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OCT 8 1972

Docket No. 50-410

Niagara Mohawk Power Corporation
ATTN: Mr. Thomas J. Brosnan
Vice President and Chief Engineer
300 Erie Boulevard West
Syracuse, New York 13202

Gentlemen:

In order that we may continue our review of your application for a license to construct the Nine Mile Point Nuclear Station Unit 2, additional information is required. The information requested is described in the enclosure and pertains to the area of Electrical Systems, Auxiliary Systems, Steam and Power Conversion System and Station Structures and Shielding.

The questions in the enclosure have been grouped by sections that correspond to the relevant sections of the NMPNS-2 Preliminary Safety Analysis Report.

In order to maintain our licensing review schedule, we will need a completely adequate response to all enclosed questions by December 7, 1972. Please inform us within 7 days after receipt of this letter of your confirmation of the schedule date or the date you will be able to meet. If you cannot meet our specified date or if your reply is not fully responsive to our request it is highly likely that the overall schedule for completing the licensing review for the project will have to be extended. Since reassignment of the staff's efforts will require completion of the new assignment prior to returning to this project, the extent of the extension will most likely be greater than the extent of the delay in your response.

Please contact us if you have any questions regarding the information requested herein.

Sincerely,

Original signed by:
Roger S. Boyd

Roger S. Boyd, Assistant Director
for Boiling Water Reactors
Directorate of Licensing

OFFICE ▷	L:GCR	L:GCR	L:BWR			45
SURNAME ▷	ABournia:nb	RAClark	RSBoyd			
DATE ▷	10/6/72	10/6/72	10/6/72			

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

OCT 8 1972

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OCT 8 1972

REQUEST FOR ADDITIONAL INFORMATION

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION-2

DOCKET NO 50-410

8.0 ELECTRICAL SYSTEMS

8.1 Redundant equipment for the diesel generator fuel oil transfer system and the associated pneumatic equipment for the diesel generator starting system are all located in each diesel generator room. Describe the criteria and protection provided for the physical separation of components within each diesel generator room to assure operability of the system in the event of a gross failure of one of the components.

8.2 Figure 8.14-1 of the standby diesel generator (SDG) fuel transfer system indicates that a vaportight penetration to the SDG fuel storage tank has been provided for sounding. Describe the use of this penetration in more detail.

8.3 The diesel generator (DG) starting system has been provided with two full capacity air starting systems, including reserve air tanks. Provide the total number of DG starts provided by each air tank and the time required for the air compressors to replenish an empty tank.

10.0 AUXILIARY SYSTEMS

10.1 Provide a drawing of the new fuel storage vault, indicate also, with the aid of a cross-sectional view, its location in the refueling building.

10.2 List the code and standards governing the design and construction of the concrete new fuel storage vault.

10.3 Section 10.33 of the PSAR states that sufficient depth of water and concrete is provided to adequately shield personnel from a full load of spent fuel assemblies. Define full load in terms of spent fuel assemblies from the core.

10.4 With respect to the spent fuel storage facility provide the following information:

(a) Provide a drawing of the spent fuel pool showing the storage racks and other refueling equipment arrangement in the pool, also indicate on the drawing the drainage monitoring channels.

(b) Drainage monitoring channels have been provided to detect, measure and locate liner leaks. Describe the associated instrumentation in more detail and provide an estimate of the normal leakage expected.

(c) With respect to the size, shape, and weight of equipment used during refueling or lowered in and out of the pool, provide an analysis of the inherent resistance ability of the spent fuel pool water and the design of the storage racks to withstand the impact forces due to dropped heavy objects.

10.5 Sections 10.3.4 and 10.17.4 of the PSAR state that a system of motion and travel restriction devices on the polar crane and administrative procedures provide assurance that heavy objects will not be transported over the spent fuel pool whenever fuel handling is not in progress. The PSAR description of these motion and travel restricting devices appears contradictory and should be clarified. Also expand the write-up to include the use of the crane during refueling as well as normal usage. Describe when and where the administrative procedures will be used to limit travel of the polar crane over the pool. Also restate your degree of compliance with AEC Safety Guide No. 13 with respect to interlocks or justify any deviations.

