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Docket No. 50-220

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Niagara Mohawk Power Corporation
ATTN: Mr. Donald P. Dise
Vice President - Engineering
300 Erie Boulevard West
Syracuse, New York 13202

Gentlemen:

The Commission has issued the enclosed Amendment No. 21 to Facility License No. DPR-63 for Unit No. 1 of the Nine Mile Point Nuclear Station. This amendment consists of changes to the Technical Specifications and is in response to your request dated December 7, 1976 (as supplemented by letters dated April 13, July 27 and September 29, 1977).

The amendment increases the spent fuel pool storage capacity from 1140 to 1984 fuel assemblies.

Certain changes to the original application were made with the mutual approval of the NRC staff and your licensing representatives.

Copies of the related Safety Evaluation, Environmental Impact Appraisal and the Notice of Issuance and Negative Declaration also are enclosed.

Sincerely,

Original signed by

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Enclosures:
1. Amendment No. 21 to License DPR-63
2. Safety Evaluation
3. Environmental Impact Appraisal
4. Notice of Issuance and Negative Declaration

cc w/enclosure:
See next page

subject to changes in Safety Evaluation to conform to those being made in Quad Cities Dresden

*SEE PREVIOUS YELLOW FOR CONCURRENCE

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SURNAME ➤	*CParrish:acr	SNowicki		GLear		
DATE ➤	1/12/78	1/19/78	1/23/78	1/27/78		

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SURNAME➤	CParrish cp	SNowicki:acr		GLear		
DATE➤	1/ 12 /78	1/ /78	1/ /78	1/ /78		

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

NIAGARA MOHAWK POWER CORPORATION

DOCKET NO. 50-220

NINE MILE POINT NUCLEAR STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 21
License No. DPR-63

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

   A. The application for amendment by Niagara Mohawk Power Corporation (the licensee) dated December 7, 1976 (as supplemented by letters dated April 13, July 27 and September 29, 1977), 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 Facility Operating License No. DPR-63 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 21, 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

Stanley J. Varga

for George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: January 27, 1978

ATTACHMENT TO LICENSE AMENDMENT NO. 21

TO THE TECHNICAL SPECIFICATIONS

FACILITY OPERATING LICENSE NO. DPR-63

DOCKET NO. 50-220

Replace the following page of the Appendix "A" Technical Specifications with the enclosed page. The revised page is identified by Amendment number and contains vertical lines indicating the area of change.

Remove	Replace
244	244

5.5 Storage of Unirradiated and Spent Fuel

Unirradiated fuel assemblies will normally be stored in critically safe new fuel storage racks in the reactor building storage vault. Even flooded with water, the resultant k_{eff} is less than 0.95. Fresh fuel may also be stored in shipping containers. The unirradiated fuel storage vault is designed and shall be maintained with a storage capacity limited to no more than 200 fuel assemblies.

The spent fuel storage facility is designed to maintain fuel in a geometry such that k_{eff} is less than 0.95 under conditions of optimum water moderation. The spent fuel storage facility is designed and shall be maintained with a storage capacity limited to no more than 1984 fuel assemblies containing not more than 15.6 grams of Uranium-235 per axial centimeters of assembly.

Calculations for k_{eff} values have been based on methods approved by the NRC covering special arrays (10CFR70.56).

5.6 Seismic Design

The reactor building and all contained engineered safeguards are designed for the maximum credible earthquake ground motion with an acceleration of 11 percent of gravity. Dynamic analysis was used to determine the earthquake acceleration, applicable to the various elevations in the reactor building.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 21 TO FACILITY OPERATING LICENSE NO. DPR-63

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT UNIT NO. 1

DOCKET NO. 50-220

Introduction

By letter dated December 7, 1976, the Niagara Mohawk Power Corporation (NMPC) submitted an application for an amendment to Appendix A of Facility Operating License No. DPR-63 to increase the spent fuel pool (SFP) storage capacity of the Nine Mile Point Nuclear Station Unit No. 1 (NMP-1) from 1140 to 1984 fuel assemblies. Supplemental information in response to NRC letters dated February 11, 1977, June 30, 1977 and September 1, 1977 was provided by NMPC in letters dated April 13, 1977, July 27, 1977 and September 29, 1977. Notice of Proposed Issuance of Amendment to Facility Operating License No. DPR-63 issued to Niagara Mohawk Power Corporation was published in the FEDERAL REGISTER on August 8, 1977 (42FR40060).

Discussion

The SFP at the NMP-1 facility contains 660 spent fuel assemblies at the present time. Spent fuel has been stored in the pool since the first core refueling. Since there is storage space for only 1140 spent fuel assemblies and since the core contains 532 fuel assemblies, the Nine Mile Point Unit No. 1 facility cannot, with the existing spent fuel storage racks, accommodate removal and storage in the SFP of all the fuel assemblies in the core.

The proposed increase in spent fuel storage capacity from 1140 fuel assemblies will (1) provide storage for all spent fuel assemblies removed from the core between the present time and 1989, (2) provide sufficient additional fuel assembly storage capacity so that the entire core (532 fuel assemblies) can be removed from the reactor vessel and stored in the SFP to about 1986, and (3) continue to accommodate one fuel assembly shipping cask for offsite shipping of spent fuel assemblies from the NMP-1 SFP when offsite spent fuel shipment is resumed at some indefinite future date within the next 12 years.

Our review and evaluation considered the following:

1. Structural adequacy of the proposed spent fuel racks and pool

2. Criticality considerations

3. Spent fuel pool cooling capacity

4. Fuel handling and installation of the modified spent fuel racks

5. Occupational radiation exposure and radioactive waste treatment

Evaluation

1. Structural Adequacy of the Proposed Spent Fuel Racks and Pool

The current aluminum fuel storage racks have a storage capacity of 1140 fuel assemblies. The proposed SFP modification consists of replacing these existing racks with higher density, stainless steel fuel racks which will accommodate the storage of 1984 fuel assemblies in a subcritical array. Each fuel rack consists of an array of stainless steel boxes constructed of 0.09-inch thick stainless steel plates which are edge welded to each other to form a honeycomb structure with a nominal 9.3 x 5.9 inch fuel assembly pitch. Individual module capacities are 96, 108, 128, 160 and 200 fuel assemblies depending on pool location. The racks are mounted on bases that are preplaced and interconnected to form a seismically restrained foundation. The racks are cantilevered from the bases with no lateral supports at the top. The seismic restraint is provided by bumpers which bear against each other and are attached to the bases, snubbers fitted to the pool wall, and mounting brackets imbedded in the fuel pool floor. Details of the fuel racks are shown in Figures 1, 2, 3, 5 and 6 of Attachment B to the Nine Mile Point Unit No. 1 license change request entitled "Nine Mile Point Unit No. 1 - Spent Fuel Pool Modification" (Reference 1). Details of the rack bases and the arrangement of the new storage racks in the fuel pool are shown in Figures 1 through 4 of the "Response to the June 30, 1977 Nuclear Regulatory Commission Questions" (Reference 2).

The review of the SFP modification was made in accordance with the applicable portions of Section 3.7 and 3.8 of the USNRC Standard Review Plan considering (1) the supportng arrangements for the modules, including their restraints; (2) the design, fabrication and installation procedures; (3) the structural design and analyses procedures for all loadings, including seismic and impact; (4) quality control for the design, fabrication and installation; and (6) industry codes applied.

Since only the ground response spectrum was available, the reactor building model employed in the original seismic analysis of the Nine Mile Point Unit No. 1 reactor building was utilized with the fuel racks incorporated into the model at the proper elevation (Mass Point 4 of the FSAR). A response spectrum dynamic analysis was then performed in accordance with the Nine Mile Point Unit No. 1 FSAR (Reference 3). The seismic accelerations were computed by the SRSS (square root of the sum of the squares) method for all significant modes of vibration. The three components of earthquake input were applied to the racks and the maximum responses were combined in accordance with the requirements of Regulatory Guide 1.92 entitled "Combining Modal Responses and Spatial Components In Seismic Response Analyses." The operating basis earthquake (OBE) base accelerations were taken as one-half of the safe shutdown earthquake (SSE) accelerations. Variations in the material properties of the rack modules were accounted for by choosing the properties so as to maximize the response of the rack modules. The structural damping ratio utilized for the rack modules was 0.025. This value is 0.010 greater than that specified in the FSAR for welded structures. This increase in damping is acceptable since there is additional Coulomb damping due to the large contact area between the individual boxes which are spot welded together, and the bolting of the rack modules to their bases. Also, the margins of safety for the various seismic loading conditions were acceptable without the increases in the allowable stresses permitted by the NRC Standard Review Plan (Reference 4) for the less probable loading conditions. This introduces an inherent conservatism in the design of the rack modules.

The existing pool structure has been analyzed to account for the increase in dead load and seismic loads and the structure has been found to be acceptable. The peak concrete bearing and shear stresses in the fuel pool walls and floor are within the allowable stress limits of the ACI Reinforced Concrete Code 318.63.

The spent fuel storage rack modules, their associated hardware, the rack bases, the seismic lateral restraint system, and the pool liner are constructed entirely of Type 304 stainless steel. Since the possibility of onsite long-term storage of spent fuel exists, the effects of the pool environment on the racks, fuel cladding and pool liner are being investigated. Based upon our preliminary review and previous operating experience, we have concluded that at the pool temperature and the quality of the demineralized water, and taking no credit for inservice inspection, there is reasonable assurance that no significant corrosion of the racks, the fuel cladding or the pool liner will occur over the lifetime of the plant. However, if the results of the current generic review indicate that additional protective measures are warranted to protect the racks, the fuel cladding, and the liner from the effects of corrosion, the necessary steps and/or inspection programs will be determined to assure that an acceptable level of safety is maintained.

