Niagara Mohawk

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November 6, 1998
NMP1L 1378

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

RE: Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

Subject: ***10CFR70.24(a) Exemption Request***

Reference: NRC Information Notice 97-77, "Exemptions from the Requirements of Section 70.24 of Title 10 of the Code of Federal Regulations," dated October 10, 1997.

Gentlemen:

Niagara Mohawk Power Corporation (NMPC) hereby requests an exemption from the requirements of 10 CFR 70.24(a), "Criticality Accident Requirements," for Nine Mile Point Unit 1 (NMP1). This request is for areas in which unirradiated fuel is handled, used, or stored. The Attachment to this letter presents the relevant details and justification for this exemption request.

In the above reference, the NRC recommended that to avoid enforcement action, licensees obtain any required exemptions from 10 CFR 70.24 regulations before the next receipt of fresh fuel or before the next planned movement of fresh fuel. NMPC requests that the NRC grant this exemption by December 31, 1998, to support the receipt of fresh fuel at NMP1, which is scheduled for January 10, 1999.

Based on the information in the Attachment, NMPC believes that this exemption request satisfies the good cause requirements described in 10 CFR 70.24(d). We further believe that the requested exemption is authorized by law, will not endanger life or property or the common defense and security, and is otherwise in the public interest.

Very truly yours,

Carl D. Terry
Vice President
Nuclear Safety Assessment and Support

CDT/IAA/sc
Attachment

xc: Mr. H. J. Miller, NRC Regional Administrator
Mr. S. S. Bajwa, Director, Project Directorate, I-1, NRR
Mr. G. K. Hunegs, Senior Resident Inspector
Mr. D. S. Hood, Senior Project Manager, NRR
Records Management

UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
NIAGARA MOHAWK POWER CORPORATION	)	**Docket No. 50-220**
	)	
Nine Mile Point Nuclear Station Unit 1	)	

Carl D. Terry, being duly sworn, states that he is Vice President-Nuclear Safety Assessment and Support of Niagara Mohawk Power Corporation; that he is authorized on the part of said Corporation to sign and file with the Nuclear Regulatory Commission the document attached hereto; and that the document is true and correct to the best of his knowledge, information, and belief.

NIAGARA MOHAWK POWER CORPORATION

By C D Terry

Carl D. Terry
Vice President
Nuclear Safety Assessment and Support

Subscribed and sworn to before me, a Notary Public in and for the State of New York and the County of Oswego, this 6 day of November, 1998.

Beverly W. Ripka

Notary Public

BEVERLY W. RIPKA
Notary Public State of New York
Qual. in Oswego Co. No. 4644879
My Commission Exp. Mar. 1999
2/28/00

My Commission Expires:

2/28/00

ATTACHMENT

10 CFR 70.24(a) Exemption Request

NINE MILE POINT UNIT 1

ATTACHMENT

10 CFR 70.24(a) EXEMPTION REQUEST

Pursuant to 10 CFR 70.24(d) and 10 CFR 70.14(a), Niagara Mohawk Power Corporation (NMPC) requests an exemption from the criticality accident requirements of 10 CFR 70.24(a) for Nine Mile Point Unit 1 (NMP1). This request is for areas in which unirradiated fuel is handled, used, or stored.

An exemption from the criticality monitoring requirements of 10 CFR 70.24(a)(1) in the spent fuel storage area was granted to NMP1 during the construction phase, as part of special nuclear material license SNM-1028, dated August 16, 1967. However, NMP1's current Facility Operating License (DPR-63, dated December 26, 1974) invokes 10 CFR 70 as a whole without stating any exemptions. Therefore, this exemption is requested to clarify the requirements stipulated in the NMP1 Facility Operating License DPR-63, in light of current NRC guidance.

In Reference 1 below, the NRC stated:

> "The staff considers a fuel-handling accidental criticality at a commercial nuclear power plant to be extremely unlikely due to administrative and design controls. Therefore, imposition of the 10 CFR 70.24 criticality monitoring requirement on licensees of operating reactors is not necessary as long as design and administrative controls are maintained."

In Reference 2 below, the NRC recommended that to avoid enforcement action, licensees obtain an exemption before the next receipt of fresh fuel or before the next planned movement of fresh fuel. NMPC, therefore, requests that the NRC grant this exemption by December 31, 1998, to support the receipt of new fuel, which is scheduled for January 10, 1999.

