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TO: G Lear	FROM: Niagara Mohawk Pwr Corp Syracuse, NY G KRhode	DOCKET NUMBER 50-220 FILE NUMBER DATE OF DOCUMENT 9-29-77 DATE RECEIVED 10-3-77
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DESCRIPTION	ENCLOSURE
1p	addl info concerning spent fuel pool modification as requested in NRC ltr dtd 9-1-77............. 9p
PLANT NAME: Nine Mile Pt #1Nir 10- 3-77 ehf	1 cy Encl Rec'd *

FOR ACTION/INFORMATION

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NIAGARA MOHAWK POWER CORPORATION

NIAGARA MOHAWK

300 ERIE BOULEVARD, WEST
SYRACUSE, N. Y. 13202

September 29, 1977

RECEIVED OCT 3 1977 U.S. NUCLEAR REGULATORY COMMISSION Mail Section

Director of Nuclear Reactor Regulation
Attn: Mr. George Lear, Chief
Operating Reactors Branch #3
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

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

Dear Mr. Lear:

Your letter of September 1, 1977 requested additional information regarding the spent fuel pool modification for Nine Mile Point Unit 1. The enclosed information responds to your request.

Very truly yours,

NIAGARA MOHAWK POWER CORPORATION

Gerald K. Rhode
Vice President-Engineering

/szd

Enclosure

7727600 46

Responses to September 1, 1977

Nuclear Regulatory Commission Questions

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

QUESTION 1: Provide the average burn up expected for the spent fuel in the spent fuel pool (SFP).

RESPONSE: The average burn up of spent fuel in the spent fuel pool from the beginning of reactor life to the date at which the pool is completely filled (1984 fuel assemblies) is projected to be approximately 23,200 MWD/MTU. The projected average burn up assumes no spent fuel is shipped off site.

QUESTION 2: Discuss any expected change in the radiological liquid effluents from the Liquid Radioactive Waste Disposal System (LRWDS) because of the proposed modification. Discuss the impact of the filter precoat being transferred from the Spent Fuel Storage Pool Filtering System to the LRWDS.

RESPONSE: While there may be a slight increase in the volume of filter sludge transferred to the LRWDS due to the expected slight increase in filter change frequency, there should be no significant increase in the volume or concentration of liquid radioactive waste effluents.

At the present time, the spent fuel pool filter sludge is transferred to the LRWDS where it is filtered and concentrated. The filter cake and concentrator liquid are disposed of off site as solid radioactive waste. The waste disposal system is presently operating at approximately 60% of capacity. The modification is expected to increase the LRWDS usage by 1 percent.

QUESTION 3: Discuss the disposition of the material to be removed from the spent fuel pool (e.g., spent fuel racks, seismic restraints) during the proposed modification. If the material to be removed will be disposed of as solid waste, provide the volume of the package waste.

RESPONSE: The existing spent fuel racks plus hardware will be removed from the spent fuel pool and disposed of in two phases. Phase 1 will clear the north half of the pool. It is anticipated that fuel and channel racks removed during Phase 1 will be disposed of as low level, shallow burial solid radwaste and will consist of four shipments 9 feet by 8 feet by 15 feet in volume resulting in a total volume of 4,320 cubic feet.

It is anticipated that the Phase 2 solid radwaste will be treated as Phase 1. The total volume of Phase 2 radwaste will be approximately equal to that of Phase 1.

QUESTION 4: Provide the volume of solid waste to be generated by the replacement of the filter precoat in the Spent Fuel Pool Filtering System. Provide the current frequency of operation and the normal flow rate through the filter. Provide the current frequency of replacing the filter precoat. Discuss and quantify any expected changes in the above due to the proposed modification.

RESPONSE: Presently the Spent Fuel Pool Filtration System is operated continuously at a flow rate of approximately 600 gallons per minute. The filter precoat is changed approximately once every three months yielding an estimated 5 cubic feet of radioactive solids after waste treatment. The maximum expected filter change frequency will be once per two months to maintain the spent fuel pool radionuclide concentrations at present levels.

This increase in filter change frequency would increase the spent fuel pool contribution to solid radioactive waste by approximately 2.5 cubic feet per 3 months or approximately 1% of our total quarterly radioactive waste generation from filter sludge disposal in all systems.

QUESTION 5: Explain why no equipment modifications for the Spent Fuel Storage Pool Filtering System (SFSPFS) were proposed. Consider that the proposed SFP modification may result in a factor of approximately eight times more fuel movements during the modification than during a normal refueling which may increase the level of crud in the pool above that expected during a normal refueling. Justify why SFSPFS is adequate to maintain low fuel pool concentration of radioactivity including crud so that there are reasonably low exposure levels in and around the fuel pool area during and after the modification.