Any problems associated with longer storage of fuel in the pool, such as possible corrosion of stored fuel, additional need for controls on water chemistry, or others, will be addressed in the generic EIS, as is appropriate.

Summary of Structural and Material Adequacy

The analyses, the design, the fabrication and the installation of the proposed fuel rack storage system are in accordance with accepted criteria. The entire design of the racks was governed by the applicable sections of the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1. The design of the welds was based upon the applicable portions of ASME Section VIII, Division I and the AISC Steel Construction Manual, Part 5, "Specifications and Codes." Appropriate material allowables are taken at a temperature of 200°F. Installation of the racks is governed by ANSI Standard N45.2.2 (with Appendix), "Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants." The welds, welders and welding procedures are qualified in accordance with the rules of Section IX of the ASME Boiler and Pressure Vessel Code.

The effects of the additional loads in the existing pool structure due to the high density storage racks have been examined. The pool structural integrity and leak tightness were determined to be adequate under the new loading conditions.

There is no existing evidence at this time to indicate that corrosion of the fuel cladding, the stainless steel racks or the liner will occur at the temperatures and quality of the demineralized water present in this pool.

We find that the subject modification proposed by the licensee is acceptable and satisfies the applicable portions of General Design Criteria 2, 4 and 61.

2. Criticality Considerations

The proposed spent fuel storage racks, which are designed to support the fuel assemblies on a nominal 9.3 x 5.9 inch pitch, are to be fabricated from 0.090-inch thick, Type 304 stainless steel. The steel racks will be made from two types of rectangular boxes. One of the boxes will be sized to hold two fuel assemblies in a close-packed condition, while the other will be designed to contain water for moderating and absorbing neutrons. When these racks are installed in the fuel pool, there will be rows of close-packed fuel assemblies separated by the 3.25-inch wide water boxes. This results in a fuel region volume fraction of 0.47 for the storage lattice.

NMPC states that its criticality calculations are based on fresh (i.e., unirradiated) fuel with 3.0 weight percent uranium-235. For the present fuel assemblies in Nine Mile Point Nuclear Station, Unit No. 1, this corresponds to a fuel loading of 15.6 grams of uranium-235 per axial centimeter of fuel assembly.

Pickard, Lowe and Garrick, Inc. (PLG) of Washington, D.C., performed the criticality analyses for these fully loaded racks. PLG used its own version of the LEOPARD computer program to get four groups' cross sections for the PDQ-7 diffusion theory calculations. The accuracy of this method was checked by using the LEOPARD program in analyses of nineteen critical experiments and the combination LEOPARD/PDQ-7 method in analyses of seven critical experiments. Eleven of the nineteen critical experiments had stainless steel in them. The results of these analyses show that for these 26 experiments, the calculated neutron multiplication factors were not more than 0.0098 too low.

PLG calculated the infinite neutron multiplication factor for the as-designed storage rack to be 0.903. This analysis includes the effects of the Zircaloy channels and the inconel springs in the spacers used in the bundles, and it assumes the water to be at a temperature of 100°F.

PLG then calculated the effects of: (1) the tolerance of the thickness of the stainless steel; (2) the tolerances of the dimensions of the stainless steel boxes and the uncertainties in the fuel assembly positioning in the boxes; (3) the effect of increasing the water temperature to 200°F; and (4) the possible perturbations to the nominal lattice that could occur between the rack modules. Adding the absolute values of all of these perturbations yields a maximum total possible increase of 0.025 in the neutron multiplication factor. PLG then calculated the condition wherein a fuel bundle is accidentally brought up as close as possible to the outside of a filled rack. They found its effect on the neutron multiplication factor to be +0.007. In this way PLG calculated the maximum neutron multiplicaton factor in the fuel pool to be 0.935.

The result of PLG's calculation for the neutron multiplication factor in the nominal storage attice compares favorably with results of parametric calculations made with other methods. By adding PLG's maximum calculational deviation from experiment (.0098) to their maximum calculated neutron multiplication factor (0.935) we find the maximum neutron multiplication factor for the fuel in the pool to be 0.945. The exclusion of water from the water gap between the assemblies could change this factor, but this is a highly improbable situation due to the open design of the racks.

We find that when any number of fuel assemblies, which have no more than 15.6 grams of uranium-235 per axial centimeter of fuel assembly, are loaded into the proposed racks, the neutron multiplication factor will be less than 0.945. Since this factor is less than our acceptance criterion of 0.95, we find the proposed design to be acceptable. On this basis, we conclude that with the plant's Technical Specifications amended to prohibit the storage of fuel assemblies that contain more than 15.6 grams of uranium-235 per axial centimeter of assembly, there is reasonable assurance that the health and safety of the public will not be endangered by the use of the proposed racks. NMPC has agreed to this modification of the Technical Specifications and the modification is included in this amendment.

3. Spent Fuel Pool Cooling Capacity

The licensed thermal power for Nine Mile Point Nuclear Station, Unit No. 1, is 1850 MWt. Refueling is done on an 18-month cycle. After 18 months of operation, 160 of the 532 fuel assemblies are replaced with new assemblies. In its December 7, 1976 submittal, NMPC stated that: (1) ten days is the minimum time needed to move the core to the SFP and to replace the gate between the SFP and the reactor cavity; and (2) procedural controls will be established for determining and setting delay times such that the shutdown cooling system will be available in addition to the fuel pool cooling system until it is known that the fuel pool water temperature will not exceed 125°F. NMPC's calculations for the heat generation rates in the fuel pool are based on an initial ten days of cooling with the shutdown cooling system available and in operation. With this assumption, NMPC calculated the maximum heat generation rate in the SFP after the 18-month refueling which would fill the pool (i.e., 1984 fuel assemblies) to be 6.4×10^6 BTU/hr (1.9 MW). Also, the maximum calculated heat generation rate in the spent fuel pool after unloading a full core, which would fill the pool, will be 17.9×10^6 BTU/hr (5.2 MW).

NMPC, in its December 7, 1976 submittal, states that the Nine Mile Point, Unit No. 1, spent fuel cooling system has two cooling trains both of which are designed to seismic Category 1 criteria. The FSAR states that each of the two heat exchangers is designed to remove 6×10^6 BTU/hr with a water flow of 600 gallons per minute.

With both trains in the spent fuel cooling system operating, NMPC calculated that for a ten-day fuel decay time the maximum outlet water temperature will be less than 104°F for the usual 18-month reload cycle and less than 128°F for the full core offload. In Figure 12 (Reference 1) which assumed no heat loss from the pool, NMPC shows that for the full core offload the outlet water temperature could be kept below 125°F by delaying the isolation of the spent fuel cooling system to 13 days after the reactor was shutdown.

By comparing NMPC's calculated heat loads with those obtained by using the total decay energy curve given on pages 9.2.5-8 through 9.2.5-14 of the NRC Standard Review Plan, we find them to be conservative.

NMPC's calculated fuel pool outlet water temperatures are consistent with the stated flow rates and design capabilities of the heat exchangers. With both trains of the SFP cooling system operating it should be possible to keep the outlet water temperature below 125°F even after a full core offload. If, however, one of the siesmic Category I trains were to fail within about sixty days after a full core offload, the fuel pool outlet water temperature could go above 125°F, unless the reactor vessel were flooded and the gate opened so that the shutdown cooling system could be used. For an assumed failure of one of the two SFP cooling trains immediately following a full core offload, the equilibrium outlet water temperature would go up to about 150°F. This is an acceptable outlet water temperature.

Conclusion on Spent Fuel Pool Cooling

We find that the cooling system capacity will be sufficient to maintain the outlet water temperature below 125°F, provided that both of the siesmic Category I spent fuel pool cooling system trains are operational and isolation of the spent fuel cooling system from the shutdown cooling system is delayed to 13 days after reactor shutdown for a full core offload. In the event of a failure of one cooling train within 60 days of a full core offload, the use of the shutdown cooling system could be required to keep the outlet water temperature below 125°F.

4. Fuel Handling and Installation of the Modified Spent Fuel Racks

4.1 Fuel Handling

The overhead handling system provided for moving shielded casks in the area of the SFP is provided with a sufficiently high degree of redundancy that the probability of a cask drop accident which can damage the pool water-tight integrity is small enough to preclude consideration of that event.

In addition, the NRC staff has underway a generic review of load handling operations in the vicinity of spent fuel pools to determine the likelihood of a heavy load impacting fuel in the pool, and if necessary, the radiological consequences of such an event. However, considering the existing crane and rigging redundancy, we have concluded that the probability of a load-handling accident is sufficiently small that cask handling operations may proceed while this generic review is underway. The generic EIA on spent fuel storage will consider the load handling accident, and any further problems identified there will be addressed.

The consequences of fuel handling accidents in the NMP-1 SFP area are not changed from those presented in their Safety Evaluaton Report (SER) dated July 1974.

4.2 Installation of the Modified Spent Fuel Racks

In its December 7, 1976 submittal, NMPC states that during the installation of the new racks: (1) a procedure will be followed that will insure that the racks will not be moved over the fuel bundles in the pool; (2) all racks containing fuel bundles will meet the seismic

Category I criteria at all times; and (3) applicable safety and design criteria will be satisfied in all steps of the rack replacement procedure.

In regard to fuel handling, NMPC states, and the staff agrees (Reference 1), that the proposed modification does not create the possibility for an accident or malfunction of a different type than those evaluated in the FSAR.