As demonstrated below, the requested exemption satisfies the criteria listed by the NRC in References 1 and 2, good cause exists for the exemption, and the exemption will not present an undue risk to public health and safety nor have significant adverse effect on the quality of the environment.

I. Scope of Exemption Request

10 CFR 70.24, "Criticality Accident Requirements," Part (a), states the following:

> *"Each licensee authorized to possess special nuclear material in a quantity exceeding 700 grams of contained uranium-235, 520 grams of uranium-233, 450 grams of plutonium, 1,500 grams of contained uranium-235 if no uranium enriched to more than 4 percent by weight of uranium-235 is present, 450 grams of any combination thereof, or one-half such quantities if massive moderators or reflectors made of graphite, heavy water or beryllium may be present, shall maintain in each area in which such licensed special nuclear material is handled, used, or stored, a monitoring system meeting the*

requirements of either paragraph (a)(1) or (a)(2), as appropriate, and using gamma- or neutron-sensitive radiation detectors which will energize clearly audible alarm signals if accidental criticality occurs. This section is not intended to require underwater monitoring when special nuclear material is handled or stored beneath water shielding or to require monitoring systems when special nuclear material is being transported when packaged in accordance with the requirements of Part 71 of this chapter."

Most Special Nuclear Material (SNM) at NMP1 is in the form of nuclear fuel. However, there are non-fuel quantities of SNM that are potentially used, handled, or stored at NMP1.

Non-Fuel SNM

Items that contain non-fuel SNM include sealed neutron sources for reactor startup, sealed sources for calibration of reactor instrumentation and radiation monitoring equipment, and fission detectors.

The amount of non-fuel SNM at NMP1 is significantly less than the quantities listed in the above quoted paragraph from 10 CFR 70.24(a). The total amount of non-fuel SNM located on site is such that it meets the "forms not sufficient to form a critical mass" guidance in Section 1.1 of Regulatory Guide 10.3 (Reference 3 below).

Based on the above, an exemption from the criticality accident monitoring requirements for non-fuel SNM is not required for NMP1.

Unirradiated Nuclear Fuel

Unirradiated nuclear fuel packaged in accordance with regulations is prevented from criticality events due to the construction of the package and the storage configuration of the fuel in the shipping container. Package design ensures that a criticality safe configuration is maintained during transport, handling, storage, and accident conditions. Package design also precludes introduction of any moderating agents due to leak tight construction. The unirradiated fuel that is received at NMP1 is packaged in NRC approved shipping packages which satisfy the requirements of 10 CFR Part 71. These shipping packages consist of an outer wooden container and an inner metal container. The outer wooden container is removed prior to transporting the new fuel to the reactor building and the refueling floor. Personnel at NMP1 only remove the new fuel from the inner shipping container in areas where Area Radiation Monitoring (ARM) system equipment is present, i.e., refueling floor.

Based on the measures implemented to prevent inadvertent criticality, as described above, an exemption from the criticality accident monitoring requirements for unirradiated nuclear fuel is requested for NMP1.

II. Criteria for Evaluating 10 CFR 70.24 Exemption Requests

In References 1 and 2 below, the NRC provided seven (7) criteria for evaluating exemption requests to 10 CFR 70.24. To assist the NRC in its review of this exemption request, each

criterion is restated below followed by NMP1's response to demonstrate how the criterion is satisfied.

It should be noted for clarification that the values of k-effective as stated in Criteria 2, 3, and 4 have statistical parameters "95 percent probability" and "95 percent confidence level" assigned to them. The original criticality calculations for NMP1 fuel date back to the 1970s and did not employ these statistical parameters. Therefore, these parameters are not considered part of the NMP1 design basis and are not addressed in our responses to Criteria 2, 3, and 4.

Criterion 1 *Plant procedures do not permit more than [1 PWR or 3 BWR] new fuel [assembly/assemblies] to be in transit between their associated shipping cask and dry storage rack at one time.*

Response

Existing plant procedures for handling new fuel do not allow more than three new fuel bundles to be in transit between their shipping containers and the normal fuel storage areas. By procedure, up to three fuel bundles may be present outside normal shipping containers and normal fuel storage areas if an edge to edge spacing of at least 12 inches is maintained between the fuel bundles. Therefore, NMPC believes that this criterion is satisfied by use of existing plant procedures.

