

Docket No. 50-220

MAR 5 1976

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Niagara Mohawk Power Corporation
 ATTN: Mr. Gerald K. Rhode
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Gentlemen:

We have completed our review of the information submitted in your letters of August 8, 1975, October 31, 1975, and January 7, 1976, regarding your planned modification of the Nine Mile Point Unit 1 spent fuel storage pool. As discussed in the attached enclosure we have concluded that (1) the planned modification, as described, does not involve an unreviewed safety question, and (2) the environmental impacts associated with the planned modification are not significantly different from those previously analyzed and reported in our Final Environmental Statement related to operation of Nine Mile Point Unit 1, issued January 1974.

Sincerely,

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

Enclosure:
 NRC Staff Review of Information
 Related to the Planned Modification
 of the Nine Mile Point Unit 1 Spent
 Fuel Storage Pool

cc: See next page

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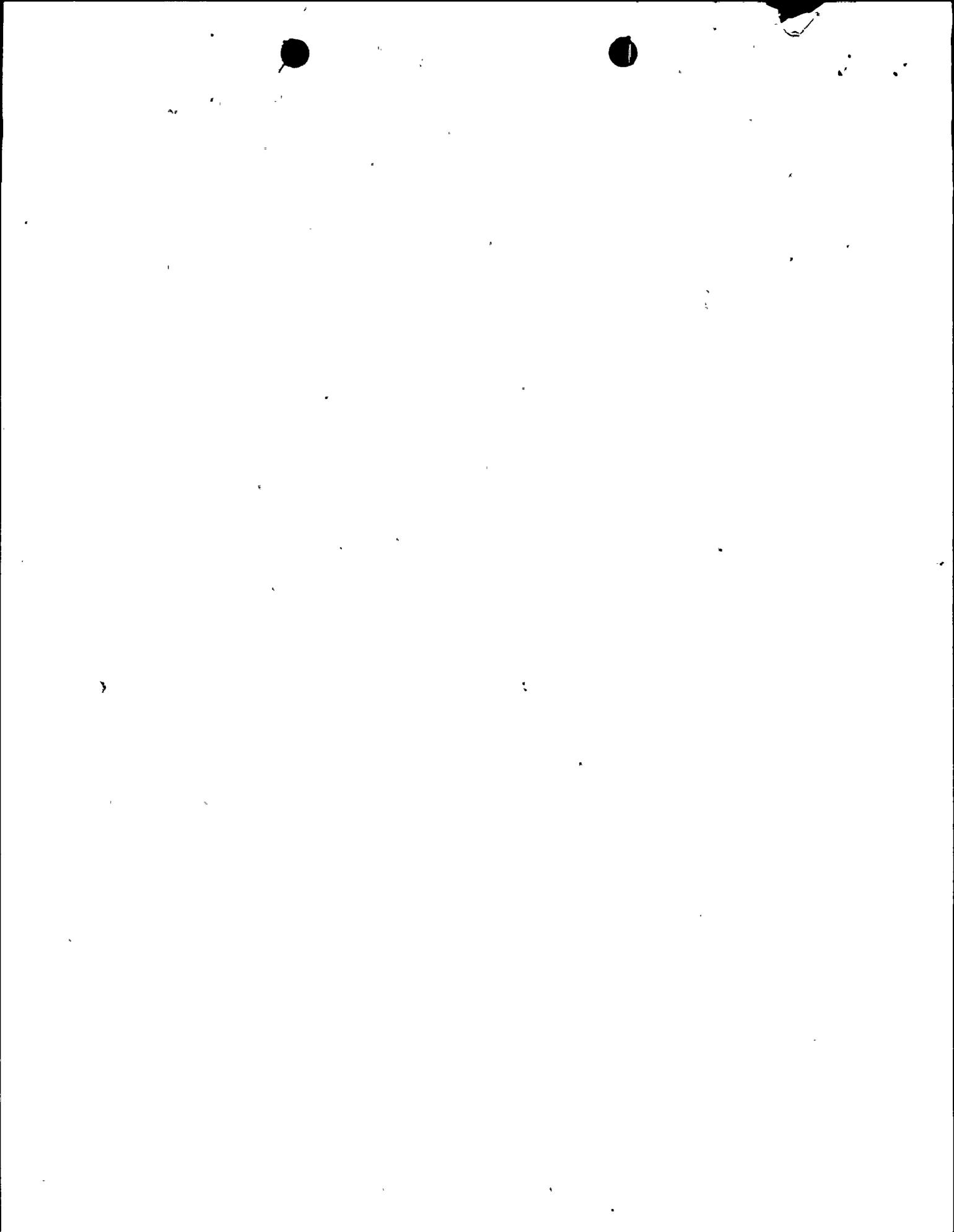
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NRC STAFF REVIEW OF INFORMATION RELATED TO THE PLANNED
MODIFICATION OF THE NINE MILE POINT UNIT 1 SPENT FUEL STORAGE POOL

LICENSEE: Niagara Mohawk Power Corporation
FACILITY: Nine Mile Point Unit 1
DOCKET NO.: 50-220

INTRODUCTION: By letter dated August 8, 1975, Niagara Mohawk Power Corporation (NMPC) informed the NRC that they intend to modify the Nine Mile Point Unit 1 (NMP-1) Facility by installing up to seventeen additional spent fuel storage racks in the spent fuel storage pool. NMPC stated that, based upon their safety evaluation of the planned modification, they had concluded that it does not constitute an unreviewed safety question.

By letter dated September 10, 1975, we requested additional information from NMPC to enable us to determine if we were in agreement with their conclusion that the planned spent fuel pool modification does not involve an unreviewed safety question. NMPC's submittal dated October 31, 1975 was responsive to our request.

By letter dated January 7, 1976, NMPC provided additional information which was requested by the NRC staff in order to determine the environmental impact associated with the planned spent fuel pool modification. NMPC's submittal was responsive to our request.

DISCUSSION: The planned modification consists of installing seventeen additional spent fuel storage racks in the spent fuel storage pool, thereby increasing the pool storage capacity from 800 to 1140 spent fuel assemblies. The additional fuel racks are identical in design to the existing racks and will be installed on existing swing bolt mountings in the spent fuel storage pool. Although the NMP-1 FSAR does not explicitly address the fact that the original design of the spent fuel storage pool included installation mountings for additional storage racks, the existence of such mountings is indicative of the licensee's long-standing intention to install additional racks at some time during the operational lifetime of the facility.

Based upon the projected refueling schedule for NMP-1, the existing spent fuel storage capacity would be filled during the September 1978 refueling. By increasing the storage capacity as planned, the spent fuel storage racks would not be filled until September 1981. Thus, this modification would provide additional time for long-term solutions to the industry-wide fuel storage and reprocessing problems to be worked out.

The only currently existing NMP-1 Technical Specification related to this planned modification is a requirement that the spent fuel storage facility be designed to maintain fuel in a geometry such that K_{eff} is less than 0.9.



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EVALUATION: SECTION 1.0 - EVALUATION TO DETERMINE THE EXISTENCE OF AN UNREVIEWED SAFETY QUESTION

We have evaluated the information presented in NMPC's letters of August 8 and October 31, 1975 to determine if any of the criteria which define an unreviewed safety question (10 CFR Part 50, Section 50.59(a)(2)) are applicable to the planned modification of the NMP-1 spent fuel storage pool. The specific aspects of the planned modification which have been considered are as follows:

1. Criticality Considerations

The NMP-1 Technical Specifications require that the spent fuel is stored in a geometrical configuration which assures that K_{eff} is less than 0.9. Compliance with this K_{eff} limit is assured by the spacing of the spent fuel assemblies in the spent fuel storage racks rather than by limiting the number of storage racks in the pool. Since the additional racks have been designed and will be placed in the pool such that the spent fuel assembly spacing is identical to that of the original racks, we conclude that the planned modification does not result in:

- (1) A requirement for a Technical Specification change, or
- (2) a decrease in a safety margin described in the bases of a Technical Specification, or
- (3) an increase in the probability or consequences of a criticality accident in the spent fuel storage pool.