10.6 Provide the design bases for the quantity of fuel to be cooled and the requirements for continuous cooling to maintain pool temperature.

10.7 Describe the bypass capabilities provided for the filters and demineralizer in the spent fuel pool clean-up system (refer to Figure 10.5-1).

10.8 Describe the requirements and means for augmenting the cleanup system during refueling by using the reactor water cleanup system filter/demineralizer units.

10.9 Provide the increase in heat removal capabilities of the spent fuel pool heat exchanger when service water cooling is used instead of the reactor building closed loop cooling water.

10.10 Provide a list of refueling equipment that are designed to seismic Class I requirements and discuss the associated safety aspects of refueling equipment not designed to seismic Category I requirements considering their failure.

10.11 For both the reactor building overhead crane and the turbine building overhead crane describe the degree of compliance with each of the following portions of Occupational Safety and Health Administration OSHA Subpart N - Materials Handling and Storage of 29 CFR 1910, Section 1910.179 Overhead and Gantry Cranes, paragraphs (b) General Requirements, (c) Cabs, (d) Foot Walks and Ladders, (e) Stops, Bumpers, Rail Sweeps and Guards, (f) Brakes, (g) Electrical Equipment, (h) Hoisting Equipment, (i) Warning Device, (j) Inspection, (k) Testing, (l) Maintenance, (m) Rope Inspection, (n) Handling the Load, and (o) Other Requirements, general. For each of the above identify, discuss, and provide a basis for all exceptions and/or deviations taken.

10.12 Provide a discussion, with the aid of drawings, of the principles of operation of any special handling fixtures employed in handling their respective loads such as the reactor vessel head, shield plugs, reactor vessel internals and the spent fuel shipping cask. Describe in detail the applicable codes and standards used in the design, fabrication, installation and testing of these special handling fixtures. For each, list its design load rating, pre-operation test load, maximum operating loads and the tests loads that will be used throughout the life of the facility.

10.13 Describe the modes of failure that were considered in the design of the spent fuel cask crane and containment crane such as breaking of cables, lifting slings, sheared shafts, keys, stripped gear teeth, and brake failures. Also discuss the limitations and control that will exist in handling objects over an opened reactor vessel.

10.14 Provide the maximum drop height, weight and size of components and discuss with the aid of drawings, where appropriate, the consequences of dropping the following:

(a) The reactor vessel head on to an opened reactor vessel.

(b) The steam dryer and/or separator into an opened reactor vessel.

(c) The heaviest or most accessable segment of the removable missile shield plug on the reactor vessel.

Include in your discussion the results of an evaluation of the effect on the reactor vessel supports and the reactor cavity seal that could result from the postulated dropping of the above components.

10.15 The circulating water pumps, fire protection pumps, and water treatment equipment are located adjacent to the service water pumps. Considering the effects of flooding and missiles due to component or equipment failure of the seismic Category II systems, determine the effects on the design of the service water pumps.

10.16 Temperature control of the Reactor Building Closed Loop Cooling Water (RBCLCW) system will be accomplished by a temperature controller which bypasses part of the cooling water flow around the RBCLCW heat exchangers. Provide the criteria and/or limiting condition that will affect bypassing, and also provide the maximum bypass capabilities of the system and determine the effect on the RBCLCW system assuming the temperature controller fails as to affect the maximum bypass situation.

10.17 Section 10.6.2. of the PSAR states that during the LOCA condition, when the RBCLCW system loses pressure, the supply and return lines of the system are isolated by two valves in series and essential pumps and bearing seal coolers are supplied from the service water system. Based on Figure 10.6-1, it appears that the valves (one a check) in the return line of the RBCLCW system do not provide redundancy. Discuss the ability of your design to accomodate a single failure without loss of safety function.

10.18 Section 10.6.2 of the PSAR states that make-up water for the RBCLCW system is supplied from the condensate storage tank. Sections 10.11, 11.8 and Figure 10.6-1 indicate that the demineralized storage tank provides make-up water. Clarify this apparent discrepancy.

10.19 Provide the isolation criteria and capabilities of the RBCLCW system to isolate portions of the system with leakage or malfunctions.

