February 8, 1984

Docket No. 50-244
LS05-84-02-020

Mr. John E. Maier, Vice President
Electric and Steam Production
Rochester Gas & Electric Corporation
89 East Avenue
Rochester, New York 14649

Dear Mr. Maier:

SUBJECT: INSERTION OF A HIGHER ENRICHMENT FUEL ASSEMBLY INTO THE SPENT FUEL RACKS

Re: R. E. Ginna Nuclear Power Plant

The Commission has issued the enclosed Amendment No. 60 to Provisional Operating License No. DPR-18 for the R.E. Ginna Nuclear Power Plant. This amendment is in response to your application dated February 23, 1983 as supplemented by your letter of September 12, 1983.

The amendment approves a Technical Specification change that permits storage, in the new and spent fuel racks, of Westinghouse 14X14 fuel assemblies of maximum enrichment no greater than 4.25 weight percent U-235.

A Notice of Consideration of Issuance of Amendment to License and Proposed No Significant Hazards Consideration Determination and Opportunity for Hearing related to the requested action was published in the Federal Register on October 26, 1983 (48 FR 49595). No request for hearing and no comments were received.

SE01
DSU USE 07

A copy of our related Safety Evaluation is also enclosed. This action will appear in the Commission's Monthly Notice publication in the Federal Register.

Sincerely,

Original signed by

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Enclosures:
1. Amendment No. 60 to License No. DPR-18
2. Safety Evaluation

cc w/enclosures:
See next page

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cc
Harry H. Voigt, Esquire
LeBoeuf, Lamb, Leiby and MacRae
1333 New Hampshire Avenue, N.W.
Suite 1100
Washington, D.C. 20036

Mr. Michael Slade
12 Trailwood Circle
Rochester, New York 14618

Ezra Bialik
Assistant Attorney General
Environmental Protection Bureau
New York State Department of Law
2 World Trade Center
New York, New York 10047

Resident Inspector
R.E. Ginna Plant
c/o U.S. NRC
1503 Lake Road
Ontario, New York 14519

Stanley B. Klimberg, Esquire
General Counsel
New York State Energy Office
Agency Building 2
Empire State Plaza
Albany, New York 12223

Dr. Emmeth A. Luebke
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. Richard F. Cole
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. Thomas E. Murley
Regional Administration
Nuclear Regulatory Commission
Region I Office
631 Park Avenue
King of Prussia, Pennsylvania 19406

U.S. Environmental Protection Agency
Region II Office
ATTN: Regional Radiation Representative
26 Federal Plaza
New York, New York 10007

Herbert Grossman, Esq., Chairman
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Supervisor of the Town
of Ontario
107 Ridge Road West
Ontario, New York 14519

Jay Dunkleberger
New York State Energy Office
Agency Building 2
Empire State Plaza
Albany, New York 12223

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ROCHESTER GAS AND ELECTRIC CORPORATION

DOCKET NO. 50-244

R. E. GINNA NUCLEAR POWER PLANT

AMENDMENT TO PROVISIONAL OPERATING LICENSE

Amendment No. 60
License No. DPR-18

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Rochester Gas and Electric Corporation (the licensee) dated February 23, 1983, as supplemented September 12, 1983, 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 Provisional 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. 60, 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.

FOR THE NUCLEAR REGULATORY COMMISSION

Dennis M. Crutchfield

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: February 8, 1984

ATTACHMENT TO LICENSE AMENDMENT NO. 60

PROVISIONAL OPERATING LICENSE NO. DPR-18

DOCKET NO. 50-244

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages contain the captioned amendment number and marginal lines which indicate the area of change.