NMPC has upgraded the Nine Mile Point, Unit No. 1, overhead crane system, providing it with redundant features so that a single failure will not result in a dropped load. NRC found this modification to be acceptable in its January 7, 1976 letter to NMPC (Reference 5). The use of this upgraded crane, along with NMPC's stipulation that racks will not be taken over fuel bundles present in the pool, will make the probability for an empty rack falling on a loaded rack in the pool acceptably small. By using the same safety criteria and procedures that are used in handling the fuel cask, NMPC can install the new spent fuel storage racks without undue risk of either an increase in the neutron multiplication factor in the pool or the loss of capability for spent fuel cooling.

After the racks are installed in the pool, the fuel handling procedures in and around the pool will be the same as those procedures that were in effect prior to the proposed modifications. These have been reviewed and found to be acceptable by the NRC.

We conclude that there is reasonable assurance that the health and safety of the public will not be endangered by the installation and use of the proposed racks and is therefore acceptable.

5. Occupational Radiation Exposure and Radioactive Waste Treatment

We have estimated the increment in onsite occupational dose resulting from the proposed increase in stored fuel assemblies on the basis of information supplied by the licensee and by utilizing realistic assumptions for occupancy times and for dose rates in the spent fuel area from radionuclide concentrations in the SFP water. The spent fuel assemblies themselves contribute a negligible amount to dose rates in the pool area because of the depth of water shielding the fuel. The occupational radiation exposure associated with installing the racks is conservatively estimated at 16 man-rem and represents a negligible burden. Based on present and projected operations in the SFP area, we estimate that the proposed modification will add less than one percent to the total annual occupational radiation exposure burden at this facility. The small increase in radiation exposure will not affect the licensee's ability to maintain individual occupational doses to as low as is reasonably achieveable and within the limits of 10 CFR Part 20. Thus, we conclude that storing additional fuel in the SFP will not result in any significant increase in doses received by occupational workers and is acceptable.

The station contains waste treatment systems designed to collect and process the gaseous, liquid and solid wastes that might contain radioactive material. The waste treatment systems were evaluated in the Safety Evaluation Report (SER) for the station dated July 1974. There will be no change in the waste treatment systems or in the conclusion of the evaluation of these systems as described in Section 11.0 of the SER because of the proposed modification.

Conclusion on Occupational Radiation Exposure and Radioactive Waste Treatment

Our evaluation supports the conclusion that the proposed modification to the SFP at NMP-1 is acceptable because:

(1) The increase in occupational radiation exposure to individuals due to the storage of additional fuel in the SFP would be negligible.

(2) The installation and use of the new fuel racks does not alter the consequences of the design basis accident for the SFP, i.e., the rupture of a fuel assembly and subsequent release of the assembly's radioactive inventory within the gap.

(3) The overhead handling system is provided with a sufficient degree of redundancy to preclude consideration of cask and/or heavy load handling accidents.

Conclusion

We have 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.

Dated: January 27, 1978

ENVIRONMENTAL IMPACT APPRAISAL

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO MODIFICATION OF THE SPENT FUEL STORAGE POOL

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION

DOCKET NO. 50-220

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BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATING TO MODIFICATION OF THE SPENT FUEL STORAGE POOL
NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT NUCLEAR STATION
DOCKET NO. 50-220

1.0 Description of Proposed Action

In their submittal of December 7, 1976, supplemented by letters dated April 13, 1977, July 27, 1977 and September 29, 1977, Niagara Mohawk Power Corporation (the licensee) requested an amendment to Facility Operating License No. DPR-63 for the Nine Mile Point Nuclear Station Unit No. 1 (NMP-1). The amendment to the license concerns the proposed expansion of the storage capacity of the spent fuel storage facility at NMP-1. The proposed change would increase the storage capacity of the spent fuel pool (SFP) from 1140 to 1984 fuel assemblies (i.e., from about 2 cores to 3 3/4 cores).

The modification evaluated in this environmental impact appraisal is the proposal by the licensee to increase the storage capacity of the SFP by replacing the existing spent fuel storage racks with closer spaced racks and to use these new racks for the longer term storage of more spent fuel in the SFP. The rack spacing would be changed from 12 inches by 6.5 inches center-to-center spacing to 9.3 inches by 5.9 inches center-to-center spacing of the individual spent fuel cavities.

2.0 Need For Increased Storage Capacity

Nine Mile Point Unit No. 1 achieved initial criticality on September 5, 1969. The facility recently completed its sixth refueling, as a result of which there are currently 660 spent fuel assemblies stored in the SFP. The current licensed storage capacity of the SFP is 1140 fuel assemblies. With 660 assemblies presently stored in the pool, there is only storage space for an additional 480 assemblies. A full core for NMP-1 consists of 532 assemblies. Thus, Nine Mile Point Unit No. 1 does not have room in the SFP with the present storage capacity to off-load a full core. While the capability to off-load a full core is not required from the standpoint of safety, it is desirable from an economic and operational standpoint (e.g., to allow inspection of core intervals). Under the current fuel management plan, approximatley 1/3 of the core (about 160 fuel assemblies) is replaced every 18 months (Reference 2). With the present storage capacity of the SFP, the pool will be full after the next three refuelings (i.e., after the refueling tentatively scheduled for about January 1982). If the storage capacity of the SFP is not increased or if alternate storage space for spent fuel from this facility is not located, Nine Mile Point Unit No. 1 would have to be shutdown about mid 1983.

With the proposed modification, the SFP would have storage capacity to accommodate five additional refuelings (of 160 fuel assemblies per refueling). This would provide storage space for the spent fuel which is expected to be generated through mid 1989. There would also be space in the SFP to discharge a full core through to about mid 1986. With the proposed modification, NMP-1 could operate through early 1991 before the facility would be forced to shutdown due to lack of storage space for spent fuel in the SFP. In our evaluation, we considered the impacts which may result from storing up to an additional 844 spent fuel assemblies in the SFP.

The proposed modification would not alter the external physical geometry of the spent fuel pool or involve significant modifications to the SFP cooling or purification systems. The proposed modification does not affect in any manner the quantity of uranium fuel utilized in the reactor over the anticipated operating life of the facility and thus in no way affects the generation of spent uranium fuel by the facility. The rate of spent fuel generation and the total quantity of spent fuel generated during the anticipated operating lifetime of the facility remains unchanged as a result of the proposed expansion. The modification will increase the number of spent fuel assemblies that could be stored in the SFP and the length of time that some of the fuel assemblies could be stored in the pool.

On the basis of the evaluation discussed herein, we have concluded that the storage capacity of the Nine Mile Point Unit No. 1 SFP should be increased.

3.0 Fuel Reprocessing History

Curently, spent fuel is not being reprocessed on a commercial basis in the United States. The Nuclear Fuel Services (NFS) plant at West Valley, New York, was shut down in 1972 for alterations and expansions; on September 22, 1976, NFS informed the Commission that they were withdrawing from the nuclear fuel reprocessing business. The Allied-General Nuclear Services (AGNS) proposed plant in Barnwell, South Carolina, is not licensed to operate. The General Electric Company's (GE) Midwest Fuel Recovery Plant (MFRP) in Morris, Illinois, now referred to as Morris Operation (MO), is in a decommissioned condition. Although no plants are licensed for reprocessing fuel, the storage pool at Morris, Illinois, and the storage pool at West Valley, New York, (on land owned by the State of New York and leased to NFS through 1980) are licensed to store spent fuel. The storage pool at West Valley is not full but NFS is presently not accepting any additional spent fuel for storage, even from those power generating facilities that had contractual arrangements with NFS. Construction of the AGNS fuel receiving and storage station has been completed. AGNS has applied for - but has not been granted - a license to receive and store irradiated fuel assemblies in the storage pool at Barnwell prior to a decision on the licensing action relating to the reprocessing facility. A fourth plant, the Exxon plant proposed for construction in Tennessee, is currently under license review; this review, however, will be affected by the Commission's decision announced December 23, 1977 to terminate the proceedings on pending or future plutonium recycle-related license applications.

4.0 The Plant

The Nine Mile Point Nuclear Station Unit No. 1 (plant) is described in the Final Environmental Statement (FES) related to operation of the facility issued by the Commission in January 1974 (Reference 1). The plant has a single boiling water reactor, manufactured by the General Electric Company, which generates steam at 1000 psig to drive the turbine-generator. The reactor has a rating of 1850 megawatts thermal (Mwt), corresponding to a net electrical output of 610 megawatts electrical (Mwe). Pertinent descriptions of principal features of the plant as it currently exists are summarized below to aid the reader in following the evaluations in subsequent sections of this appraisal.

4.1 Fuel Inventory

The reactor core, which contains 532 fuel assemblies, is refueled every eighteen months, with about 30 percent or 160 fuel assemblies replaced during each refueling period. The assemblies now in use were manufactured by General Electric Company.

4.2 Plant Cooling Water Systems

The plant uses once-through cooling to dissipate to the environment waste heat from the main condensers and auxiliary cooling systems. The circulating water for the plant is drawn from Lake Ontario into a submerged inlet, circulated through the condensers, and returned to the lake through a submerged discharge structure. There is also a separate service water system used to cool the intermediate heat exchangers in the reactor building and turbine building cooling water systems, the steam jet air ejector precooler, and the building area coolers. The service water system also provides makeup water to the demineralizer and water for the pump screen wash pumps. At maximum power output the plant requires a total flow of 268,000 gpm: 250,000 gpm are for the main conderser and 18,000 gpm are for service water requirements. The main condenser raises the cooling water temperature a maximum of 32°F corresponding to a heat rejection rate of 4.0×10^9 BTU/hrs. The service water temperature is raised about 20°F. The temperature rise for the total flow is about 31.2°F.

