

Mr. John H. Mueller
Chief Nuclear Officer
Niagara Mohawk Power Corporation
Nine Mile Point Nuclear Station
Operations Building, Second Floor
P.O. Box 63
Lycoming, NY 13093

April 7, 1999

SUBJECT: ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT
SPENT FUEL POOL MODIFICATION, NINE MILE POINT NUCLEAR STATION,
UNIT NO. 1 (TAC NO. MA1945)

Dear Mr. Mueller:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for amendment dated May 15, 1998, as supplemented September 25, October 13, December 9 (two letters), 1998; January 11 and April 1, 1999.

The proposed amendment would change Technical Specification 5.5, "Storage of Unirradiated and Spent Fuel," for Nine Mile Point Nuclear Station, Unit 1 (NMP1) to reflect a planned modification to increase the number of fuel assemblies that can be stored in the spent fuel pool from 2776 to 4086. The changes also delete an erroneous reference.

The assessment is being forwarded to the Office of the Federal Register for publication.

Sincerely,

Original signed by:

Darl S. Hood, Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-220
Enclosure: Environmental Assessment
cc w/encl: See next page

DOCUMENT NAME: G:\NMP1\EA1945.WPD

*See previous concurrence

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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Darl S. Hood, Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
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ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT-SPENT
FUEL POOL MODIFICATION, NINE MILE POINT NUCLEAR STATION, UNIT NO. 1 (TAC NO.
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A. Blough, Region I

John H. Mueller
Niagara Mohawk Power Corporation

Nine Mile Point Nuclear Station
Unit No. 1

cc:

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UNITED STATES NUCLEAR REGULATORY COMMISSIONNIAGARA MOHAWK POWER CORPORATIONDOCKET NO. 50-220NINE MILE POINT NUCLEAR STATION, UNIT NO. 1ENVIRONMENTAL ASSESSMENT AND FINDING OFNO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (the Commission) is considering issuance of an amendment to Facility Operating License No. DPR-63, issued to Niagara Mohawk Power Corporation (the licensee), for operation of the Nine Mile Point Nuclear Station, Unit No. 1 (NMP1), located in the town of Scriba, Oswego County, New York.

ENVIRONMENTAL ASSESSMENTIdentification of the Proposed Action:

The proposed action would increase the number of fuel assemblies that can be stored in the NMP1 spent fuel pool (SFP) from 2776 (i.e., 1066 in the northern half of the pool and 1710 in the southern half of the pool) to 4086. The modification will be achieved by two separate campaigns. For the 1999 refueling outage (RFO15), the licensee will first replace the non-poison racks in the northern half of the pool with high density racks providing 1840 storage cells. Later, as further capacity increase is warranted, the licensee will replace the racks in the southern half of the pool with high density racks providing 2246 storage cells. The design of the new high density spent fuel storage racks incorporates Boral as a neutron absorber in the cell walls to allow for more dense storage of spent fuel.

The proposed action is in accordance with the licensee's application for amendment dated May 15, 1998, as supplemented September 25, October 13, December 9 (two letters), 1998; January 11 and April 1, 1999.

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The Need for the Proposed Action:

An increase in spent fuel storage capacity is needed to reestablish full core off-load capability. Loss of that capability will occur as a result of RFO-15, currently scheduled to start April 11, 1999. Thus, after RFO-15, the licensee will replace the eight non-poison rack modules in the northern half of the NMP1 pool (which currently provides 1066 spent fuel storage locations) with new poison rack modules providing 1840 storage locations. Ultimately, additional capacity will be needed to accommodate future refueling outages. Thus, as further capacity increase is warranted by the increasing fuel inventory in the pool, the licensee will increase the capacity of the southern half of the pool (currently limited to 1,710 storage locations) so as to provide a total pool capacity for 4086 spent fuel assemblies. This capacity of 4086 storage locations is sufficient to extend full core off-load capability to at least the expiration date of the plant operating license, August 22, 2009.