PAGES

5.3-1

5.3-2

5.4-1

5.3 Reactor Design Features

5.3.1 Reactor Core

a. The reactor core contains approximately 45 metric tons of uranium in the form of uranium dioxide pellets. The pellets are encapsulated in Zircaloy 4 tubing to form fuel rods. 179 fuel rods, 16 guide tubes and one instrumentation thimble are arranged in a 14 x 14 array to form a fuel assembly. The reactor core is made up of 121 fuel assemblies.(1)

b. The enrichment of reload fuel shall be no more than 3.5 weight per cent U-235 for regions delivered prior to January 1, 1984 (Regions 1-15), 4.25 weight per cent U-235 for regions delivered after January 1, 1984, or their equivalents in terms of reactivity.

c. There are 29 full-length RCC assemblies in the reactor core. Each RCC assembly contains 16 144 inch lengths of silver-indium-cadmium alloy clad with stainless steel which act as neutron absorbers when inserted into the core.(5)

5.3.2 Reactor Coolant System

a. The design of the reactor coolant system complies with the code requirements.[3]

b. All piping, components and supporting structures of the reactor coolant system are designed to Class I requirements, and have been designed to withstand:

   i. The design seismic ground acceleration, 0.08g, with stresses maintained within code allowable working stresses.

   ii. The maximum potential seismic ground acceleration, 0.2g, acting in the horizontal and vertical directions simultaneously with no loss of function.

c. The nominal liquid volume of the reactor coolant system, at rated operating conditions, is 6236 cubic feet.

5.4 Fuel Storage

Specification

5.4.1 The new and spent fuel pit structures are designed to withstand the anticipated earthquake loadings as Class I structures. The spent fuel pit has a stainless steel liner to ensure against loss of water.

5.4.2 The new and spent fuel storage racks are designed so that it is impossible to insert assemblies in other than the prescribed locations. The fuel is stored vertically in an array with sufficient center-to-center distance between assemblies to assure $K_{eff} \leq 0.95$ for (1) unirradiated fuel assemblies delivered prior to January 1, 1984 (Region 1-15) containing no more than 39.0 gms U-235 per axial cm, and (2) unirradiated fuel assemblies delivered after January 1, 1984 containing no more than 41.9 gms U-235 per axial cm. Both cases assume unborated water used in the pool.

5.4.3 The spent fuel storage pit is filled with borated water at a concentration to match that used in the reactor cavity and refueling canal during refueling operations whenever there is fuel in the pit.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 60 TO PROVISIONAL OPERATING LICENSE NO. DPR-18

ROCHESTER GAS AND ELECTRIC CORPORATION

R. E. GINNA NUCLEAR POWER PLANT

DOCKET NO. 50-244

1.0 INTRODUCTION AND BACKGROUND

By letter dated February 23, 1983, Rochester Gas and Electric Corporation (the licensee) requested an amendment to the Appendix A Technical Specifications appended to Provisional Operating License No. DPR-18 for the R.E. Ginna Nuclear Power Plant. The amendment would permit the storage of spent fuel with an unirradiated fuel assembly enrichment of 4.25 weight percent U-235. By letter dated September 12, 1983, the licensee provided additional information to support the amendment request.

A Notice of Consideration of Issuance of Amendment and Proposed No Significant Hazards Consideration Determination and Opportunity for Hearing related to the requested action was published in the Federal Register on October 26, 1983 (48 FR 49595). No requests for hearing and no public comments were received.

2.0 DISCUSSION AND EVALUATION

2.1 Analysis Methods

The criticality aspects of the storage of Westinghouse fuel assemblies incorporating axial natural uranium blankets in the spent fuel storage pool have been analyzed using the PDQ-7 computer code for reactivity determination with four energy group neutron cross sections generated by the LEOPARD code, as modified by Pickard, Lowe and Garrick, Incorporated (PLG). These codes have been benchmarked against both Westinghouse and Battelle Pacific Northwest Laboratories critical experiments with pellet diameters, water-to-fuel ratios and U-235 enrichments similar to the Ginna design. This benchmarking led to the conclusion that the calculational model is capable of determining the multiplication factor (k_{eff}) of the Ginna spent fuel racks with a combined LEOPARD/PDQ-7 model bias of .0071 Δk and a .0024 Δk uncertainty corresponding to a 95 percent probability at a 95 percent confidence level.

2.2 Spent Fuel Rack Analysis

The criticality of fuel assemblies in the spent fuel storage rack is prevented by maintaining a checkerboard configuration with a minimum separation of 16.86 inches between assemblies. Although spent fuel is normally stored in borated pool water containing approximately 2000 ppm boron, the NRC acceptance criterion for spent fuel storage is that there is a 95 percent probability at a 95 percent confidence level (including uncertainties) that k_{eff} of the fuel assembly array will be less than 0.95 when fully flooded with unborated water. The fuel assemblies are assumed to be unirradiated with a U-235 enrichment of 4.25 weight percent.

Although the basic cell calculation is performed for unborated water at a uniform pool temperature of 68°F, the reactivity effect on an increase in water temperature to 200°F is included as an additional bias. Other calculational biases included are the effects of calculational mesh size variations and axial neutron leakage. In addition, uncertainties due to mechanical and fuel fabrication tolerances are included as perturbations on the calculated basic cell reactivity. The total reactivity effect on these biases and uncertainties assure that the maximum multiplication factor (k_{eff}) of the spent fuel racks (moderated by unborated water) will be no greater than 0.9463 with a 95 percent probability at the 95 percent confidence level (95/95).

2.3 New Fuel Rack Analysis

The Ginna new fuel storage racks accommodate 44 fuel assemblies in 4 rows of 11 assemblies. Although new fuel assemblies are stored in a dry condition, the condition of optimum moderation is considered in the analysis in accordance with the NRC acceptance criterion for new fuel storage. The NRC acceptance criterion for new fuel storage is that the spacing between fuel assemblies is sufficient to maintain the k_{eff} less than 0.95 when fully loaded and flooded with unborated water. Furthermore, the k_{eff} will not exceed 0.98 with fuel of the highest anticipated reactivity in place assuming optimum moderation. The fuel assemblies are assumed to be unirradiated with a uniform axial enrichment distribution of 4.25 weight percent U-235 in each fuel rod.

The neutron multiplication factor of the new fuel storage racks in a fully flooded condition with a water density of 1.0 gm/cc is calculated to be less than 0.88. Analyses of the optimum moderation condition is calculated by assuming the entire rack is surrounded by full density water and varying the water density inside the rack area. An optimum moderation condition is approached at water densities below 0.1 gm/cc. However, when neutron leakage effects are considered, the maximum neutron multiplication factor at low densities is found to be about 0.70 at a water density of about 0.075 gm/cc. Therefore, the analysis shows that the NRC acceptance criterion for new fuel storage is met.

2.4 Accident Conditions

Postulated events such as the inadvertent placement of an assembly in a non-fuel storage location is considered to be an abnormal condition and appropriate credit is taken for the soluble boron that is present in the pool water which is more than sufficient to compensate for the positive reactivity of the extra fuel assembly. In its assessments, the staff does not consider it necessary to assume two unlikely independent, concurrent events to ensure protection against a criticality accident.

3.0 SUMMARY

Based on the above, the staff concludes that the storage racks meet the requirements of General Design Criterion 62 as regards criticality. Also, the staff concludes that any number of Westinghouse 14X14 fuel assemblies of maximum enrichment no greater than 4.25 weight percent U-235 may be stored in the new and spent fuel racks of Ginna. These conclusions are based on the following considerations:

1. Calculational methods which have been verified by comparison with experiment have been used.
2. Conservative assumptions have been made about the enrichment of the fuel to be stored and the pool conditions.
3. Credible accidents have been considered.
4. Suitable uncertainties have been considered in arriving at the final value of the multiplication factor.
5. The final effect multiplication factor value meets our acceptance criterion.

The staff also finds that the proposed changes adequately account for the reload fuel enrichment increase and are, therefore, acceptable.

4.0 ENVIRONMENTAL CONSIDERATION

The staff has determined that the amendment does not authorize a change in effluent types or total amount nor an increase in power level and will not result in any significant environmental impact. Having made this determination, the staff has further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

5.0 CONCLUSION

The staff has further 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; and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ACKNOWLEDGEMENT

L. Kopp prepared this evaluation.

Dated: February 8, 1984