2. Drop of a New Fuel Rack onto Existing Spent Fuel Storage Racks during Installation

The accident caused by dropping a heavy object into the spent fuel storage pool was previously considered in the "Second Supplement to the NMP-1 FSAR", dated October 1968. NMPC presented an analysis of the radiological consequences of dropping a spent fuel shipping cask onto spent fuel storage racks in the pool. Since this accident is a bounding analysis for similar accidents of this type, we conclude that the planned modification does not create the possibility of a new type of accident. In addition, NMPC has presented an analysis which demonstrates that the radiological consequences of dropping a new spent fuel storage rack into the pool are slightly less than the consequences of dropping a fuel assembly into the core during refueling operations. (An analysis of the



refueling accident was previously reviewed and accepted by the NRC staff in the Safety Evaluation Report for the conversion from Provisional to Full Term Operating License for NMP-1.) The probability of dropping a new fuel rack onto existing racks in the pool is no higher than that of dropping a fuel assembly into the core or into the spent fuel storage pool during refueling operations.

3. Loss of Spent Fuel Storage Pool Cooling

A loss of spent fuel storage pool cooling accident would consist of either a partial or complete loss of the redundant spent fuel storage pool cooling systems. This type of accident was not previously analyzed in the NMP-1 FSAR. However, since the probability of occurrence of such an accident is related to the reliability of the cooling system and its components and is independent of the amount of spent fuel stored in the pool, the planned modification does not create the possibility of a new type of accident.

NMPC has presented information which demonstrates that:

- (1) Under the maximum anticipated normal spent fuel storage conditions, only one of the two redundant cooling trains is required to be operating to maintain the pool water temperature at or below the design pool temperature of 125°F for both the post and pre-modification fuel storage capacities;
- (2) Under maximum anticipated emergency spent fuel storage conditions, both of the two redundant cooling trains are required to be operating to maintain the pool water temperature at or below the design pool temperature of 125°F for both the post and pre-modification fuel storage capacities; and
- (3) Under maximum anticipated emergency spent fuel storage conditions, a loss of one cooling train will result in an increase in the stabilized pool water temperature to a temperature less than 150°F for both the post and pre-modification fuel storage capabilities.



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- (4) The possibility of a simultaneous loss of both of the redundant spent fuel cooling trains is remote since the cooling system is designed as Seismic Category I. If such an unlikely event should occur, two independent emergency sources of pool makeup water are available.

Consequently, we conclude that the proposed modification does not significantly change the consequences of a loss of spent fuel storage pool cooling.

4. The new fuel racks will be installed onto existing mountings which have been designed to Seismic Category I criteria. The additional racks will not affect the integrity of the spent fuel storage pool for the design seismic event. Consequently, the seismic design considerations associated with the planned modification do not involve an unreviewed safety question.

Based on our evaluation of the planned modification to the NMP-1 spent fuel storage pool we conclude that it does not (i) increase the probability of occurrence or the consequences of an accident previously evaluated in the NMP-1 FSAR; or (ii) create the potential for an accident or malfunction of a different type than any previously evaluated in the NMP-1 FSAR; or (iii) reduce the margin of safety described in the bases of a NMP-1 Technical Specification.

Consequently, we conclude that the planned modification does not involve an unreviewed safety question.

SECTION 2.0 - EVALUATION TO DETERMINE THE ENVIRONMENTAL IMPACTS

On September 16, 1975, the Commission announced (40 F.R. 42801) its intent to prepare a generic environmental impact statement on handling and storage of spent fuel from light water power reactors. In this notice, the Commission also announced its conclusion that it would not be in the public interest to defer licensing actions intended to ameliorate a possible shortage of spent fuel storage capacity pending completion of the generic environmental impact statement. The Commission directed that in the consideration of any such proposed licensing action, five specific factors should be applied, balanced, and weighed in the context of the required environmental statement or appraisal. Although the planned modification of the NMP-1 spent fuel storage pool does not involve a licensing action (i.e., a license amendment), we have evaluated the environmental consequences of the modification by addressing the same five specific factors. The five factors and our response to each follow:



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

Response:

The planned facility modification would have independent utility, because it would enable the licensee to unload and store an additional amount of spent fuel which is equivalent to 2/3 of a complete core. Combined with the existing spent fuel storage capacity at NMP-1, the planned modification would result in a total storage capacity which is equivalent to slightly more than 2 complete cores.