Environmental Impacts of the Proposed Action:

Radioactive Waste Treatment

NMP1 uses waste treatment systems designed to collect and process gaseous, liquid, and solid waste that might contain radioactive material. These radioactive waste treatment systems were evaluated in the Final Environmental Statement (FES) dated January 1974. The proposed SFP expansion will not involve any change in the waste treatment systems described in the FES.

Gaseous Radioactive Wastes

The storage of additional spent fuel assemblies in the pool is not expected to affect the releases of radioactive gases from the pool. Gaseous fission products such as Krypton-85 and Iodine-131 are produced by the fuel in the core during reactor operation. A small percentage of these fission gases is released to the reactor coolant from the small number of

fuel assemblies that are expected to develop leaks during reactor operation. During refueling operations, some of these fission products enter the pool and are subsequently released into the air. Since the frequency of refueling (and therefore the number of freshly offloaded spent fuel assemblies stored in the pool at any one time) will not increase, there will be no increase in the amounts of these types of fission products released to the atmosphere as a result of the increased pool fuel storage capacity.

The increased heat load on the pool from the storage of additional spent fuel assemblies will potentially result in an increase in the pool's evaporation rate. However, this increased evaporation rate is not expected to result in an increase in the amount of gaseous tritium released from the pool. The overall release of radioactive gases from NMP1 will remain a small fraction of the limits of 10 CFR 20.1301.

Solid Radioactive Wastes

Spent resins are generated by the processing of SFP water through the pool's purification system at NMP1. These spent resins are disposed of as solid radioactive waste ("radwaste"). The water turbulence caused by the removal and replacement operations in the pool ("reracking") may result in some resuspension of particulate matter in the pool. This could result in a temporary increase in the replacement frequency of the resin in the SFP purification system during the pool reracking operation. The licensee will use an underwater vacuum to clean the floor of the pool following removal of the old spent fuel rack modules. Vacuuming the SFP floor will remove any extraneous debris and crud and ensure visual clarity in the pool (to facilitate diving operations). Filters from this underwater vacuuming will be a source of solid radwaste. These filters and resins are collected and disposed of in accordance with existing plant radwaste procedures. Additional solid radwaste will consist of the old spent fuel rack modules themselves, as well as any interferences or pool hardware that may have to be

removed from the pool to permit installation of the new rack modules. The old rack modules and removed hardware will be decontaminated, placed in shipping containers approved by the U.S. Department of Transportation, and shipped offsite to a licensed processing or disposal facility. Other than the radwaste generated during the actual reracking operation, the NRC staff does not expect that the additional fuel storage provided by the increased SFP storage capacity will result in a significant change in the generation of solid radwaste at NMP1.

Liquid Radioactive Wastes

The release of radioactive liquids will not be affected directly as a result of the SFP modifications. The SFP ion exchanger resins remove soluble radioactive materials from the pool water. When the resins are replaced, the small amount of resin sluice water that is released is processed by the radwaste system. As previously stated, the frequency of resin replacement may increase slightly during the installation of the new racks. However, the amount of radioactive liquid released to the environment as a result of the proposed SFP expansion is expected to be negligible.

Occupational Dose Consideration

Radiation Protection personnel at NMP1 will constantly monitor the doses to the workers during the SFP expansion operation. If it becomes necessary to utilize divers for the reracking operation, the licensee will equip each diver with whole-body and extremity dosimeters having remote, above surface, readouts that will be continuously monitored by Health Physics personnel. The total occupational dose to plant workers as a result of the SFP expansion operation is estimated to be between 6 and 12 person-rem. This dose estimate is comparable to doses for similar SFP modifications performed at other nuclear plants. The upcoming SFP rack installation will follow detailed procedures prepared with full consideration of ALARA (as low as is reasonably achievable) principles.

On the basis of its review of the licensee's proposal, the NRC staff concludes that the NMP1 SFP reracking operation can be performed in a manner that will ensure that doses to workers will be maintained ALARA. The estimated dose of 6 to 12 person-rem to perform the proposed SFP reracking operation is a small fraction of the annual collective dose accrued at NMP1.

