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

April 30, 1975

Dr. Marvin Resnikoff
174 West Avenue
Buffalo, New York 14201

Dear Dr. Resnikoff:

Thank you for your letter of March 27, 1975. We are pleased to provide you with specific technical information on several aspects of refueling practices and spent fuel storage at the Nine Mile Point Nuclear Station 1 of the Niagara Mohawk Power Corporation.

Much of this information is contained in the NMP-1 Final Safety Analysis Report (FSAR) that may be examined by any citizen at the Public Document Room for NMP-1, located at 120 E. Second Street, Oswego, New York in the Oswego City Library. Other information has been obtained directly by our inspectors.

Before providing you with specific answers to your questions, and some comments on several statements contained in your letter, there is one general comment I would like to make: your basic assumption that NMP has to be able to "remove the fuel from the reactor rapidly" in order to serve some urgent safety requirement in the event of an accident is not a realistic one. Under all credible accidents the reactor pressure vessel is the best place for fuel assemblies in that the reactor pressure vessel is supplied by several different and redundant coolant supply systems.

We also would like to clarify some other assumptions contained in your letter.

> When you relate the safe operation of the plant to the licensee's future ability to ship out spent fuel now stored in the licensee's spent fuel pool, we would say they are not related. If this licensee reaches a point where he has used all on-site spent fuel storage space and has consumed the fuel in the reactor, and has nowhere to ship spent fuel to make storage room for defueling the reactor, then he would have no choice but to reduce and eventually cease power production. Ceasing power operation in our view is not a safety problem, i.e. no particular safety problem would be created by an orderly shut down of the plant. It should be recognized however, that licensees may have other options available such as shipping old stored fuel to fuel storage pools at newly licensed plants not yet in need of all their storage spaces; shipping spent

fuel to facilities that are authorized to store but not to reprocess fuel, or possibly add more fuel storage racks to the present facility. If a licensee develops no options, a shutdown would be inevitable.

It is true that the fuel storage pool at NMP cannot now receive the entire reactor fuel load without the addition of more fuel storage racks. In that connection, your subsequent comments regarding storage of control rods need to be clarified. There are about 130 positions for storage of control rods designed into the spent fuel pool. These control rod storage spaces are provided in the event that some problem causes one or more control rods to be damaged during use, and rods have to be replaced with new ones. The old ones are best stored under water so that they are shielded from personnel. But the inference that these control rods somehow serve some safety function in the pool such as they do in the control of reactivity in an operating core is not a correct one. This licensee is not given any credit by NRC for reactivity control for control rods stored in the fuel pool. Your phrase "additional manipulations with the control rods would definitely appear to be undesirable" implies the stored control rods serve some safety function. That is not the case.

Regarding your reference to the Barnwell facility and the outlook for on-site storage at NMP in the future, these are the facts: NMP expects to have its next refueling in September 1975, and there is adequate capacity in the storage pool for the fuel assemblies that are to be removed at that time. The design capacity of the spent fuel storage pool is 800 assemblies. Of that capacity, 300 assembly spaces are used now, and the September 1975 refueling effort will use another 200. There will still remain spaces for a refueling after the one currently scheduled for September 1975.

In this connection your assumption about a relationship between spent fuel storage space and the phenomenon of cladding failure does not appear to relate to the situation at NMP, in that as a part of reconstituting fuel assemblies from individual fuel rods, some fuel rods that had been in storage for a period of time have been reused, over the past several years, to replace individual rods in assemblies. These reconstituted assemblies were then returned to the reactor rather than being left in storage. The reason for this fuel reconstitution is a more complete (economic) use or "burnup" of fuel. This would not be feasible if, as you postulate, the cladding on the basis of prior use were in some immediate danger of failing. We will have more to say about this in answer to your specific question No. 6.

The following are the specific facts requested in the eight questions contained in your letter:

1. "What is the capacity of the NMP-1 storage pool?"

   The following spaces are available in the design capacity of the pool: 140 flow channels, 130 control rods and 800 fuel assemblies.

2. "What is the storage date, burn-up and quantity of each batch of irradiated fuel discharged to the storage pool?"

   In the fall of 1971, 17 fuel assemblies were discharged, with a combined usage of 4,320 megawatt-days per short ton; Spring of 1972, 31 assemblies, 7,210 Mwd/short ton; Spring of 1973, 156 assemblies, 11,500 Mwd/short ton; Spring of 1974, 96 assemblies, 13,300 Mwd/short ton, for a total of 300 assemblies in storage.

3. "What is the cooling capacity of the storage pool?"

   The cooling capacity is 20 million BTU's per hour.

4. "What is the burnup and quantity of the irradiated fuel elements presently in the reactor core?"

	Assemblies	Average Exposure On April 1, 1975
	232	14,843 Mwd/short ton
	56	10,015 "
	40	13,027 "
	108	9,290 "
	96	4,325 "
Total	532	

5. "What is the total heat output of all, storage pool plus reactor, fuel elements and control rods, in a non-critical array?"

   On the basis of current data, it is approximately 6,029,000 BTU/hour. This calculation includes the assumption that all 532 fuel assemblies destined for the spent fuel storage pool are transferred over a ten-day period, some of that time contributing to reactor heat output in the shutdown condition, and thereafter to the heat output of the spent fuel pool, and it is to be remembered that during these early days after reactor shutdown for refueling, the rate of heat production in the fuel itself declines rapidly.

6. "What percentage of the fuel elements are damaged?"

No gross cladding failures have been observed in this fuel. Those small cladding defects that allow gaseous fission products to be released from the rods under hot operating conditions in the reactor cease to be a factor when the fuel comes to essentially room temperature in the spent fuel pool which is cooled by its heat removal system.

7. "What is the radioactivity level of the coolant water presently in the reactor?"

The activity is 0.057 microcuries per milliliter of gross beta gamma.

8. "When was the last check for cracks in the cooling pipes, including the ECCS pipes?"

February 10, 1975, when the licensee performed nondestructive testing in compliance with IE Bulletin No. 75-01 issued by NRC.

In summary, there is no licensee in the United States where the extent of available spent fuel storage space on-site impacts on the safe operation of the plant. The NRC will not allow any plant to be operated in less than a safe manner because of fuel storage or any other situation.

Sincerely,

Donald F. Knuth

Donald F. Knuth
Director, Office Inspection
and Enforcement