RESPONSE: The expansion of the spent fuel capacity at Unit 1 will be done in phases. During the first phase of installation approximately 1000 storage locations will be installed in the north half of the pool. The north half of the pool contains less than 200 spent fuel bundles, therefore, the first phase should require moving only these fuel assemblies. During a normal refueling, approximately 150 to 200 fuel bundles are transferred from the core to the spent fuel pool. The fuel moves performed during a normal refueling would result in a higher concentration of radioactivity than the moves required for the first phase of installation due to length of time since shutdown associated with the bundles. The fuel bundles discharged during a refueling would be the most recently irradiated exhibiting the highest radioactivity levels. The fuel bundles to be moved during the first phase of installation will have been in storage for a period of time, decreasing the crud radioactivity levels. Therefore, fuel moves associated with the first phase of installation are not expected to result in any substantial increase in the level of crud in the pool above that expected during a normal refueling.

The second phase of installation is not expected to take place until approximately 1980-81. Prior to this time, fuel assemblies in the south end of the pool will on a gradual basis be transferred to the north end of the pool to allow adequate room for the second phase of installation. The movement of these fuel assemblies during this time period is not expected to result in any increase in the level of crud in the pool above that expected during a normal refueling.

RESPONSE 5: Continued

Most of the dose rate contribution above the pool is due to activity in the water from recently discharged spent fuel bundles. Since the proposed expansion would not increase the number of recently discharged bundles, the change in dose rates above the pool is expected to be insignificant.

Presently, the dose rate above the pool is controlled to between 5 and 10 MR/HR, by controlling the frequency of change of the spent fuel pool filter. As shown above, the expansion is not expected to result in any substantial increase in the level of crud in the pool above that normally expected during a refueling outage. Since the policy of changing the spent fuel filters as often as necessary to maintain the radiation dose rate around the spent fuel storage pool to levels between 5 and 10 MR/HR will continue, no increased occupational exposure is anticipated due to personnel working in the pool vicinity and no equipment modifications for the Spent Fuel Storage Pool Filtering System are required.

QUESTION 6: Provide a discussion of the increases and the doses to personnel from radionuclide concentrations in the SFP due to the expansion of the capacity of the SFP, including the following:

a) Identify the principle radionuclides and their respective concentrations in the spent fuel pool water found by gamma isotopic analysis during all operations. Identify the sample with respect to a specific operation (i.e., refueling, fuel handling, etc.).

b) Provide an estimate of the man-rem exposure that will be received during removal of the old racks and installation of the new ones.

c) Provide an estimate of the dose rates above the spent fuel pool from the concentrations of the radionuclides identified in (a), and the concomitant occupational exposure, in annual man-rem, due to all operations associated with fuel handling in the spent fuel pool area. Describe the impact of the proposed modifications on these estimates. Include in your analysis the expected exposure from more frequent changing of the filter precoat.

RESPONSE: The attached isotopic analysis and gross activity data indicate activity levels expected during normal operating refueling operations as well as those found during fuel channel cutting, crushing, and packaging. The fuel channel work is performed during normal station operation.

A preliminary conservative estimate of exposure during removal of the old racks and installation of new ones is approximately 16 man-rems. As working procedures are finalized, a more accurate exposure may be obtainable. The 16 man-rems is based on the following assumptions:

8 weeks of installation	(18 personnel around pool)
Use of a Diver	(4 hours per day for 10 days)
5 MR/hr around pool	
50 MR/hr in the pool	

This estimate is conservative when compared to rack replacements performed at Oyster Creek and Ginna.

RESPONSE 6: Continued

Whole body dose rates at the spent fuel pool rail generally vary between 5 and 10 millirem. Effective dose rates for work carried on in the vicinity of the pool amount to less than 5 millirem/hr because rates in many areas of the floor are only 1 to 2 millirem/hr.

An estimate of annual man-rems associated with fuel pool area work can be made by using the portion of refueling exposure received by operators, reactor physists, and instrument technicians (maintenance exposure should not be included since this exposure category includes drywell and vessel disassembly, decontamination, and reassembly). Contractor exposures should also be included.

	MAN-REMS	
	1975 (Including Refueling Outage)	1976 (No Refueling Outage)
Operators	2.968	0.058
Reactor Physists	0.046	0.000
Instrument & Control	0.588	0.010
Contractors	5.134	2.652

The proposed modifications will not affect the portion of the exposure received during refueling. Since shipment of the spent fuel will be postponed, the modification ultimately will result in lower exposure for that operation due to increased decay time prior to shipment. Since dose rate at the fuel pool rail only varies slightly with fuel pool activity, and since this activity is easily controlled, the only impact on man-rems received in the fuel pool area will be that received during the modification.

The average man-rems received during waste processing and shipment was 102 in 1975 and 104 in 1976. It is expected that filter sludge volume may increase by approximately 1%. This could increase exposures by approximately one man-rem/year if it were conservatively assumed all waste processing exposures were attributable to filter sludge.

Spent Fuel Pool Data

Operation During 1977	CPM/ml	MR/HR	Analysis μci/ml Cs-134 ($\times 10^{-4}$)	Cs-137 ($\times 10^{-4}$)	Co-60 ($\times 10^{-5}$)
Normal Operation	200-1000	5-10	3	5	5
Refueling	~2400	5-10	3	5	5
Fuel Channel Crushing & Cutting	200-2700	5-10	7	14	15