Accident Considerations

In its application, the licensee evaluated the possible consequences of a fuel handling accident to determine the thyroid and whole-body doses at the site's Exclusion Area Boundary, Low Population Zone, and in the NMP1 Control Room. The proposed SFP rack installation at NMP1 will not affect any of the assumptions or inputs used in evaluating the dose consequences of a fuel handling accident and, therefore, will not result in an increase in the doses from a postulated fuel handling accident.

The NRC staff reviewed the licensee's analysis of a fuel handling accident and performed confirmatory calculations to check the acceptability of the licensee's doses. The NRC staff's calculations confirmed that the thyroid doses at the Exclusion Area Boundary, Low Population Zone, and in the Control Room from a fuel handling accident meet the acceptance criteria and that the licensee's calculations are acceptable. The results of the NRC staff's calculations are presented in the Safety Evaluation to be issued with the license amendment.

An accidental cask drop into the pool continues to be unlikely as none of the features preventing such a drop (e.g., design and maintenance of the main hoist, the controlled cask movement path, and the hydraulic guide cylinder cask drop protection system) are affected by the proposed action. The licensee also found that the consequences of a loss of SFP cooling was acceptable in that ample time would be available for the operators to re-establish cooling before the onset of pool boiling. Evaluation of a design basis seismic event indicated the new

racks would remain safe and impact-free, the structural capability of the pool would not be exceeded, and the reactor building and crane structure would continue to retain necessary safety margins. Thus, these potential accidents have no environmental consequences.

In summary, the proposed action will not increase the probability or consequences of accidents, no changes are being made to radioactive waste treatment systems or in the types of any radioactive effluents that may be released offsite, and the proposed action will not result in a significant increase in occupational or offsite radiation exposure. Accordingly the Commission concludes that there are no significant radiological environmental impacts associated with the proposed action.

With regard to potential nonradiological impacts, the proposed action does not affect nonradiological plant effluents and has no other nonradiological environmental impact.

Accordingly, the Commission concludes that there are no significant environmental impacts associated with the proposed action.

Alternatives to the Proposed Action:

Shipping Fuel to a Permanent Federal Fuel Storage/Disposal Facility

Shipment of spent fuel to a high-level radioactive storage facility is an alternative to increasing the onsite spent fuel storage capacity. However, the U.S. Department of Energy's (DOE's) high-level radioactive waste repository is not expected to begin receiving spent fuel until approximately 2010, at the earliest. In October 1996, the Administration did commit DOE to begin storing waste at a centralized location by January 31, 1998. However, no location has been identified and an interim federal storage facility has yet to be identified in advance of a decision on a permanent repository. Therefore, shipping spent fuel to the DOE repository is not considered an alternative to increased onsite spent fuel storage capacity at this time.

Shipping Fuel to a Reprocessing Facility

Reprocessing of spent fuel from the Nine Mile Point Nuclear Station is not a viable alternative since there are no operating commercial reprocessing facilities in the United States. Therefore, spent fuel would have to be shipped to an overseas facility for reprocessing. However, this approach has never been used and it would require approval by the Department of State as well as other entities. Additionally, the cost of spent fuel reprocessing is not offset by the salvage value of the residual uranium; reprocessing represents an added cost.

Shipping Fuel to Another Utility or Site or to the NMP2 Spent Fuel Pool for Storage

The shipment of fuel to another utility or transferring NMP1 spent fuel to the NMP2 spent fuel pool for storage would provide short-term relief from the storage problem at NMP1. The Nuclear Waste Policy Act of 1982 and 10 CFR Part 53, however, clearly place the responsibility for the interim storage of spent fuel with each owner or operator of a nuclear plant. The NMP2 spent fuel pool has been designed with capacity to accommodate NMP2 and, therefore, transferring spent fuel from NMP1 to the NMP2 pool would create fuel storage capacity problems for NMP2. The shipment of fuel to another site or transferring it to NMP2 is not an acceptable alternative because of increased fuel handling risks and additional occupational radiation exposure, as well as the fact that no additional storage capacity would be created.

