate that the more restrictive CT associated with Required Action B.2 of this TS would prevent this from occurring.

The licensee stated that two SW pumps out-of-service concurrently increases overall plant risk, and would require additional risk management actions in accordance with 10 CFR 50.65(a)(4).

Based on the above, and considering the very small risk increase noted for the proposed TS change, the NRC staff finds the licensee's Tier 2 evaluation of potential risk significant configurations supports the implementation of changes to the TS 3.7.8 CTs, and is acceptable to the NRC staff.

3.3.1.3 Tier 3 - Risk-Informed Configuration Risk Management

The third tier requires a licensee to develop a program that ensures that the risk impact of out-of-service equipment is appropriately evaluated prior to performing any maintenance activity.

The licensee stated that the Ginna online risk assessment process helps to ensure that the decrease in plant safety for voluntary entry into an LCO Required Action statement is small and is acceptable for the period of the maintenance or testing activity, and that the general impact of maintenance and testing is minimized. The licensee identified that the program conformed to the elements identified in RG 1.177, including PRA scope, tools, process, and consideration of level 2 and external events risk.

Based on the licensee's conformance to the requirements of the guidelines of RG 1.177, the NRC staff finds the licensee's Tier 3 program is acceptable and supports the proposed changes to TS 3.7.8.

3.3.2 Key Principle 5: Performance Measurement Strategies - Implementation and Monitoring Program

RG 1.174 and RG 1.177 establish the need for an implementation and monitoring program to ensure that extensions to TS CTs do not degrade operational safety over time and that no adverse degradation occurs due to unanticipated degradation or common cause mechanisms. An implementation and monitoring program is intended to ensure that the impact of the proposed TS change continues to reflect the reliability and availability of systems, subsystems, and components (SSCs) impacted by the change. RG 1.174 states that monitoring performed in conformance with the Maintenance Rule, 10 CFR 50.65, can be used when the monitoring performed is sufficient for the SSCs affected by the risk-informed application.

The licensee stated that the reliability and availability of the SW pumps are monitored under the Maintenance Rule Program. If the pre-established reliability or availability performance criteria are exceeded for the SW pump trains, they are considered for 10 CFR 50.65(a)(1) actions, requiring increased management attention and goal setting in order to restore their performance (reliability and availability) to an acceptable level. The performance criteria are risk informed and, therefore, are a means to aid in managing the overall risk profile of the plant. The actual out-of-service time for the SW pump trains will be minimized to ensure their reliability and availability performance criteria are not exceeded. Additionally, as discussed above, the more limiting AOT for a single SW pump out-of-service will tend to reduce the actual unavailability of the pumps by requiring shorter planned maintenance outages than are currently allowed. In practice, the actual out-of-service time for the SW pump trains is minimized to ensure that the Maintenance Rule reliability and availability performance criteria for these components are not exceeded.

The licensee also stated that to ensure that the operational safety associated with the extended TS required action completion time does not degrade over time, the Maintenance Rule Program is used as discussed above to identify and correct adverse trends. Compliance with the Maintenance Rule not only optimizes reliability and availability of important equipment, it also results in management of the risk when equipment is taken out-of-service for testing or maintenance.

3.4 Summary

The licensee has submitted a risk-informed application to change TS 3.7.8, "Service Water (SW) System," from an electrical train-based specification to a pump-based specification for the R.E. Ginna Nuclear Power Plant. The NRC staff has reviewed the application to determine whether it meets the five key principles of a risk-informed TS change as described in RG 1.177, Section B. The staff concludes that risk impacts for Δ CDF, Δ LERF, ICCDP, and ICLERP, as estimated by the licensee are within the acceptance guidelines for RGs 1.174 and 1.177 for the proposed changes to the TS 3.7.8 CTs. The licensee's Tier 2 analysis provides reasonable assurance that risk-significant plant equipment outage configurations will not occur when specific plant equipment is taken out of service in accordance with the proposed TS change.

Furthermore, the licensee's Tier 3 configuration risk management program was found to be consistent with the RG 1.177 configuration risk management program guidelines.

Therefore, based on these findings, the staff finds the licensee's proposal acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New York State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (71 FR 65144). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The NRC staff has concluded, based on the considerations discussed above that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Date: May 16, 2007