Criterion 2 *The k-effective of the fresh fuel storage racks filled with fuel of the maximum permissible U-235 enrichment and flooded with pure water does not exceed 0.95, at a 95 percent probability, 95 percent confidence level.*

Response

As stated in Technical Specification (TS) 5.5, "Storage of Unirradiated and Spent Fuel," the new fuel storage racks are designed to maintain a k-effective of less than 0.95, even when the new fuel storage vault is flooded with water.

The Updated Final Safety Analysis Report (UFSAR), Section X-J, "Fuel and Reactor Components Handling System," states the following concerning the new fuel vault:

"Racks in the vault can hold a maximum of 200 fuel bundles in an upright attitude. The center-to-center spacing of bundles in the racks is 6.5 in by 10 in."

"The spacing of fuel bundles in the fresh fuel storage vault maintains K-eff <0.95 even if flooded with water. The vault floor drain prevents flooding."

Therefore, NMPC believes that this criterion is satisfied by existing design requirements.

Criterion 3 *If optimum moderation of fuel in fresh fuel storage racks occurs when the fresh fuel storage racks are not flooded, the k-effective corresponding to this optimum moderation does not exceed 0.98, at a 95 percent probability, 95 percent confidence level.*

Response

In lieu of performing optimum moderation analysis, NMPC has adopted procedure changes recommended in General Electric Service Information Letter (GE SIL) 152 (Reference 4 below) to reduce the probability of optimum fuel moderation during storage. Consistent with that philosophy, NMPC is also revising the Pre-Fire Plans to further reduce the already low probability of establishing critical conditions in the new fuel storage racks. NMPC believes that these controls, along with the design bases for the new fuel storage vault, will effectively preclude optimum moderation of fuel in the new fuel storage racks. Each of these topics is further discussed below.

1 - Procedure Changes

Existing plant procedures specify that:

- The new fuel vault should always be dry.
- Fuel movement in the new fuel vault should not be permitted if an abnormal condition of vault flooding occurs.
- Only one new fuel vault (non-combustible) cover should be removed at a time during new fuel handling and storage activities. In addition, when the vault is to be left unattended, either the new fuel vault cover shall be reinstalled or a solid fireproof cover installed.

2 - Pre-Fire Plans Revision

Currently, incoming new fuel is transported in NRC approved packaging from the delivery truck into the reactor building at the 261 foot elevation. From the 261 foot elevation, the new fuel, while still in its packaging, is lifted to the refueling floor at the 340 foot elevation. The 340 foot elevation does not contain any automatic suppression fire systems or portable fire extinguishers. However, two fire hose stations are located on this floor. The Pre-Fire Plans for this area (N1-PFP-RX340-01) are being revised to ensure that firefighting foam or water will not be directed toward the new fuel vault during dry storage of new fuel.

3 - New Fuel Vault Design Bases

UFSAR Section X.J.2.1 states the following concerning the new fuel vault:

> "Racks in the vault can hold a maximum of 200 fuel bundles in an upright attitude. The center-to-center spacing of bundles in the racks is 6.5 in by 10 in. There is an open drain in the floor of the vault. An area monitor used as a criticality monitor is installed in the vault."

[**Note:** The area monitor referred to above is the same as the New Fuel Room monitor mentioned in response to Criterion 6.]

Based on the above discussion, NMPC believes that this criterion is satisfied by existing procedures and design requirements. Pre-Fire Plans are being revised to further reduce the already low probability of establishing critical conditions in the new fuel storage racks.

Criterion 4 *The k-effective of spent fuel storage racks filled with fuel of the maximum permissible U-235 enrichment and filled with pure water does not exceed 0.95, at a 95 percent probability, 95 percent confidence level.*

Response

As stated in TS 5.5, "Storage of Unirradiated and Spent Fuel," the spent fuel storage facility is designed to maintain fuel in a geometry such that k-effective is less than 0.95 under conditions of optimum water moderation. Additionally, as stated in UFSAR Section X-J.2.1, there are two types of spent fuel storage racks in the spent fuel storage pool and both are designed to maintain an adequate criticality margin (K-effective less than or equal to 0.95) under all storage conditions. Therefore, NMPC believes that this criterion is satisfied by existing design requirements.