Alternatives Creating Additional Storage Capacity

Alternative technologies that would create additional storage capacity include rod consolidation, dry cask storage, modular vault dry storage, and constructing a new pool. Rod consolidation involves disassembling the spent fuel assemblies and storing the fuel rods from two or more assemblies into a stainless steel canister that can be stored in the spent fuel racks. Industry experience with rod consolidation is currently limited, primarily due to concerns

for potential gap activity release due to rod breakage, the potential for increased fuel cladding corrosion due to some of the protective oxide layer being scraped off, and because the prolonged consolidation activity could interfere with ongoing plant operations. Dry cask storage is a method of transferring spent fuel, after storage in the pool for several years, to high capacity casks with passive heat dissipation features. After loading, the casks are stored outdoors on a seismically qualified concrete pad. Concerns for dry cask storage include the potential for fuel or cask handling accidents, potential fuel clad rupture due to high temperatures, the need for special security provisions, and high cost. Vault storage consists of storing spent fuel in shielded stainless steel cylinders in a horizontal configuration in a reinforced concrete vault. The concrete vault provides missile and earthquake protection and radiation shielding. Due to large space requirements, a vault secured area for NMP1 would have to be located outside the secured perimeter of the plant site. Concerns for vault dry storage include security, land consumption, eventual decommission of the new vault, the potential for fuel or clad rupture due to high temperatures, and high cost. The alternative of constructing and licensing a new fuel pool is not practical for NMP1 because such an effort would require about 10 years to complete and would be the most expensive alternative.

The alternative technologies that could create additional storage capacity involve additional fuel handling with an attendant opportunity for a fuel handling accident, involve higher cumulative dose to workers effecting the fuel transfers, require additional security measures, are significantly more expensive, and would not result in a significant improvement in environmental impacts compared to the proposed reracking modifications.

Reduction of Spent Fuel Generation

Generally, improved usage of the fuel and/or operation at a reduced power level would be an alternative that would decrease the amount of fuel being stored in the pool and thus

increase the amount of time before full core off-load capacity is lost. With extended burnup of fuel assemblies, the fuel cycle would be extended and fewer offloads would be necessary. This is not an alternative for resolving the loss of full-core offload capability that will occur as a result of the NMP1 refueling outage scheduled to begin about April 11, 1999, because the spent fuel to be transferred to the pool for storage has now almost completed its operating history in the core. For many years now, NMP1 has been operating on the basis of 24-month refueling cycles, with core designs and fuel management schemes optimized accordingly. Operating the plant at a reduced power level would not make effective use of available resources, and would cause unnecessary economic hardship on the licensee and its customers. Therefore, reducing the amount of spent fuel generated by increasing burnup further or reducing power is not considered a practical alternative.

The No-Action Alternative

The NRC staff also considered denial of the proposed action, (i.e., the "no-action" alternative). Denial of the application would result in no significant change in current environmental impacts. The environmental impacts of the proposed action and the alternative actions are similar.

Alternative Use of Resources:

This action does not involve the use of any resources not previously considered in the Final Environmental Statement for the Nine Mile Point Nuclear Station, Unit No. 1.

Agencies and Persons Consulted:

In accordance with its stated policy, on April 7, 1999, the NRC staff consulted with the New York State official, Jack Spath of the New York State Research and Development Authority, regarding the environmental impact of the proposed action. The State official had no comments.

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the environmental assessment, the Commission concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the Commission has determined not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the licensee's letter dated May 15, 1998, as supplemented by letters dated September 25, October 13, December 9 (two letters), 1998; January 11 and April 1, 1999. These letters are available for public inspection at the Commission's Public Document Room, The Gelman Building, 2120 L Street, NW., Washington, D.C., and at the local public document room located at the Reference and Documents Department, Penfield Library, State University of New York, Oswego, New York 13126.

Dated at Rockville, Maryland, this 7th day of April 1999.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read "S. Singh Bajwa", written over a horizontal line.

S. Singh Bajwa, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation