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SUBJECT: FORWARDS RESPONSES TO NRC 790116 LTR REQUESTING ADDL INFO RE RADVASTE REDUCTION SYS (RWR-1).

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March 6, 1979

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

Re: Niagara Mohawk Power Corporation
Nine Mile Point Nuclear Station Unit 1
Docket No. 50-220
DPR-63

Dear Mr. Ippolito:

As counsel for Niagara Mohawk, I enclose their response to questions raised in your January 16, 1979 letter. For your convenience three copies are also enclosed.

REGULATORY DOCKET FILE COPY

Very truly yours,

Robert S. Faron

Enclosures

A001
1/1

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NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

March 2, 1979

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

Dear Mr. Ippolito:

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

Attached are responses to the questions enclosed in your January 16, 1979 letter relating to the Radwaste Reduction System (RWR-1).

Very truly yours,

NIAGARA MOHAWK POWER CORPORATION

Gerald K. Rhode, Vice President
System Project Management

LMM/szd

Attachment

NIAGARA MOHAWK POWER CORPORATION

Nine Mile Point Unit 1

Docket No. 50-220

DPR-63

RADWASTE REDUCTION SYSTEM

Additional Information

EFFLU[illegible] TREATMENT SYSTEMS BRANCH (ET[illegible]

Question 1

Provide estimates of the expected volumetric generation rates (Ft^3/yr) and specific activities (Ci/g) by radionuclide, including transuranics, of the wastes (filter sludges, deep bed and powdered demineralizer resins, concentrated waste, and contaminated filters, paper, wood, etc.) input to the Radwaste Reduction System. To the maximum extent practicable, you should base your estimates on the previous operating experience of the plant.

Response

The expected volumetric generation rates are as follows:

	EXPECTED	RANGE
Spent resin	800 ft^3/yr.	600-1000 ft^3/yr.
Concentrated Waste (Evaporator Bottoms)	10,400 ft^3/yr.	9,400-12,000 ft^3/yr.
Filter Sludge	2,200 ft^3/yr.	800-3,400 ft^3/yr.
Low Level Trash (Wood, Paper, Shoe Covers, Etc.)	6,600 ft^3/yr.	4,800-8,800 ft^3/yr.

The expected activities by nuclide are as follows:

	EXPECTED (Average)	COMPOSITION	RANGE
Spent resin	150 uCi/gm	Cs-137 (60%) Cs-134 (25%) Co- 60 (15%)	2-200 uCi/gm
Concentrated Waste	1 uCi/gm	Cs-137 (50%) Cs-134 (25%) Co- 60 (25%)	0-200 uCi/gm
Filter Sludge	50 uCi/gm	Cs-137 (40%) Cs-134 (25%) Co- 60 (10%) Remainder -- I-131, B_a-140, Mn-54, Co-58, Ce-141	0-1000 uCi/gm
Low Level Trash	0.1 uCi/gm	Major nuclides Cs-137, Cs-134, Co- 60	0-0.5 uCi/gm

Other nuclides such as SR-90, FE-55 and transuranics are being studied in further detail. Analyses have recently been done. The results of these analyses are expected to be available by May 1, 1979.

Question 2

Describe any deviations or variations of the design of the Radwaste Reduction System to be installed at Nine Mile Point, Unit No. 1, from the scope and design of the system described in the Newport News Topical Report, RWR-1TM Radwaste Volume Reduction System.

Response

Generic changes will be made to the design as described in the Licensing Topical Report (LTR). These differences will be described in an amendment to the Licensing Topical Report. These changes will be included in the unit to be installed at Nine Mile Point Unit 1. The differences are as follows:

1. The system described in the Newport News Topical Report has the hot gas from the burner injected directly into the process vessel from the side. The later design will have the hot gas injected beneath the bed by means of a manifold. The fluidizing air will enter through the same manifold.

2. The later design will have a bed removal system at the bottom of the process vessel to allow for remote removal of the bed.

3. The later design will have a multiple cyclone instead of the single cyclone shown in the Newport News Topical Report. The multiple design allows higher removal efficiencies to be attained.

4. The later design will have a jacket to allow cooling air to pass over the outer surface of the process vessel and the cyclones.

5. The later design will have an entrainment separator added between the wet cyclone and the condenser.

Question 3

Provide an estimate of the annual volume and radionuclide distribution of the scrub liquid which is to be recylced to the liquid waste system. Dèscribe the processing which the scrub liquid will undergo, including all alternative methods of handling, and provide justification that the liquid waste system has the capability of handling the waste volumes anticipated. Provide a flow schematic of all pathways for disposition of scrub liquid. Indicate the size of the day tank incorporated to feed the radwaste reduction system.

Response

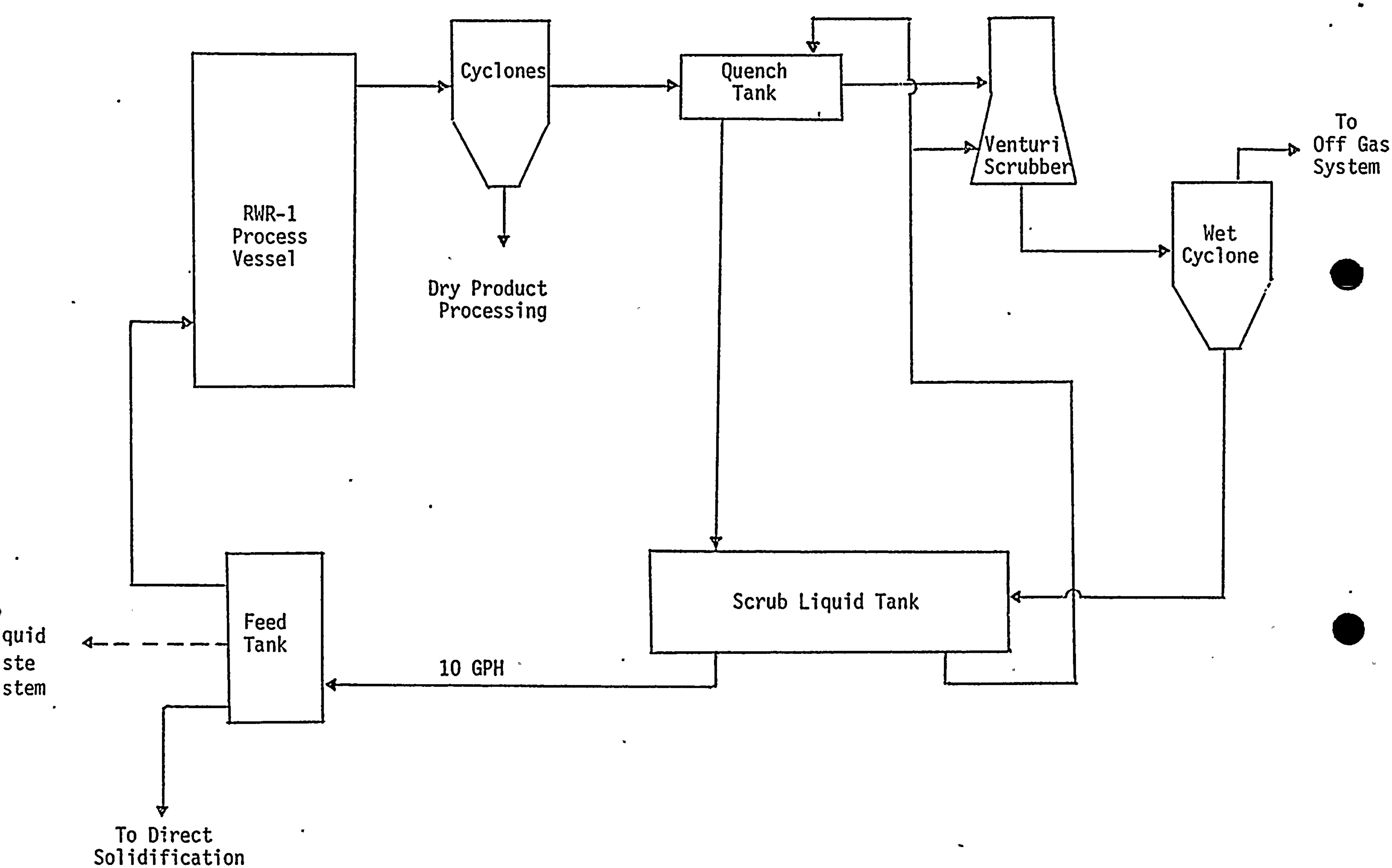
There will be no scrub liquid recycled to the liquid waste system on a normal basis. The scrub liquid will be discharged from the scrub liquid tank to a 2000 gallon feed tank. Flow, as shown by the attached schematic, will be a maximum of 10 gallons per hour. The liquid will have three possible pathways from the feed tank.

The normal pathway is to recycle the liquid back through the RWR-1. A backup pathway is to direct solidification.