The service water system is supplied by two full-capacity (20,000 gpm) pumps which take suction from a flooded suction pit in the screen-house. The 20,000 gpm rating is based on a maximum requirement of 19,200 gpm, of which 6200 gpm is for the reactor building cooling water system, 8000 gpm is for the turbine building cooling water system, and the remainder is for four other systems.

The function of the reactor building cooling water system is to provide controlled cooling via a closed loop to all auxiliary equipment in the reactor and waste disposal buildings. The cooling water temperature is to be maintained at 85°F to 90°F at all times in order to avoid chilling of equipment. The reactor building cooling water system provides cooling water during normal Station operation to the following major components.

Cleanup nonregenerative heat exchangers
Fuel pool heat exchangers
Drywell coolers
Waste concentrator condenser
Reactor recirculating pump coolers
Instrument air compressor

In addition to the above, during normal Station shutdown, cooling water is provided to the shutdown cooling system heat exchangers. The full capacity of the system is 9000 gpm, which is the maximum cooling requirement during shutdown. The heat load at this full capacity is 136×10^6 Btu/hr. The system consists of three half-capacity pumps and three half-capacity heat exchangers plus necessary flow control valves. Each of the three pumps is rated at 4500 gpm, and in normal Station operation, one pump will be sufficient to provide cooling to all necessary reactor and waste disposal building equipment. A second pump is needed only when the shutdown cooling system is employed, at which time the cooling load is about doubled. The heat exchangers are designed to cool every component in the system with the maximum lake temperature of 77°F.

4.3 Radioactive Wastes

The plant contains waste handling and treatment systems designed to collect and process gaseous, liquid and solid waste that might contain radioactive material. The waste handling and treatment systems are evaluated in Section 3.5 of the FES and there is no change in this Section as a result of modification of the SFP.

4.4 Purpose of SFP

The SFP at Nine Mile Point Nuclear Station Unit No. 1 (NMP-1) was designed to store spent fuel assemblies prior to shipment to a reprocessing facility. These assemblies may be transferred from the reactor core to the SFP during a core refueling, or to allow for inspection and/or modification to core internals. The latter may require the removal and storage of up to a full core. The assemblies are initially intensely radioactive due to their fission product content and have a high thermal output. They are stored in the SFP to allow for radioactive and thermal decay.

The major portion of decay occurs during the first 120-day period following removal from the reactor core. After this period, the assemblies may be withdrawn and placed into a heavily shielded fuel cask for offsite shipment. Space permitting, the assemblies may be stored for an additional period which will provide for additional fission product decay and thermal cooling prior to shipment.

4.5 SFP Cooling and Cleanup System

The SFP for NMP-1 is provided with two parallel cooling loops which remove residual heat from fuel stored in the SFP. The Spent Fuel Pool Cooling and Cleanup System (SFPCCS) was designed to maintain the SFP water temperature less than or equal to 125°F during maximum anticipated normal and emergency storage conditions. The cooling and cleanup system is described in Section X.H. of the FSAR.

The SFP cooling and cleanup system consists of two 600 gpm circulating pumps, two heat exchangers, two filter demineralizers, and the required piping, valves and instrumentation. The pumps draw water from the pool or the refueling cavity, circulate it through the heat exchangers (the primary side) and filters and return it to the pool. Cooling water is supplied to the heat exchangers (secondary side) from the reactor building cooling water system, which is maintained at 85°F to 95°F. Experience has shown that 25-micron-particle size filtration should be sufficient to maintain pool clarity; however, the precoat-type filters provided are capable of removing particles as small as one micron. Therefore, the filters are adequate to provide SFP water cleanup.

5.0 Environmental Impacts of Proposed Action

5.1 Land Use

The proposed modification will not alter the external physical geometry of the SFP. No additional commitment of land is required.

The SFP was designed to store spent fuel assemblies under water for a period of time to allow shorter-lived radioactive isotopes to decay and to reduce this thermal heat output. The Commission has never set a limit on how long spent fuel assemblies could be stored onsite. The longer the fuel assemblies decay, the less radioactivity they contain. The proposed modification will not change the basic land use of the SFP. The pool was designed to store the spent fuel assemblies from up to seven normal refuelings. The modification would provide storage for up to twelve normal refuelings. The pool was intended to store spent fuel. This use will remain unchanged by the proposed modification.

5.2 Water Use

There will be no significant change in plant water usage as a result of the proposed modification. Storing additional spent fuel in the SFP will increase the heat load on the SFP cooling system, which is transferred to the Reactor Building Cooling Water System and thence to the plant Service Water System. The modification will not change the flow rate within these cooling systems. In the December 7, 1976 submittal, the licensee stated that for both the annual refueling and the full core offload, the spent fuel pool outlet temperature will be maintained below 125°F. As discussed in the staff's Safety Evaluation of this proposed modification, we conclude that the 125°F is a conservative estimate of the maximum pool outlet water temperature if both trains of the spent fuel pool cooling system are operating. Since the temperature of the SFP water during normal refueling operations will ramain below the 125°F evaluated in the FES, the rate of evaporation and, thus, the need for makeup water will not be significantly changed by the proposed modification.

5.3 Radiological
5.3.1 Introduction

The potential offsite radiological environmental impacts associated with the expansion of the NMP-1 spent fuel storage capacity were evaluated and determined to be environmentally insignificant as addressed below.

The existing spent fuel storage racks are capable of storing the spent fuel from seven refuelings. The expansion of the SFP would allow the storage of spent fuel from five additional refuelings to be stored onsite. According to the present NMP-1 schedule, refuelings occur about every 18 months. The additional spent fuel which would be stored, due to the expansion of capacity, is fuel which has decayed for up to 10 years. During the storage of the spent fuel under water, both volatile and nonvolatile radioactive nuclides may be released to the water from the surface of the assemblies or from defects in the fuel cladding. Most of the material released from the surface of the assemblies consists of activated corrosion products such as Co-58, Co-60, Fe-59 and Mn-54 which are not volatile. The radionuclides that might be released to the water through defects in the cladding, such as Cs-134, Cs-137, Sr-89 and Sr-90, are also predominately nonvolatile. The primary impact of such nonvolatile radioactive nuclides is their contribution to radiation levels to which workers in and near the SFP would be exposed. The volatile fission product nuclides of most concern that might be released through defects in the fuel cladding are the noble gases (xenon and krypton), tritium and the iodine isotopes.

5.3.2 Effect of Fuel Failures on the SFP

Experience indicates that there is little radionuclide leakage from Zircaloy clad spent fuel stored in pools for over a decade. The predominance of radionuclides in the spent fuel pool water appears to be radionuclides that were present in the reactor coolant system prior to refueling (which become mixed with water in the spent fuel pool during refueling operations) or crud dislodged from the surface of the spent fuel during transfer from the reactor core to the SFP. During and after refueling, the spent fuel pool cleanup system reduces the radioactivity concentrations considerably.

A recent Battelle Northwest Laboratory (BNL) report, "Behavior of Spent Nuclear Fuel in Water Pool Storage" (BNWL-2256 dated September 1977), states that radioactivity concentrations may approach a value up to 0.5 μCi/ml during fuel discharge in the SFP. After the refueling, the SFP ion exchange and filtration units will reduce and maintain the pool water in the range of 10^{-3} to 10^{-4} μCi/ml.

It is theorized that most failed fuel contains small, pinhole-like perforations in the fuel cladding at reactor operating conditions of approximately 800°F. A few weeks after refueling, the spent fuel cools in the spent fuel pool so that fuel clad temperature is relatively cool, approximately 180°F. This substantial temperature reduction should reduce the rate of release of fission products from the fuel pellets and decrease the gas pressure in the gap between pellets and clad, thereby tending to retain the fission products within the gap. In addition, most of the gaseous fission products have short half-lives and decay to insignificant levels within a few months.

In handling defective fuel, the BNL study found that the vast majority of failed fuel does not require special handling and is stored in the same manner as intact fuel. Two aspects of the defective fuel account for its favorable storage characteristics. First, when a fuel rod perforates in-reactor, the radioactive gas inventory is released to the reactor primary coolant. Therefore, upon discharge, little additional gas release occurs. Only if the failure occurs by mechanical damage in the basin are radioactive gases released in detectable amounts, and this type of damage is extremely rare. In addition, most of the gaseous fission products have short half-lives and decay to insignificant levels. The second favorable aspect is the inert character of the uranium oxide pellets in contact with water. This has been demonstrated in laboratory studies and also by casual observations of pellet behavior when broken rods are stored in pools.

Operators at several reactors have discharged, stored, and/or shipped relatively large numbers of Zircaloy-clad fuel which developed defects during reactor exposures, e.g., Ginna, Oyster Creek, Nine Mile Point, and Dresden Unit Nos. 1 and 2. Several hundred Zircaloy-clad assemblies which developed one or more defects in-reactor are stored in the GE-Morris pool without need for isolation in special cans. Detailed analysis of the radioactivity in the pool water indicates that the defects are not continuing to release significant quantities of radioactivity. Normal radioactivity concentrations in the Morris pool water are about $3x10^{-4}$ μCi/ml which is near the maximum desired concentration for occupational exposure considerations in bathing and culinary uses. The radioactivity concentrations rose to $2x\ 10^{-3}$ μCi/ml during a month when the water cleanup system was removed from service.

Based on the operational reports submitted by the licensees and discussions with the operators, there has not been any significant leakage of fission products from spent light water reactor fuel stored in the Morris Operation (MO) pool (formely Midwest Recovery Plant) at Morris, Illinois, or at Nuclear Fuel Services' (NFS) storage pool at West Valley, New York. Spent fuel has been stored in these two pools which, while it was in a reactor, was determined to have significant leakage and was, therefore, removed from the core. After storage in the onsite spent fuel pool, this fuel was later shipped to either MO or NFS for extended storage. Although the fuel exhibited significant leakage at reactor operating conditions, there was no significant leakage from this fuel in the offsite storage facility.