This total capacity would give the licensee greater operational flexibility which would be desirable even if adequate offsite storage facilities were now or hereafter become available to the licensee.

2. Is it likely that completion of the planned modification 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?

Response:

It is not likely that completion of the planned modification 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 individual licensing action designed to ameliorate a possible shortage of spent fuel storage capacity. The time frame under consideration is two years, the staff's estimate of the time necessary to complete the generic environmental statement. The action here proposed will not have any significant effect on whether similar actions are or should be taken at other nuclear reactors since it will not affect either the need for or availability of storage facilities at other nuclear reactors. Similarly, the added capacity at NMP-1 will not significantly affect the need for the total additional storage space presently planned at fuel reprocessing facilities for which licensing actions are pending. The addition of fuel storage capacity planned for NMP-1 (approximately 76 metric tons of uranium) is less than ten percent of the total storage capacity proposed to be added or put into use



within the next two years at the reprocessing facilities of GE, NFS, and AGNS (1130 metric tons of uranium). The modification at NMP-1 would postpone the date when it would be necessary to ship spent fuel offsite. The planned modification would allow for continued use of nuclear fuel, but it would not lead to increased use. The spent fuel stored at NMP-1 would be available for future reprocessing when such capability becomes available.

In order to carry out the planned modification, the licensee will require 17 custom-made aluminum racks. The 1850 pounds of aluminum which would be needed to fabricate these new storage racks would not lead to any shortage of this material and does not constitute an irreversible commitment of natural resources.

3. Can the environmental impacts associated with the proposed modification be adequately addressed without overlooking any cumulative environmental impacts?

Response:

The licensee has presented the need for additional storage capacity solely on the basis of this plant. Because the additional capacity is for this site alone and for this licensee only, all the environmental impacts can be assessed within the context of this evaluation.

Using the same guidelines as those employed during its earlier environmental reviews, the NRC staff has assessed the potential environmental impacts that might result from the planned modification of the NMP-1 spent fuel storage pool.

Based upon the projected refueling schedule for NMP-1, the existing spent fuel storage capacity will be exhausted during the September 1978 refueling. After completion of the planned modification of the storage pool, sufficient storage capacity will exist to accommodate projected refueling through September 1981. Therefore, we have evaluated the releases of radioactive materials which would result if 340 spent fuel assemblies were stored for an additional three (3) years. Since the planned modification only extends the period of time during which spent fuel may remain in storage, the radioactive material released during the first year of storage is not attributable to the planned modification. It is of note that most of the radioactive decay associated with spent fuel assemblies occurs during the first year that they are stored in the spent fuel pool. The environmental



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impacts associated with the first year of storage were previously evaluated in the Nine Mile Point Unit 1 Final Environmental Statement (FES) issued in January 1974.

The only significant radioactive noble gas isotope remaining in spent fuel after storage of one year would be Krypton-85, since the short-lived noble gases would have decayed to negligible amounts. We have estimated that the amount of Krypton-85 that potentially could be released from the 340 assemblies would be 384 curies per year over a three year period. The annual noble gas activity resulting from the planned modification would be less than .1% of the noble gas activity released from all sources at NMP-1 (872,000 curies in 1973).

Iodine-131 releases will not be increased significantly by the increase in spent fuel storage capacity because the additional spent fuel retained would have been already stored for a year or more. During this time, the Iodine-131 in the fuel would have decayed to negligible levels.

Nonvolatile fission products and corrosion products that enter the water in the fuel storage pool will be removed by the fuel pool cleanup and filtering system. Storing an additional 340 spent fuel assemblies in the NMP-1 storage pool would result in an increase in the amount of nonvolatile radioactive materials leaked into the pool water and an associated increase in the quantity of radioactive materials accumulated on the pool water filters which are eventually disposed of as solid waste. The quantity and curie content of the solid wastes from the spent fuel pool cleanup system would increase by approximately 33%. However, these wastes amount to less than .1% of the total quantity of solid wastes shipped from the plant.