Another alternative to be used on an emergency basis is to recycle back to the liquid waste system. This will be used, for example, in the event that the RWR-1 is not operating and maintenance in the area of the feed tank is to be performed. It is projected that this may occur on a maximum frequency of once per year. Consequently, the volume that would be recycled under these conditions would be 2000 gallons or one feed tank capacity.

The liquid waste system has the capacity to handle this volume. This liquid could be diverted to a 25,000 gallon capacity waste neutralizer tank or either of two concentrator bottoms tanks (8,000 and 12,000 gal. in capacity).

Assuming the same activity and composition as that dilineated for the accident condition, the total activity in the scrub liquid would be 230 Ci in the tank volume. Since this activity was derived from processing resins in the RWR, the nuclide distribution would be the same as that indicated in Response 1.



RWR-1
Process
Vessel
Cyclones
Dry Product
Processing
Quench
Tank
Venturi
Scrubber
To
Off Gas
System
Wet
Cyclone
Feed
Tank
quid
ste
stem
To Direct
Solidification
10 GPH
Scrub Liquid Tank

Question 4

Provide an updated evaluation of the expected releases of radioactive materials in liquid effluents from the modified radioactive waste management system, including those indirect effluents due to the operation of the Radwaste Reduction System, and show how the proposed radioactive waste management system meets the requirements of Appendix I to 10 CFR Part 50.

Response

There will be no direct pathways for liquid effluents from the Radwaste Reduction System. All liquids from the Radwaste Reduction System will be routed to the scrub liquid tank. As stated in Response 3, liquids from the scrub liquid tank will either be recycled to the Radwaste Reduction System, will go to solidification or to liquid waste in an emergency situation. The increase in liquid waste effluent due to processing a 2000 gallon feed tank of scrub liquid would be 0.023 Ci/yr. This is based on the decontamination factors and assumptions from the Nine Mile Point Unit 1 "Compliance with 10CFR50, Appendix I." It was assumed that the liquid is processed in the concentrator.

All closed loop cooling and service water to the Radwaste Reduction System will be at a higher pressure than the process stream side of the system. If leakage occurs, it will be into the process stream.

Therefore, it is anticipated that there will be no increases in the liquid waste effluent due to normal operation of the Radwaste Reduction System.

The balance of the radwaste management system processes the same wastes as the existing system and augments the existing system. The releases are expected to be no different in either quantity or nuclide content from those presently released. It is concluded that there will be no significant change in the "Compliance with 10CFR Part 50, Appendix I" assessment.

Question 5

Provide the bases for the maximum feed rates (Ci/year) and distribution of radionuclides input to the Radwaste Reduction System (see Table 1 of Attachment A to letter from D. Dise, NMPC, to T. Ippolito, NRC, September 1, 1978).

Response

The maximum feed rate and nuclide distribution are based upon Nine Mile Point Unit 1 shipment records through the end of 1976.

The maximum feed rate was obtained by adding an additional 40% to the maximum amount shipped in one year. This amount is from the year 1975 and is 3250 Ci. The nuclide distribution is an average of those measured in 1975 and 1976. Nuclides making up less than 1% of the activity were found to make insignificant contributions to the dose rates with respect to cesium 137, and were dropped. Data for the years 1977 and 1978 is now available and indicates that these figures remain appropriate.

Question 6

Describe in detail the manner in which calcined material/ash from the Radwaste Reduction System will be transferred to the proposed solidification and handling system, including the provisions for controlling "dusting" or the spread of airborne contamination.

Response

Various "ash transfer" components (from the dry cyclone to the 55 gallon drum) are being evaluated at this time. Primary considerations in this design are remote operability, high reliability, minimum radiation exposure, and low maintenance as well as the criteria delineated in Regulatory Guide 8.8 (ALARA). Several designs are being considered involving basic commercial concepts of moving a dry product.

The final design will be leak tight and totally enclosed to the drum fill connection. Volumetric and/or gravimetric principles will be applied to measure the quantities of ash transferred into each drum.

The design of these components is expected to be finalized by May 1, 1979. At that time, appropriate information on that design will be provided.

Question 7

Provide the type, number, and locations of the continuous air monitors which are intended to detect leakage from the Radwaste Reduction System. Describe the treatment, if any, provided for the ventilation in the building which houses the Radwaste Reduction System.

Response

There will be one continuous air monitor which will sample building ventilation air prior to discharge to the stack. This monitor will be located in the discharge of the ventilation system before reaching the stack. It will be a beta-gamma continuous air monitor with an alarm on high radiation level located in the main control room. In addition, there will be at least one portable continuous air monitor capable of being moved to various locations within the radwaste building. This monitor will also be a gross beta-gamma monitor and will have both a local and main control room alarm.