10.20 With respect to Section 10:11 and Figure 10.11-1 Make-up Water Treatment System, expand the PSAR description to provide a clear understanding of the following areas:

(a) The location and capacity of the demineralized water storage tank.

(b) The reason for and the use of the ferric sulphate feeder system with respect to the coagulant system provided.

(c) Provide a description and delineation of the acid addition system to the clearwell and determine the mixing and isolation capabilities to preclude a strong acid solution reaching the pump seals.

(d) Describe the operational use of and the source of water for the caustic and acid dilution systems.

10.21 Provide a comparison of the design criteria of the ultimate heat sink with the contents of AEC's Safety Guide No. 27. Identify any aspects of the ultimate heat sink that do not conform to the provisions of the Safety Guide and provide your bases for their acceptability.

10.22 The intake and discharge structures within the screenwell have the design provisions for reversing flow, if required, by utilizing a system of counterweighted gates. Describe the procedure necessary to affect this flow reversal, include also a detailed description and operation of the flow reversing gates.

10.23 Describe the criteria and/or instrumentation necessary to determine when flow reversal is required. Determine the effect the reduced NPSH will have on the circulating and service water pumps just prior to flow reversal.

10.24 Discuss the potential for the inadvertent operation of a single gate or the failure of a gate in such a manner as to allow the intake water to be short circuited to the discharge structure. Also discuss the effects of other failure modes such as blocking the discharge by the gate.

10.25 Describe the instrumentation and alarms available in the screenwell to determine water level and state the automatic or operator actions required for each instrumented water level.

10.26 The Main Steam Line Isolation Valve (MSLIV) water seal system is designed to seismic Category I requirements and as an engineered safety feature. The water seal system is manually initiated by the operator with options available for pump starting and also the sealing pumps are available, with the operation of the standby A-C power supply, 10 minutes after the loss of offsite power. Justify these design aspects from the standpoint of:

(a) Making the sealing system a fully automatic system.

(b) Bringing other loads on the diesel generator during the same time interval.

(c) The total time required to complete a MSLIV seal with respect to its impact on a 2 hour dose.

10.27 Provide an analysis to demonstrate that the effect of a water hammer on the outboard isolation valve, due to the inadvertant operation or failure of the inboard isolation valve after a seal has been established, will not endanger the integrity of the steam line or outboard isolation valve.

10.28 Section 10.16.3 of the PSAR states that redundancy in the MSLIV water seal system has been provided to assure that no single failure will prevent its operation. Based on Figure 10.16-1 it appears that a common line exists between the sealing system loops and the connection to the main steam line drain inside the primary containment. Justify this design aspect from the standpoint of single failure criteria.

10.29 Describe the instrumentation available to verify that the water seal on the isolation valve has been adequately established or drained.

10.30 Describe the test planned to demonstrate the adequacy and feasibility of the design of the MSLIV water seal system. What tests will be made to determine the time associated with the fluid flow to establish the required seal.

10.31 Provide a piping and instrumentation diagram of the Process Sampling System and indicate alternate paths to obtain a sample from the reactor system or containment during an accident condition.

10.32 The equipment and floor drainage systems have the capability of processing low conductivity drainage through the main condenser. Describe in more detail the associated piping, valves, and pumps used in the transfer of the low conductivity drainage to the condenser. Determine the potential and the effects of processing high conductivity (normally low) drainage through the condenser due to inadvertant transfer or error in conductivity measurements.

10.33 Provide the following information about the carbon dioxide system:

(a) The operating and design pressure of the bulk storage tank and its location.

(b) The design feature which would prevent or mitigate the effects of a CO_2 tank missile.

10.34 Discuss the following with respect to the water spray system used for cable tunnels and the Standby Gas Treatment System (SBGTS) charcoal filters:

(a) Are all cable tunnels containing safety related cables afforded this protection?

(b) Is operation of the system manual or automatic for starting and stopping?

(c) On what parameter(s) is system operation dependent? (i.e., products of combustion, rate of temperature rise, etc.)

(d) What means are provided for control and drainage of the spray water?

(e) What means are provided for the treatment of spray water which, in the case of the SBGTS filters, may become contaminated?

10.35 What is the location of the "cable room" mentioned in Section 10.9.3.3 of the PSAR. Are safety related cables located in this room, and if so, what fire protection is provided?