The licensee presently maintains the radiation dose rate around the spent fuel pool to levels between 5 and 10 mrem/hr by controlling the frequency of changing the spent fuel pool filters. As discussed above, the planned increase in the storage capacity will result in an increased accumulation of radioactive materials on the filters. Consequently, more frequent filter changes will be required to maintain the current radiation levels around the spent fuel pool. Since NMPC has expressed its intention to continue to change the filters as often as is necessary to maintain the radiation dose rate around the spent fuel storage pool to levels between 5 and 10 mrem/hr, no increased occupational man-rem exposure



to personnel working in the pool vicinity is anticipated as a result of the planned modification.

4. Have all the technical issues been resolved?

Response:

Yes. See Section 1.0 of this evaluation.

5. Would a deferral or severe restriction of this planned modification result in substantial harm to the public interest?

Response:

Shipping spent reactor fuel from NMP-1 to storage facilities at reprocessing plants or to a storage pool at another nuclear reactor are alternatives to the planned modification.

Since the last partial core reload in September 1975, the NMP-1 spent fuel storage pool has held 500 spent fuel assemblies, thus leaving storage space for 300 additional fuel assemblies. Based upon the projected refueling schedule, the existing storage capacity would be filled during the September 1978 refueling. NMP-1 could continue to operate during 1979 with a full spent fuel pool and NMPC could probably arrange to store spent fuel at a reprocessing plant or in a storage pool at another nuclear reactor before being faced with the situation of having a region of fuel to discharge and no place to store it onsite. However, there are drawbacks to each of these alternatives:

- a. Storage of spent fuel from NMP-1 at a reprocessing plant could preempt the use of this space by another utility which might have no other storage option available. In addition, this alternative is considerably more expensive than the planned modification. The licensee estimates that the total construction cost associated with the addition of storage space for 340 additional spent fuel assemblies in the NMP-1 spent fuel storage pool would be \$175,000. For this expense the licensee would be able to store spent fuel onsite through the September 1981 refueling before the storage pool would be filled. This would allow for continued operation of NMP-1 through 1982. The extension of time amounts to three years and the expense would have to be borne only once. However,



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to store spent fuel at a reprocessing facility would cost approximately \$2,000 per spent fuel assembly per year. NMPC has estimated that the cost of storing the spent fuel assemblies resulting from continued reactor operation through September 1981 at a reprocessing facility would be approximately \$700,000.

- b. The alternative of storing spent fuel in the storage pool of another nuclear reactor also compares poorly with the proposed action. Moreover the availability of such storage space is unlikely since many other utilities are experiencing similar storage problems. Nevertheless, in the event that such an alternative were available, the storage cost would probably be comparable to the cost of storing the spent fuel at a reprocessing facility (i.e., \$700,000). However, additional shipping charges of \$15-25/KgU would be incurred as compared to shipping directly to a reprocessor. NMPC has estimated that the total cost of storing the spent fuel assemblies resulting from continued reactor operation through September 1981 at another nuclear reactor facility would be more than \$1,500,000. The handling and transporting necessary to move the fuel to another reactor facility could be avoided if additional storage at reprocessing facilities were licensed during the additional storage period at NMP-1.

The alternatives described above neither offer the operating flexibility which could be achieved by the planned modification, nor could they be completed as rapidly as the planned modification. Either of these alternatives would be more expensive than the planned modification and either might preempt storage space needed by another utility. Accordingly, deferral or severe restriction of the action here proposed would result in substantial harm to the public interest.

Having applied, weighed, and balanced the five specific factors described in the Commission's announcement of September 16, 1975 (40 F.R. 42801), we have determined that the environmental consequences that might reasonably be associated with the planned modification of the NMP-1 spent fuel storage pool do not result in a significant change in the environmental impact as analyzed and set forth in the Final Environmental Statement (FES), issued January 1974, related to operation of NMP-1.



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CONCLUSION: Based upon our evaluation we have concluded that: (1) the planned modification of the NMP-1 spent fuel storage pool does not involve an unreviewed safety question, and (2) the environmental impacts associated with the planned modification are not significantly different from those previously analyzed and reported in the NMP-1 FES.

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