Criterion 5 *The quantity of forms of special nuclear material, other than nuclear fuel, that are stored on site in any given area is less than the quantity necessary for a critical mass.*

Response

The total amount of non-fuel SNM stored in any given area at NMP1 is such that it meets the "forms not sufficient to form a critical mass" guidance in Section 1.1 of Regulatory Guide 10.3 (Reference 3 below). The total amount of SNM at NMP1 is significantly less than the quantities delineated in 10 CFR 70.24(a). Therefore, NMPC believes that this criterion is satisfied due to the low quantities of non-fuel SNM at NMP1.

Criterion 6 *Radiation monitors, as required by GDC 63, are provided in fuel storage and handling areas to detect excessive radiation levels and to initiate appropriate safety actions.*

Response

The Area Radiation Monitoring System used at NMP1 is described in the UFSAR Section XII.B.2.0. Two area radiation monitors, one located on Reactor Building elevation 340-east wall (fuel handling area) and one in the New Fuel Room (fuel storage area) are provided to detect excessive radiation levels, and generate alarms and signals for appropriate safety actions to be initiated (see UFSAR Table XII-8 for area radiation monitors). Therefore, NMPC believes that even though NMP1 is not required to meet GDC 63 requirements, this criterion is satisfied by providing radiation monitors, consistent with GDC 63.

Criterion 7 *The maximum nominal U-235 enrichment is 5 wt percent.*

Response

The fuel used at NMP1 does not exceed the maximum nominal U-235 enrichment of 5 weight percent. NMP1 fuel suppliers are licensed to handle a maximum of 5 weight percent enrichment in their fuel fabrication facilities. Therefore, NMPC believes that this criterion is satisfied.

III. Good Cause Justification

Paragraph 10 CFR 70.24(d) permits licensees to request an exemption in whole or in part from the requirements of Section 70.24 if good cause is shown. NMPC believes that good cause exists, since as discussed above, design and administrative controls are in place to ensure that the probability of an inadvertent criticality accident is acceptably low in areas where unirradiated fuel is handled, used, or stored.

IV. Cost Benefit

Considerable resources would be expended to install, maintain, and operate a criticality accident monitoring system capable of detecting a criticality event at all locations where new fuel is processed at NMP1 to satisfy the requirements of 10 CFR 70.24. Without the requested regulatory relief, these expenditures would be incurred without a commensurate increase in plant safety. Therefore, installation of a monitoring system designed to meet these requirements is not justified or necessary.

V. Risk to Public Health and Safety

Based on NMPC's responses to the above criteria, an inadvertent criticality in the new fuel handling and storage areas is extremely unlikely. Therefore, the requested exemption will not present an undue risk to the public health and safety.

VI. Environmental Assessment

Fuel handling activities at NMP1 are performed in accordance with approved procedures to ensure non-criticality and radiation safety. Therefore, environmental effects from an inadvertent criticality are not expected, and granting this exemption will have no significant adverse effect on the quality of the environment.

VII. Conclusion

Based on the above discussion and justification, the operation of NMP1 in accordance with the proposed exemption to 10 CFR 70.24(a) is authorized by law, will not present an undue risk to the public health and safety, is consistent with common defense and security, and is otherwise in the public interest. Good cause for granting an exemption has been demonstrated, and the requested exemption should be granted in accordance with the requirements of 10 CFR 70.24(d). NMPC requests that the NRC grant this exemption by December 31, 1998.

VIII. References

1. SECY-97-155, "Staff's Action Regarding Exemptions from 10 CFR 70.24 for Commercial Nuclear Power Plants," dated July 21, 1997

2. NRC Information Notice 97-77, "Exemptions from the Requirements of Section 70.24 of Title 10 of the Code of Federal Regulations," dated October 10, 1997

3. Regulatory Guide 10.3, "Guide for the Preparation of Applications for Special Nuclear Material Licenses of Less than Critical Mass Quantities," dated April 1977

4. General Electric (GE) Service Information Letter 152, "Criticality Margins for Storage of New Fuel," dated March 31, 1976