5.3.3 Radioactive Material Released to Atmosphere

With respect to gaseous releases, the only significant noble gas isotope attributable to storing additional assemblies for a longer period of time would be krypton-85. As discussed previously, experience has demonstrated that after spent fuel has decayed 4 to 6 months, there is no significant release of fission products from defected fuel. However, we have conservatively estimated that an additional 50 curies per year of Krypton-85 may be released from the SFP when the modified pool is completely filled. This increase would result in an additional total body dose at the site boundary to an individual of less than 0.0001 man-rem/year. This dose is insignificant when compared to the approximately 100 man-rem/year that an individual receives from natural background radiation. The additional total body dose to the estimated population within a 50-mile radius of the plant is less than 0.0002 man-rem/year. This is less than the natural fluctuations in the dose this population would receive from natural background radiation. Under our conservative assumptions, these exposures represent an increase of less than 0.1% of the exposures from the plant evaluated in the FES for the individual (Table 5.7) and the population (Table 5.8) (Reference 1). Thus, we conclude that the proposed modification will not have any significant impact on radiation levels or exposures offsite.

Assuming that the spent fuel will be stored onsite for several years, iodine-131 releases from spent fuel assemblies to the SFP water will not be significantly increased because of the expansion of the fuel storage capacity since the iodine-131 inventory in the fuel will decay to negligible levels between each annual refueling.

Storing additional spent fuel assemblies in not expected to increase the bulk water temperature above the 125°F used in the design analysis during normal refuelings. Since the temperature of the pool water will normally be maintained below 125°F, it is not expected that there will be any significant change in evaporation rates or the release of tritium or iodine as a result of the proposed modification from that previously evalauted. Most airborne releases from the plant result from leakage of reactor coolant which contains tritium and iodine in higher concentrations than the spent fuel pool. Therefore, even if there were a slightly higher evaporation rate from the spent fuel pool, the increase in tritium and iodine released from the plant as a result of the increase in stored spent fuel would be small compared to the amount normally released from the plant and that which was previously evaluated in the FES.

5.3.4 Solid Radioactive Wastes

The concentration of radionuclides in the pool is primarily controlled by the filter-demineralizers and by decay of short-lived isotopes. The activity is high during refueling operations while reactor coolant water is introduced into the pool and decreases as the pool water is processed through the filter-demineralizers. The increase of radioactivity, if any, should be minor because the additional spent fuel to be stored is relatively cool, thermally, and radionuclides in the fuel will have decayed significantly.

While we believe that there should not be an increase in solid radwaste due to the modification, as a conservative estimate, we have assumed that the amount of solid radwaste may be increased by 33 cubic feet of powdex resin a year from the filter-demineralizers. The annual average volume of solid waste shipped from NMP-1 from 1972 to 1976 was 17,300 feet. If the storage of additional spent fuel does increase the amount of solid waste from the SFP purification systems by about 33 cubic feet per year, the increase in total waste volume shipped would be less than 0.2% and would not have any significant environmental impact.

5.3.5 Radioactivity Released to Receiving Waters

There should not be a singificant increase in the liquid release of radionuclides from the station as a result of the proposed modification. The amount of radioactivity on the SFP powdex resins in the filter-demineralizers might slightly increase due to the additional spent fuel in the pool but this increase of radioactivity should not be released in liquid effluents from the station.

The powdex resins are periodically flushed with water to the solid waste system and are not regenerated. The water used to transfer the spent resin is decanted from the tank and returned to the liquid radwaste system for processing. The radioactivity will be retained on the resins. If any activity should be transferred from the spent resin to this flush water, it would be removed by the liquid radwaste system. After processing in the radwaste system there should not be a significant increase in the amount of radioactivity released to the environment in liquid effluents as a result of the proposed modification.

5.3.6 Occupational Exposures

We have reviewed the licensee's plan for the removal, disassembly and disposal of 17 low density racks and 6 channels, and the installation of the same number of high density racks and channels with respect to occupational radiation expsoure. The occupational radiation exposure for this operation is estimated to be about 16 man-rem. We consider this to be a reasonable estimate. It is about the same order of magnitude as radiation exposures from other operations that will occur during the facility lifetime. This operation, however, is expected to be performed only once during the lifetime of the station and will, therefore, represent a very small fraction of the total man-rem burden from occupational exposure.

We have estimated the increment in onsite occupational dose resulting from the proposed increase in stored fuel assemblies on the basis of information supplied by the licensee and by utilizing realistic assumptions for occupancy times and for dose rates in the spent fuel pool area from radionuclide concentrations in the SFP water. The spent fuel assemblies themselves contribute a negligible amount to dose rates in the pool area because of the depth of water shielding the fuel. The occupational radiation exposure resulting from the proposed action represents a negligible burden. Based on present and projected operations in the spent fuel pool area, we estimate that the proposed modification will add less than one percent to the total annual occupational radiation exposure burden at this facility. The small increase in radiation exposure will not affect the licensee's ability to maintain individual occupational doses to as low as is reasonably achievable and within limits of 10 CFR 20. Thus, we conclude that storing additional fuel in the SFP will not result in any significant increase in doses received by occupational workers.

5.3.7 Evaluation of Radiological Impact

As discussed above, the proposed modification does not significantly change the radiological impact evaluated in the FES.

5.4 Nonradiological Effluents

There will be no change in the chemical or biocidal effluents from the plant as a result of the proposed modification.

The only potential offsite nonradiological environmental impact that could arise from this proposed action would be additional discharge of heat to the atmosphere and to Lake Ontario. Storing spent fuel in the SFP for a longer period of time will add more heat to the SFP water. The spent fuel pool heat exchangers are cooled by the reactor building cooling water system which in turn is cooled by the plant service water system. An evaluation of the augmented spent fuel storage facility was made to determine the effects of the increased heat generation on the plant cooling water systems, and ultimately, on the environment.

As discussed in the staff's Safety Evaluation, the maximum incremental heat load that will be added by use of the proposed rack modification is that from unloading a full core which would fill the pool. The maximum calculated heat generation rate in this case would be about 17.9×10^6 Btu/hr.

A significant result of the decay heat rate calculations is that at ten days after shutdown all existing fuel assemblies (1452) in the fuel pool contribute only 7.3% of the total heat load to the spent fuel pool. The majority of the heat (92.7%) results from the full core unload which is 532 fuel assemblies.

It can be concluded from the above discussion that expansion of the spent fuel pool from its present capacity to 1984 storage spaces does not significantly increase the heat load to the spent fuel pool cooling system. Since the greatest portion of the decay heat (approximately 93.%) is produced by the bundles being discharged from the core rather than those bundles which have been stored in the spent fuel pool from previous discharges, the added storage capacity will add less than 2×10^6 Btu/hr. to the Reactor Building Cooling Water System, which was designed for a capacity of 136×10^6 Btu/hr.

The total heat load on the environment from NMP-1 used in the evaluation in the FES was 4.0×10^9 Btu/hr. The incremental heat load attributable to the proposed modification would be about 0.05% of the total projected heat rejection rate. Compared to the existing heat load, which was evaluated in the FES and has been evaluated by continuing environmental monitoring programs, the additional thermal impact from the proposed modification would be negligible.

5.5 Impacts on the Community

The new storage racks will be fabricated offsite and shipped to the plant. No environmental impacts on the environs outside the spent fuel storage building are expected during removal of the existing racks and installation of the new racks. The nonradiological impacts within this building are expected to be limited to those normally associated with metal working activities; the radiological impacts were discussed in Section 5.3. No significant environmental impact on the community is expected to result from the fuel rack conversion or from subsequent operation with the increased storage of spent fuel in the SFP.

6.0 Environmental Impact of Postulated Accidents

The overhead handling systerm provided for moving shielded casks in the area of the SFP is provided with a sufficiently high degree of redundancy that the probability of a cask/or heavy load drop accident which can damage the pool water-tight integrity or damage fuel is small enough to approve the proposed modification.

The NRC staff has underway a generic review of load handling operations in the vicinity of spent fuel pools to determine the likelihood of a heavy load impacting fuel in the pool and, if necessary, the radiological consequences of such an event. However, considering the existing crane and rigging redundancy, we have concluded that the probability of a load-handling accident is sufficiently small that cask handling operations may proceed while this generic review is underway.

The consequences of the fuel handling accidents in the SFP area presented in the FES are not changed due to this modification.

7.0 Alternatives

In regard to this licensing action, the NRC staff has considered that following alternatives: (1) shipment of spent fuel to a fuel reprocessing facility, (2) shipment of spent fuel to a separate fuel storage facility, (3) shipment of spent fuel to another reactor site, and (4) ceasing operation of the facility. These alternatives are considered in turn.

The total construction cost associated with the proposed modification is estimated to be about $1,500,000 or approximately $1800 for each of the 844 fuel assemblies that the increased storage capacity will accommodate.

7.1 Reprocessing of Spent Fuel

As discussed earlier, none of the three commercial reprocessing facilities in the U.S. is currently operating. The General Electric Company's Midwest Fuel Recovery Plant at Morris, Illinois, is in a decommissioned condition. On September 22, 1976, Nuclear Fuel Services, Inc. (NFS) informed the Nuclear Regulatory Commission that they were "withdrawing from the nuclear fuel reprocessing business." The Allied-General Nuclear Services (AGNS) reprocessing plant received a construction permit on December 18, 1970. In October 1973, AGNS applied for an operating license for the reprocessing facility; construction of the reprocessing facility is essentially complete but no operating license has been granted. On July 3, 1974, AGNS applied for a materials license to receive and store up to 400 MTU of spent fuel in the onsite storage pool, on which construction has also been completed but hearings with respect to this application have not yet commenced and no license has been granted.