The system is designed for a flow of 80,000 ft^3/min; 66,000 ft^3/min. will be recirculated through four high efficiency filters and 14,000 ft^3/min. will be exhausted to the stack. The exhaust duct to the stack will include two sets of filters. Each contains a pre-filter element, charcoal filter element and high efficiency filter element.

This ventilation system design meets all but one of the requirements of Regulatory Guide 1.140. The exception is that access will not be provided to ducts that run in high radiation cubicles such as the RWR-1 process vessel or product hopper.

Question 8

Describe in detail the stack monitoring system which will monitor off-gases from the Radwaste Reduction System.

Response

The existing stack monitors will measure all radioactive releases from the RWR-1 as well as the existing plant releases.

In addition, there will be a separate monitor on the Radwaste Reduction System off-gas line prior to entering the existing stack. This will measure particulate and gaseous radioactivity in the Radwaste Reduction System off-gas. This monitoring device will be designed to automatically shut down the Radwaste Reduction System in the event that the measured parameters exceed the preset limits.

The following design criteria has been established for the off-gas line monitor:

1. It will have a continuous monitoring capability.

2. It will monitor a representative sample from the off-gas prior to discharge into the plant stack.

3. It will be capable of detecting concentration increase as a function of time.

4. It will be capable of monitoring both radioactive particulates and I-131.

5. Alarm points shall be provided for high radioactivity, low sample gas flow, and loss of power. Alarms shall require operator acknowledgement.

6. The monitor will permit readout and alarm at an operator control station in the radwaste building and will be equipped with isolated alarm relays to activate an automatic system shutdown and thereby prevent unallowable radio-active releases to the plant stack.

The function of the off-gas system radioactivity monitor is to assure that concentrations of radionuclides in the RWR-1 effluent going to the plant stack do not exceed present levels. The monitor will be set to alarm and initiate a system shutdown in the event radiation is detected above these levels. Set points will be established to assure implementation of the "as low as reasonably achievable" philosophy. The set points for both alarm and system shutdown initiation will be well below levels which would result in exceeding off-site limits. Setpoints for shutdown will be at a level lower than those which would result in an alarm on the main stack monitors.

Question 9

Describe the means of controlling the input of materials (plastics, PVC, rubbers, etc.) which could generate corrosive or toxic materials if incinerated in the radwaste reduction system.

Response

Newport News Industrial has incorporated into the design criteria of the RWR-1 a 5% maximum concentration of plastics, PVC's, rubber, etc., in the low level trash input volume.

An analysis has been made of the Nine Mile Point Unit 1 low level trash. This analysis indicates that the only significant source of PVC's is due to shoe covers. Other plastics are largely polyethylene and would not generate corrosive or toxic materials. During an average year, over 130,000 pounds of low level trash are produced. During an average year 4,177 pounds of shoe covers are used. This represents 3.2% by weight. By volume this percentage would probably be lower since most of the other waste is paper or cardboard and is less dense. Thus, it appears that no reduction over the present would be necessary to meet the specifications.

Nevertheless, it is Niagara Mohawk's intent to provide administrative controls to minimize these inputs to the RWR-1 system. One example of these controls would be to eliminate potential problem materials from the procurement list and replace them with acceptable substitutes (i.e., polypropylene instead of PVC shoe covers). Another example of controls would be to physically separate potential problem material from the low level trash and dispose of these using existing compaction equipment.

Question 10

Provide an analysis indicating the radionuclide concentrations which could occur in both 1) the nearest potable water supply and 2) the nearest surface water in an unrestricted area as a result of leakage based on the single failure of the scrub liquor tank. Assume 1% of the operating fission product inventory is released to the primary coolant, the failed tank releases 80% of its design capacity, and all liquid from the failed component enters the ground water (i.e., do not assume liquids are retained by building foundations). Credit for radionuclide removal by the plant process systems, consistent with the decontamination factors in NUREG-0017 should be assumed. List all parameters and provide justification for the values assumed in your calculations, including liquid dispersion and transit time based on distance, the hydraulic gradient, permeability and effect porosity of the soil, and the assumed decontamination due to ion exchange by the soil.

Response

In accordance with Effluent Treatment Systems Branch Position 11-2 (Standard Review Plan), Niagara Mohawk plans to install carbon steel liners in any cubicles which contain large liquid holding tanks. This includes the liquid scrub tank. The liners will be capable of containing one and one half times the tank capacity.

The cubicle liners therefore preclude any radioactive liquid leakage to the environment.