10.36 Discuss the fire detection and protection provided for cabinets, consoles and cable runs in the control room.

10.37 Discuss alternate means of fire protection for the relay, switchgear, and diesel generator rooms, cable chases, and cable tunnels in the event that automatic systems fail.

10.38 If any of the areas mentioned in Question 10.37 require manual fire fighting, discuss the accessibility of each such areas with respect to smoke, toxic combustion products, radiation, and CO_2 asphyxiation.

10.39 Discuss the habitability of the control room, with regard to heat, smoke, and toxic combustion products, during and after cable fires in the control building.

10.40 Considering the gravity of the situation in-so-far as offsite doses and difficulties that would be encountered in attaining and maintaining a safe shutdown if an undetected or uncontrolled fire should occur in the switchgear rooms, cable tray rooms, cable vaults and tunnels, emergency diesel generator rooms or charcoal filter beds; present a balanced discussion of the merits and other considerations to providing redundant and seismic Category I fire protection systems to cover events such as:

(a) Failure to detect fires;

(b) Failure of pipes due to seismic events, explosions, pressure, and missiles;

(c) Lack of adequate CO_2 inventory;

(d) Failure of valves to operate; and

(e) Inaccessibility of the area for manually accomplished fire control.

10.41 For all tanks that contain gas under pressure (such as nitrogen, hydrogen, oxygen, air, and CO_2 tanks) provide the following: (a) the design and operating pressure, (b) the maximum pressure of the gas supply, (c) the location of the tank; (d) the maximum total energy if the tank should rupture, (e) the possibility of the tank or parts of the tank to act as a missile, (f) the protective measures taken to prevent a tank failure, (g) the protective measures taken to prevent the loss of function of adjacent equipment essential for a safe shutdown condition, and (h) for each vessel identify, discuss and supply the basis for any exceptions or deviations that will be taken to the positions set forth in the Occupational Safety and Health Administration OSHA 29 CFR 1910 Subpart H- Hazardous Material Sections 1910.101 Compressed Gases, 1910.103 Hydrogen, and 1910.104 Oxygen; Subpart M - Compressed Gas and Compressed Air Equipment Section 1910.166 Inspection of Compressed Gas Cylinder, 1910.167 Safety Relief Devices for Compressed Gas Cylinders, 1910.168 Safety Relief Devices for Cargo and Portable Tanks Storing Compressed Gases, 1910.169 Air Receivers.

10.42 In the Control Room Ventilation System the charcoal absorber for smoke or other odor removal is normally bypassed and used only when required. Provide a description of the ability of the Control Room Ventilation System to detect these airborne contaminants to preclude their admission to the control room. Include in the description the detection methods, isolation criteria (for opening and closing valves), closure times of the isolation valves, and the time required to expedite the discharge of the contaminants from the control room should they enter in sufficient quantities prior to isolation.

10.43 Section 10.10.4.7 of the PSAR states that the control room and relay room heating, ventilation, and air-conditioning systems (HVAC) equipment are connected to the standby A-C power system for operation during an accident condition. Describe the instrumentation associated with isolation for this event and provide the criteria used to determine the starting and stopping of equipment in the system redundant trains.

10.44 Discuss the effects on performance of a clogged or partially clogged air filter in the relay room HVAC system assuming that the redundant train is out of service.

10.45 Describe the isolation criteria and capabilities of the switchgear and battery room ventilation system in more detail. Include in the description the requirements for isolation during accident condition, single failure of equipment, or fire. Also provide the physical separation criteria or design provisions incorporated to physically separate the cooling units.

10.46 The diesel generator room ventilation system has been provided with two 50 percent capacity fans for removal of generated heat during operations. Provide the results of an analysis that demonstrate the effects on the diesel generator with respect to its capability to perform over the full course of an accident with one exhaust fan and with no exhaust fan operating.