In 1976, Exxon Nuclear Company, Inc. submitted an application for a proposed Nuclear Fuel Recovery and Recycling Center (NFRRC) to be located at Oak Ridge, Tennessee. The plant would include a storage pool that could store up to 7000 MTU in spent fuel. The application for the construction permit is under review.

On April 7, 1977, the President issued a statement outlining his policy on continued development of nuclear energy in the U.S. The President stated that: "We will defer indefinitely the commercial reprocessing and recycling of the plutonium produced in the U.S. nuclear power programs. From our own experience, we have concluded that a viable and economic nuclear power program can be sustained without such reprocessing and recycling."

On December 23, 1977, the Nuclear Regulatory Commission announced that it would order the termination of the now-pending fuel cycle licensing actions involving GESMO (Docket No. RM-50-5), Barnwell Nuclear Fuel Plant Seprations Facility, Uranium Hexfluoride Facility, and Plutonium Product Facility (Docket No. 50-332, 70-1327 and 70-1821), the Exxon Nuclear Company, Inc. Nuclear Fuel Recovery and Recycling Center (Docket No. 50-564), the Westinghouse Electric Corporation Recycle Fuels Plants (Docket No. 70-1432), and the Nuclear Fuel Services, Inc. West Valley Reprocessing Plant (Docket No. 50-201). The Commission also announced that it would not at this time consider any other applications for commercial facilities for reprocessing spent fuel, fabricating mixed-oxide fuel, and related functions. At this time, any considerations of these or comparable facilities has been deferred for the indefinite future. Accordingly, the Staff considers that shipment of spent fuel to such facilities for reprocessing is not a reasonable alternative to the proposed expansion of the NMP-1 spent fuel pool especially when considered in the relevant time frame - i.e., through the mid-1980's - when expanded capacity at NMP-1 will be needed.

The licensee had intended to reprocess the spent fuel to recover and recycle the uranium and plutonium in the fuel. Due to a change in national policy and circumstances beyond the licensee's control, reprocessing of the spent fuel is not an available option at this time.

7.2 Independent Spent Fuel Storage Facility

An alternative to expansion of onsite spent fuel pool storage is the construction of new "independent spent fuel storage installations" (ISFSI). Such installations could provide storage space in excess of 1000 MTU of spent fuel. This is far greater than the capacities of onsite storage pools. Fuel storage pools at GE Morris and NFS are functioning as ISFSIs although this was not the orignial design intent. Likewise, if the receiving and storage station at AGNS is licensed to accept spent fuel, it would be functioning as an ISFSI until the reprocessing facility is licensed to operate. The license for the GE facility at Morris, Illinois, was amended on December 3, 1975 to increase the storage capacity to about 750 MTU:* as of November 1, 1977 295 MTU was stored in the pool in the form of over 1000 assemblies. The staff has discussed the status of storage space at MO with GE personnel. We have been informed that GE is primarily operating the MO facility to store either fuel owned by GE (which had been leased to utilities on an energy basis) or fuel which GE had previously contracted to reprocess. We were informed that the present GE policy is not to accept spent fuel for storage except for that fuel for which GE has a previous commitment. The NFS facility has capacity for about 260 MTU, with approximately 170 MTU presently stored in the pool. The storage pool at West Valley, New York, is on land owned by the State of New York and leased to NFS thru 1980. Although the storage pool at West Valley is not full, since NFS withdrew from the fuel reprocessing business, correspondence we have received indicates that they are not at present accepting additional spent fuel for storage even from the reactor facilities with which they had contracts. The status of the storage pool at AGNS was discussed above.

*An application for an 1100 MTU capacity addition is pending. Present schedule calls for completion in 1980 if approved. However, by motion dated November 8, 1977 General Electric Company requested the Atomic Safety and Licensing Board to suspend indefinitely further proceedings on this application. This motion was granted.

With respect to construction of new ISFSIs, Regulatory Guide 3.24, "Guidance on the License Application, Siting, Design, and Plant Protection for an Independent Spent Fuel Storage Installation," issued in December 1974, recognizes the possible need for ISFSIs and provides recommended criteria and requirements for water-cooled ISFSIs. Pertinent sections of 10 CFR Parts 19, 20, 30, 40, 51, 70, 71 and 73 would also apply.

The staff has estimated that at least five years would be required for completion of an independent fuel storage facility. This estimate assumes one year for preliminary design; one year for preparation of the license application, Environmental Report, and licensing review in parallel with one year for detail design; two and one-half years for construction and receipt of an operating license; and one-half year for plant and equipment testing and startup.

Industry proposals for independent spent fuel storage facilities are scarce to date. In late 1974, E. R. Johnson Associates, Inc. and Merrill Lynch, Pierce, Fenner and Smith, Inc. issued a series of joint proposals to a number of electric utility companies having nuclear plants in operation or contemplated for operation, offering to provide independent storage services for spent nuclear fuel. A paper on this proposed project was presented at the American Nuclear Society meeting in November 1975 (ANS Transactions, 1975 Winter Meeting, Vol. 22, TANSAO 22-1-836, 1975). In 1974, E. R. Johnson Associates estimated their construction cost at about $20 million.

Several licensees have evaluated construction of a separate independent spent fuel storage facility and have provided cost estimates. In 1975, Connecticut Yankee, for example, estimated that to build an independent facility with a storage capacity of 1000 MTU (BWR and/or PWR assemblies) would cost approximately $54 million and take about 5 years to put into operation. Commonwealth Edison estimated the construction cost to build a fuel storage facility at about $10,000 per fuel assembly. To this would be added the costs for maintenance, operation, safeguards, security, interest on investment, overhead, transportation and other costs.

On December 2, 1976, Stone and Webster Corporation submitted a topical report requesting approval for a standard design for an independent spent fuel storage facility. No specific locations were proposed, although the design is based on location near a nuclear power facility. No estimated costs for fuel storage were included in the topical report.

On a short-term basis (i.e., prior to 1983) an independent spent fuel storage installation does not appear to be a viable alternative based on cost or availability in time to meet the licensee's needs. It is also unlikely that the total environmental impacts of constructing an independent facility and shipment of spent fuel would be less than the minor impacts associated with the proposed action.

In the long-term, the U.S. Department of Energy (USDOE) is modifying its program for nuclear waste management to include design and evaluation of a retrievable storage facility to provide Government storage at central locations for unreprocessed spent fuel rods. The pilot plant is expected to be completed by late 1985 or 1986. It is estimated that the long-term storage facility will start accepting commercial spent fuel about 1990. The design is based on storing the spent fuel in a retrievable condition for a minimum of 25 years. The criteria for acceptance is expected to be that the spent fuel must have decayed a minimum of ten years so it can be stored in dry condition without need for forced air circulation. An an interim alternative to the long term retrievable storage facility, on October 18, 1977, USDOE announced a new "spent nuclear fuel policy." USDOE will determine industry interest in providing interim fuel storage services on a contract basis. If adequate private storage services cannot be provided, the Government will provide interim fuel storage facilities. It was announced by USDOE at a public meeting held on October 26, 1977, that this interim storage is expected to be available in the 1981-1982 time frame. USDOE thru their Savannah River Operations Office is preparing a conceptual design for a possible spent fuel storage pool of about 5000 MTU capacity. Based on our discussions with USDOE personnel, it appears that the earliest such a pool could be licensed to accept spent fuel would be about 1983. The interim facility(s) would be designed for storage of the spent under water. USDOE stated that it was their intent to not accept any spent fuel that had not decayed a minimum of five (5) years.

As announced in the President's energy policy statement of April 29, 1977, the preferred solution to the spent fuel storage program is to have the nuclear power plants store their spent fuel on-site until the government long term storage facility is operable, which is now estimated to be about 1990. For those nuclear power plants that cannot store the spent fuel on-site until the permanent long-term storage facility is available, USDOE will provide limited interim storage facilities.

The NMP-1 plant does not now have space in the SFP to discharge a full core. If the storage capacity of the SFP is not increased, the pool will be filled in early 1982. The precise date that interim storage would be available is not known at this time with sufficient precision to provide for planning. Should government facilities not be available by 1983, the NMP-1 plant might be forced to shutdown. Therefore, this does not appear to be a practical alternative, especially when considering the impact of plant shutdown as compared with the negligible environmental consequences of the proposed amendment.

The proposed increase in storage capacity will allow NMP-1 operate until 1991, by which time the Federal repository for spent fuel is expected to be operable.

In their submittal of December 7, 1976, the licensee stated that they had evaluated storage at commercial storage facilities. The licensee indicates the commercial storage facilities evaluated were ones in existence (e.g., Morris Operations). The licensee stated that it had been determined that the average cost, including transportation, for storage at a commercial facility is approximately $8000 per year per assembly. (In subsequent discussions with the licensee, it was determined that the $8000 per year should have been corrected to $4000 per year and that this was based on storage in an existing facility. It was also determined that this option was not available to them.) Based on the staff's evaluation of costs in conjunction with other licensing actions of this type, the $4000 figure is in line with what it could cost to store BWR fuel at an existing facility. The licensee pointed out that even if this alternative was available, only about 380 assemblies could be shipped before this alternative becomes less economical (considering rack modification only) and that this alternative would be economical only for a short term solution.

The staff concludes that even if offsite storage facilities are available, it is more economical to store spent fuel onsite and that there are no environmental benefits associated with offsite storage compared to the proposed action.

7.3 Storage at Another Reactor Site

Niagara Mohawk Corporation does not have another operating nuclear plant other than Nine Mile Point Unit No. 1. Nine Mile Point Unit No. 2 is under construction. As of November 1977, construction is estimated to be about 15% completed, with the earliest expected date for completion estimated to be March 1982. Historically, considerable delays have been experienced in construction of nuclear generating facilities. If NMP-2 were not to be completed on schedule, adoption of this alternative in lieu of the proposed action would present a very real possibility that NMP-1 might be forced to shutdown due to lack of storage space for spent fuel. At present, NMP-1 does not have room in the SFP to offload a full core. The proposed action would provide this capability as soon as the new racks are installed, whereas the alternative of using the NMP-2 SFP would not provide this capability until the facility is licensed. There would be no cost savings associated with this alternative. The licensee would have to install high density racks in the NMP-2 SFP similar to those being considered under the proposed modification for the NMP-1 SFP to be able to accommodate spent fuel from both NMP-1 and NMP-2 in the NMP-2 pool. There would be no benefit from this alternative in terms of environmental impacts. In fact, there would be a slight - but not significant - increase in the potential for accidents because of the additional fuel handling operations, the transfer of spent fuel into casks and the movement of casks between the two facilities. In summary, the alternative of planning to use the NMP-2 SFP on the assumption that it will be licensed to operate in 1982 presents significant risk of forcing shutdown of NMP-1 in 1983. Compared to the proposed action, there would be no offsiting reduction in costs or environmental benefits associated with this alternative. The staff does not consider the use of the Nine Mile Point Unit No. 2 to be a viable alternative.

The staff also considered the alternative of using the spent fuel pool at the James A. Fitzpatrick Nuclear Power Plant, which is located about 3200 feet to the east of the Nine Mile Point Nuclear Station on Lake Ontario. The licensee for the Fitzpatrick facility is the Power Authority of the State of New York. Fitzpatrick achieved initial criticality in November 1974. The facility shutdown for its first refueling in July 1977, at which time 132 spent fuel assemblies were transferred into the SFP. The next refueling is scheduled for June 1978, at which time, additional spent fuel assemblies are expected to be transferred into the SFP. The Fitzpatrick SFP presently contains storage space for 840 assemblies, of which 560 storage spaces would be needed to offload a full core. By letter dated April 22, 1977, the Power Authority notified the Commission that "the Authority is now planning to increase the storage capacity of the James A. Fitzpatrick Nuclear Power Plant Spent Fuel Pool to eliminate the need for removal of spent fuel from the pool until late in the 1980's". The Fitzpatrick SFP would have space to store spent fuel from NMP-1 on a temporary basis if NMP-1 had to offload a full core within the next year or two, but the present Fitzpatrick SFP does not have space to accommodate its own spent fuel beyond 1983. The staff concluded that use the Fitzpatrick SFP to store spent fuel from NMP-1 was not a practical alternative to the proposed action.

According to a survey conducted and documented by the former Energy Research and Development Administration, up to 27 of the operating nuclear power plants will lose the ability to refuel during the period 1977-1986 without additional spent fuel storage pool expansions or access to offsite storage facilities. Thus, the licensee cannot assuredly rely on any other power facility to provide additional storage capability except on a short-term emergency basis. If space were available in another reactor facility, it is unlikely that the cost would be less than storage onsite as proposed.

7.4 Shutdown of Facility

Storage of spent fuel from NMP-1 in the existing racks is possible but only for a short period of time. As discussed above, if expansion of the SFP capacity is not approved and if an alternate storage facility is not located, the licensee would have to shutdown NMP-1 in 1983 due to a lack of spent fuel storage facilities, resulting in the cessation of up to 610 megawatts net electrical energy production.

The licensee in their submittal of December 7, 1976 stated that the current energy replacement value for Nine Mile Point Unit No. 1 is approximately $250,000 a day (assuming 610 MWe). The licensee did not identify the source or availability of replacement power. In any case, this is not an economical alternative and would have an adverse socio-economic impact on the customers, the New York Power Pool, employees and stockholders of Niagara Mowhawk and on the communities in the licensee's service area.

7.5 Summary of Alternatives

In summary, the alternatives (1) to (3) described above are presently not available to the licensee or could not be made available in time to meet the licensee's need. Even if available, alternatives (2) and (3) are likely to be more expensive than the proposed modification and do not offer any advantages in terms of environmental impacts. The alternative of ceasing operation of the facility would be much more expensive than the proposed action because of the need to provide replacement power. In addition to the economic advantages of the proposed action, we have determined that the expansion of the storage capacity of the spent fuel pool for NMP-1 would have a negligible environmental impact. Accordingly, deferral or severe restriction of the proposed action proposed would result in substantial harm to the public interest.

8.0 Evaluation of Proposed Action

8.1 Unavoidable Adverse Environmental Impacts

8.1.1 Physical Impacts

As discussed above, expansion of the storage capacity of the SFP would not result in any significant adverse environmental impacts on the land, water, air or biota of the area.

8.1.2 Radiological Impacts

Expansion of the storage capacity of the SFP will not create any significant additional adverse radiological effects. As discussed in Section 5.3, the additional total body dose that might be received by an individual or the estimated population within a 50-mile radius is less than 0.0001 man-rem/yr and 0.0002 man-rem/yr, respectively, and is less than the natural fluctuations in the dose this population would receive from background radiation. The total dose to workers during removal of the present storage racks and installation of the new racks is estimated to be about 16 man-rem. Operation of the plant with additional spent fuel in the SFP is not expected to increase the occupational radiation exposure by more than one percent of the present total annual occupational exposure at this facility.

8.2 Relationships Between Local Short-Term Use of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

Expansion of the storage capacity of the SFP, which would permit the plant to continue to operate until 1991 when offsite storage facilities are expected to be available for interim or long-term storage of spent fuel, will not change the evaluation in the FES.

8.3 Irreversible and Irretrievable Commitments of Resources

8.3.1 Water, Land and Air Resources

The proposed action will not result in any significant change in the commitments of water, land and air resources as identified in the FES. No additional allocation of land would be made; the land area now used for the SFP would be used more efficiently by reducing the spacings between fuel assemblies.

8.3.2 Material Resources

Under the proposed modification, the present aluminum storage racks in the SFP will be replaced by new stainless steel racks that will increase the storage capacity of the SFP by 844 spent fuel assemblies. The proposed spent fuel storage racks, which are designed to support the fuel assemblies on a nominal 9.3 x 5.9 inch pitch, are to be fabricated from 0.090 inch thick, type 304 stainless steel. The steel racks will be made from two types of rectangular boxes. One of the boxes will be sized to hold two fuel assemblies in a close-packed condition, while the other will be designed to contain water for moderating and absorbing neutrons. When these racks are installed in the fuel pool, there will be rows of close-packed fuel assemblies separated by the 3.25 inch wide water boxes. The fuel storage and water boxes are 165" long. There is a base plate at the bottom of the fuel storage boxes containing two holes to support and position the fuel assemblies. There are upper end caps that fit over the top of the water boxes to provide "lead-in" for insertion of fuel assemblies into adjacent boxes.

There will be six different configurations of the high density fuel racks used to fill the pool. These units are structurally identical and differ only in the number of boxes used to construct them. To fit the geometry of the SFP, the licensee proposes to use eight racks containing 108 storage cells, three with 128 cells, two with 160 cells and one rack each with 96, 120 and 200 cells, for a total storage capacity of 1984 fuel assemblies.

The resources to be committed for fabrication of the new spent fuel storage racks total approximately 300,000 pounds of stainless steel. The racks do not use a poison material such as boron impregnated stainless steel, B_4C plates or boral. The amount of stainless steel used annually in the U.S. is about 2.82×10^{11} lbs. The material is readily available in abundant supply. The amount of stainless steel required for fabrication of the new racks is a small amount of this resource consumed annually in the United States. We conclude that the amount of material required for the new racks at NMP-1 is insignificant and does not represent a significant irreversible commitment of material resources.

The longer term storage of spent fuel assemblies withdraws the unburned uranium from the fuel cycle for a longer period of time. Its usefulness as a resource in the future, however, is not changed. The provision of longer onsite storage does not result in any cumulative effects due to plant operation since the throughput of materials does not change. Thus, the same quantity of radioactive material will have been produced when averaged over the life of the plant. This licensing action would not constitute a commitment of resources that would affect the alternatives available to other nuclear power plants or other actions that might be taken by the industry in the future to alleviate fuel storage problems. No other resources need be allocated because the design characteristics of the SFP remain unchanged.

We conclude that the expansion of the SFP at the NMP-1 facility does not constitute a commitment of either material or nonmaterial resources that would tend to significantly foreclose the alternatives available with respect to any other individual licensing actions designed to ameliorate a possible shortage of spent fuel storage capacity.

8.4 Commission Policy Statement Regarding Spent Fuel Storage

On September 16, 1975, the Commission announced (40FR42801) its intent to prepare a generic environmental impact statement on handling the storage of spent fuel from light water reactors. In this notice, the Commission also announced its conclusion that it would not be in the public interest to defer all licensing actions intended to ameliorate a possible shortage of spent fuel storage capacity pending completion of the generic environmental impact statement. The draft statement is expected to be completed in the first part of 1978.

The Commission directed that in the consideration of any such proposed licensing action, among other things, the following five specific factors should be applied, balanced, and weighed in the context of the required environmental statement or appraisal:

1. Is it likely that the licensing action proposed here would have a utility that is independent of the utility of other licensing actions designed to ameliorate a possible shortage of spent fuel capacity?