10.47 The outerwalls of the reactor building up to the reactor building crane rail level will be constructed of reinforced concrete capable of withstanding the design bases tornado missile. The superstructure

is constructed of steel framing with metal wall panels and roofing. Determine the potential for and/or provide the results of an analysis of the effects of a missile contacting the fuel stored within the spent fuel pool. Consideration should be given to missiles generated by tornadic winds and missiles generated by plant failures such as turbine failure and the destruction of non-tornado design structures or equipment. Also provide a list of the spectrum of missiles considered and if potential missiles of lesser size, ones that could produce a more damaging effect than the design bases missiles, are not considered then provide the bases for their omission.

10.48 Provide the design bases heat generation parameters used to determine sizing of the cooling units of the control and relay room, switchgear, battery rooms, and diesel generator rooms air-conditioning system. Also provide the criteria used to determine these design heat loads. The information provided should include an evaluation in sufficient detail to demonstrate the air-conditioning system's capabilities.

11.0 <u>STEAM AND POWER CONVERSION SYSTEM</u>

11.1 Describe, with the aid of drawings, the bulk hydrogen storage facility including its location and distribution system. Include the protective measures taken to prevent fires and explosions during operations, such as purging, as well as normal operations.

11.2 Considering the recent experience at a nuclear facility, present and discuss the following:

(a) The total inventory of circulating water system, including that in the screenwell basins, and the maximum flow rate through the main condensers.

(b) The potential for and the means provided to detect a failure in the circulating water transport system barrier such as the rubber expansion joints. Include the design and operating pressures of the various portions of the transport system barrier and their relation to the pressures which could exist during malfunctions and failures in the sytem.

(c) The time required to stop the circulating water flow (time zero being the instant of failure) including all inherent delays such as operator reaction time, drop out times of the control circuitry and coastdown time.

(d) For each postulated failure in the circulating water transport system barrier give the rate of rise of water in the associated spaces and total height of the water when the circulating water flow has been stopped.

(e) For each flooded space itemize, with the aid of drawings, the essential systems that could become inoperable as a result of flooding. Include in your discussion the consideration given to passageways, pipe chases and/or the cableways joining the flooded space to other spaces containing essential system components. Discuss the effect of the flood waters on all submerged essential electrical systems and components.

(f) Describe the protective measures that will be taken in terms of operation, inspections and tests to detect impending failures before they occur and the frequency at which they will be performed.

11.3 Provide a description of your in-service inspection plans for the main steam lines, steam valves, and the turbine-generator. Describe the tests and nondestructive examinations planned for the turbine generator highly stressed parts and rotating members and relate the detectable flaw size to the critical crack size for those members.

12.0 STATION STRUCTURES AND SHIELDING

12.1 Appendix C, Table C-10b provides a listing of structures and components that will be provided with tornado protection. Item XXX 2, Civil Structures indicates that the Reactor Building is tornado protected by virtue of its location. Clarify this apparent design discrepancy.

12.2 Discuss the tornado protection provided for vulnerable elements of Class I (seismic) structures, such as penetrations, locks, doors, intakes, large openings, and others. For any area not protected, justify that portion of the design.

12.3 Section 12.3.5 of the PSAR provides the design bases for tornado loads for seismic Category I structures. Discuss the adequacy of the design of these structures to preclude the generation of secondary missiles within the structure due to the tornado missiles. Determine the effects of any secondary missile on safety related equipment and systems. In addition to the design bases tornado missiles, consider also tornado missiles of lesser size that could produce a more damaging secondary missile.

12.4 Assuming that the pressure, resulting from the maximum probable flood hydrostatic head, is acting on saturated soils, discuss the amount of seepage expected through: (a) the seismic Category I structure walls, (b) an assumed crack in the concrete wall, and (c) a poorly constructed water stop at a construction joint.

12.5 Section 12.2.3 of the PSAR states that an analysis will be performed to ensure that any deflections, translations, or other movement of seismic Category II structues will not adversely affect the function of the seismic Category I portion of the structure or seismic Category I equipment adjacent to or housed therein. Provide a listing of the structures and equipment interface areas where this analysis will be performed.

12.6 Provide a list of typical internally generated missiles that have been considered in the overall design of seismic Category I structures and shielding for essential components. Indicate the nature of the missile, maximum weight, size, shape, assumed point of impact, assumed impact velocity, and where and how originated. Include also missiles of larger size, such as pumps parts, biological shield and plugs, and others. Indicate the criteria and the method of analysis used for checking failure at point of impact.