   A reactor core for NMP-1 contains 532 fuel assemblies. Typically, the reactor is refueled once every 18 months: Each refueling replaces about 1/3 of the core (about 160 assemblies), and each new assembly contains about 183 kilograms of uranium. The SFP was designed on the basis that a fuel cycle would be in existence that would only require storage of spent fuel for a year or two prior to shipment to a reprocessing facility. Initially, sufficient racks were installed to store 800 spent fuel assemblies (1 1/2 cores), which was a typical design basis for BWRs in the late sixties and early seventies. By letter dated March 5, 1976, NRC provided NMPC their evaluation of the installation of additional racks in the NMP-1 SFP to bring the storage capacity - to the present capability of 1140 spent fuel assemblies. When NMP-1 was designed, a SFP storage capacity for 1 1/2 cores was considered adequate. This provided for complete unloading of the reactor even if the spent fuel from a previous refueling were in the pool. While not required from the standpoint of safety considerations, it is a desirable engineering practice to reserve space in the SFP to receive an entire reactor core, should this be necessary to inspect or repair core internals or because of other operational considerations.

   If 160 fuel assemblies are discharged every 18 months, the SFP will be full after the refueling scheduled for early 1982. The spent fuel must be stored onsite or elsewhere if the facility is to be refueled. If expansion of the SFP capacity is not approved or if an alternate storage facility is not located, the licensee will have to shutdown Nine Mile Point Unit No. 1 about mid 1983. As discussed under alternatives, an alternate storage facility is not now available. Storage onsite is an interim solution to allow the plant to continue to operate.

   The proposed licensing action (i.e., installing new racks of a design that permits storing more assemblies in the same space) would provide the licensee with additional flexibility which is desirable even if adequate offsite storage facilities hereafter become available to the licensee.

We have concluded that a need for additional spent fuel storage capacity exists at NMP-1 which is independent of the utility of other licensing actions designed to ameliorate a possible shortage of spent fuel capacity.

2. Is it likely that the taking of the action here proposed prior to the preparation of the generic statement would constitute a commitment of resources that would tend to significantly foreclose the alternatives available with respect to any other licensing actions designed to ameliorate a possible shortage of spent fuel storage capacity?

   With respect to this proposed licensing action, we have considered commitment of both material and nonmaterial resources. The material resources considered are those to be utilized in the expansion of the SFP. The nonmaterial resources are primarily the labor and talent needed to accomplish the proposed modification.

   The increased storage capacity of the NMP-1 spent fuel pool was also considered as a nonmaterial resource and was evaluated relative to proposed similar licensing actions at other nuclear power plants, fuel reprocessing facilities and fuel storage facilities. We have determined that the proposed expansion in the storage capacity of the SFP is only a measure to allow for continued operation and to provide operational flexibility at the facility, and will not affect similar licensing actions at other nuclear power plants. Similarly, taking this action would not commit the NRC to repeat this action or a related action in 1989, at which time the modified pool is estimated to be full if no fuel is removed.

   We conclude that the expansion of the SFP at Nine Mile Point Unit No. 1, prior to the preparation of the generic statement, does not constitute a commitment of either material or nonmaterial resources that would tend to significantly foreclose the alternatives available with respect to any other individual licensing actions designed to ameliorate a possible shortage of spent fuel storage capacity.

3. Can the environmental impacts associated with the licensing action here proposed be adequately addressed within the context of the present application without overlooking any cumulative environmental impacts?

   Potential nonradiological and radiological impacts resulting from the fuel rack conversion and subsequent operation of the expanded SFP at this facility were considered by the staff.

No environmental impacts on the environs outside the spent fuel storage building are expected during removal of the existing racks and installation of the new racks. The impacts within this building are expected to be limited to those normally associated with metal working activities and to the occupational radiation exposure to the personnel involved.

The potential nonradiological environmental impact atributable to the additional heat load in the SFP was determined to be negligible compared to the existing thermal effluents from the facility.

We have considered the potential radiological environmental impacts associated with the expansion of the SFP and have concluded that they would not result in radioactive effluent releases that significantly affect the quality of the human environment during either normal operation of the expanded SFP or under postulated fuel handling accident conditions.

4. Have the technical issues which have arisen during the review of this application been resolved?

   This Environmental Impact Appraisal and the accompanying Safety Evaluation respond to the questions concerning health, safety and environmental concerns. All technical issues which have arisen in connection with this application have been resolved with the licensee.

5. Would a deferral or severe restriction on this licensing action result in substantial harm to the public interest?

   We have evaluated the alternatives to the proposed action, including storage of the additional spent fuel offsite and ceasing power generation from the plant when the existing SFP is full. We have determined that there are significant economic advantages associated with the proposed action and that expansion of the storage capacity of the SFP will have a negligible environmental impact. Accordingly, deferral or severe restriction of the action here proposed would not be in the public interest.

9.0 Benefit-Cost-Balance

This section summarizes and compares the cost and the benefits resulting from the proposed modification to those that would be derived from the selection and implementation of each alternative. The table below presents a tabular comparison of these costs and benefits. The benefit that is derived from three of these alternatives is the continued operation of NMP-1 and production of electrical energy. As shown in the table, the reactor shutdown and subsequent storage of fuel in the reactor vessel results in the cessation of electrical energy production. While this would have the "benefit" of eliminating thermal, chemical and radiological releases from NMP-1, these effluents have been evaluated and it has been determined that the environmental impacts of these releases are not significant. Therefore, there would be no significant environmental benefit in their cessation. The remaining alternative, storage at other nuclear plants, is not possible at this time or in the foreseeable future except on an short term emergency basis.

From examination of the table, it can be seen that the most cost-effective alternative is the proposed spent fuel pool modification. As evaluated in the proceeding sections, the environmental impacts associated with the proposed modification would not be significantly changed from those analyzed in the Final Environmental Statement for Nine Mile Point Nuclear Station, Unit No. 1 issued January 1974.

10.0 Basis and Conclusion for not Preparing an Environmental Impact Statement

We have reviewed this proposed facility modification relative to the requirements set forth in 10 CFR Part 51 and the Council of Environmental Quality's Guidelines, 40 CFR 1500.6 and have applied, weighed, and balanced the five factors specified by the Nuclear Regulatory Commission in 40 FR 42801. We have determined that the proposed license amendment will not significantly affect the quality of the human environment and that there will be no significant environmental impact attributable to the proposed action other than that which has already been predicted and described in the Commission's Final Environmental Statement for the facility dated January 1974. Therefore, the staff has found that an environmental impact statement need not be prepared, and that pursuant to 10 CFR 51.5(c), the issuance of a negative declaration to this effect is appropriate.

SUMMARY OF COST-BENEFITS

Alternative	Cost	Benefit
Reprocessing of Spent Fuel		None - This alternative is not available either now or in the foreseeable future.
Increase storage capacity of NMP-1's	$1800/assembly	Continued operation of NMP-1 and production of electrical energy.
Storage at Independent Facility**	$4,000 to $8,000/ assembly plus shipping costs to facility.	Continued operation of NMP-1 and production of electrical energy. This alternative is not available for several years.
Storage at Reprocessor's Facility	$30,000 to 50,000/ assembly/10 Yr* plus shipping costs to facility.	Continued operation of NMP-1 and production of electrical energy. However, this alternative is not available now. It is uncertain whether this alternative will be available in the future.
Storage at Other Nuclear Plants	Comparable to storage at NMP-1	Continued operation of NMP-1 and production of electrical energy. However, this alternative is not available.
Reactor Shutdown	$250,000/day for replacement energy plus annual costs for maintenance, security and carrying charges on inventment.	None - No production of electrical energy.

* In order to use this alternative a minimum commitment of seven to ten years of storage is required.

** Costs for interim Government storage are expected to be published early in 1978.

References

1. Nine Mile Point Nuclear Station Unit 1 Final Environmental Statement January 1974.

2. Niagara Mohawk Power Corporation letter (G. K. Rhode) to NRC (B. C. Rusche), Application for Amendment, Nine Mile Point Unit 1 Spent Fuel Pool Modification, dated December 7, 1976.

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-220

NIAGARA MOHAWK POWER CORPORATION

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSE

AND NEGATIVE DECLARATION

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 21 to Facility Operating License No. DPR-63 issued to Niagara Mohawk Nuclear Power Corporation (the licensee) which revised Technical Specifications for operation of the Nine Mile Point Nuclear Station, Unit No. 1 (the facility) located in Oswego County, New York. The amendment is effective as of its date of issuance.

The amendment increases the spent fuel pool storage capacity from 1140 to 1984 fuel assemblies.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Notice of Proposed Issuance of Amendment to Facility Operating License in connection with this action was published in the FEDERAL REGISTER ON August 8, 1977 (42 FR 40060). No request for a hearing or petition for leave to intervene was filed following notice of the proposed action.

The Commission has prepared an environmental impact appraisal for the revised Technical Specifications and has concluded that an environmental impact statement for this particular action is not warranted because there will be no environmental impact attributable to the action other than that which has already been predicted and described in the Commission's Final Environmental Statement for the facility dated January 1974.

For further details with respect to this action, see (1) the application for amendment dated December 7, 1976 as supplemented by letters dated April 13, July 27, and September 29, 1977, (2) Amendment No. 21 to License No. DPR-63, (3) the Commission's related Safety Evaluation and (4) the Commission's Environmental Impact Appraisal. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the Oswego County Office Building, 46 E. Bridge Street, Oswego, New York 13126. A copy of items (2), (3) and (4) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland this 27 day of January 1978.

FOR THE NUCLEAR REGULATORY COMMISSION

Stanley J. Nowicki

Stanley J. Nowicki, Acting Chief
Operating Reactors Branch #3
Division of Operating Reactors