CENTRAL FILES

NIAGARA MOHAWK

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

August 7, 1980

Office of Inspection and Enforcement
Region I
Attn: Mr. Boyce H. Grier, Director
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

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

Dear Mr. Grier:

Your July 18, 1980 Inspection and Enforcement Supplement No. 1 to Bulletin No. 80-17 requested information regarding the control rod scram system at Nine Mile Point Unit 1. The attachments to this letter address item A of that Bulletin. The remaining outstanding items of the Bulletin will be addressed in accordance with the schedules outlined in the Bulletin.

Supplement No. 1 to Bulletin No. 80-17 also requested Niagara Mohawk provide an estimate of the manpower expended in the conduct of the review and preparation of the reports required by the Bulletin and the manpower associated with corrective action necessary. To date, Niagara Mohawk has expended approximately 1500 manhours for the review and preparation of reports and for corrective action.

Very truly yours,

NIAGARA MOHAWK POWER CORPORATION

T. E. Lempges
T. E. Lempges
Vice President - Nuclear Generation

SWW:ja
cc: NRC Office of Inspection and Enforcement
Division of Reactor Operations Inspection
Washington, D. C. 20555

8009120263

STATE OF NEW YORK)

COUNTY OF ONONDAGA) ss:

THOMAS E. LEMPGES, being duly sworn, says:

I am Vice President, Nuclear Generation of Niagara Mohawk Power Corporation. I have read the foregoing letter and the fact contained in the letter and attachment are true to the best of my knowledge, information and belief.

Thomas E. Lempges

Thomas E. Lempges

Sworn to before me on this
7th day of August, 1980

Cynthia A. Petta

Notary Public

CYNTHIA A. PETTA
Notary Public in the State of New York
Qualified in Onondaga Co. No. 4682225
My Commission Expires March 30, 1982

NIAGARA MOHAWK POWER CORPORATION

RESPONSE TO INSPECTION AND ENFORCEMENT BULLETIN 80-17

SUPPLEMENT NO. 1

FOR

NINE MILE POINT UNIT 1

Item A.1

Provide to the NRC Regional Office an analysis of the adequacy of the "as-built" SDV system and associated vent and drain system, including any identified design deficiencies. Include copies of verified "as-built" isometric drawings of the SDV and detailed descriptions of the remainder of the system, verified to be correct, as part of this analysis.

Response

An analysis of the as-built scram system at Nine Mile Point Unit 1 has been performed. The results of that analysis, a description of the system and drawings pertaining to that system are herein presented. Only the isometric drawings of the hydraulic system shown on Attachment 2 have been verified by a walk through. However, a review of the remainder of the system indicates no modifications have been made to the pneumatic or electrical systems since plant startup. Therefore, for these systems, pre-op test data eliminates the need for a walk through.

I. Description of System

1. Hydraulic

The control rod drive hydraulic system is shown on Attachments 1 and 2. The scram subsystem consists of the scram discharge piping, instrumentation and controllers, and the accumulator subsystem. The system takes water from the condensate system downstream of the condensate demineralizers with two backup supplies (the condensate storage tank and the demineralized water storage tanks), pressurizes it, and passes it to the charging water line. From there, water goes to the charging water header where it is distributed to the accumulators for the individual drives. During a scram, the exhaust water from the drive is distributed to the scram discharge volume where it is retained until the scram is reset. Upon resetting the scram, the vent and drain valves are opened and the water is drained to the reactor building equipment drain tank. A description of the individual components associated with the scram subsystem is given below.

A. Accumulators: The scram accumulators consisting of a piston-type water accumulator connected to the gas volume serves as an independent source of energy to initiate insertion of control blades during a scram. The two cylinders comprising the accumulator occupy the lower section of the hydraulic control unit. The piston in the water cylinder serves as a barrier between the high pressure nitrogen used as the source of stored energy and the water used to initiate the scram. The piston is sealed against leakage by two teflon seals and a synthetic rubber O-ring installed in grooves around the outside wall. Water is continuously supplied to the hydraulic control unit via the charging water header. A stop check valve located in the riser serves as an isolation valve and prevents backflow from the accumulator to the charging header. The valve insures that the accumulator will retain its charge for a limited time in the event of loss of pressure in the charging water header. The nitrogen cylinder, with a volume of 1,190 cubic inches, is initially charged to approximately 900 psi. Water pressure in the charging line at approximately 1400 psi is then applied.

To assure that it is always capable of producing a scram, the accumulator is continuously monitored for water leakage and for nitrogen pressure. A float-type level switch will actuate an alarm if water leaks past the nitrogen-water barrier and collects in the bottom of the accumulator. The pressure indicator and the pressure switch are connected to the accumulator to monitor nitrogen pressure. During normal operation, the accumulator barrier has virtually zero pressure drop across it. If there should be any loss of nitrogen, the barrier will move on to a stop and further loss will cause a decrease in the nitrogen pressure. The accumulator barrier will not move down beyond the stop and therefore will not compress the reduced amount of gas back up to pressure. The decrease in nitrogen pressure will actuate the pressure switch and sound an alarm. An isolation valve allows each of the accumulator instruments to be isolated and serviced. A separate connection on the accumulator is used for pre-charging and bleeding.

B. Scram Pilot Valves: During normal operation, each of the two parallel branches of the reactor protection system energize one of the two three-way solenoid scram pilot valves associated with each drive mechanism. During normal operation, these pilot valves are energized and supply instrument air to the operators of both the inlet scram valve and the outlet scram valve, holding both scram valves closed. During a full scram, both of the reactor protection system branches are de-energized and both pilot valves open, venting the scram valves operators and allowing the scram valves to open. To protect against spurious scrams, the pilot valves are interconnected so that both pilot valves must be de-energized to vent the scram valves' operators. On the other hand, failure of either electric power to both solenoids or instrument air will produce a scram. The pilot valves are selected based on simplicity of design, a minimum of moving parts, fast opening time, and satisfactory statistical operating history on similar units.

For added protection, the instrument air header to all the pilot valves has a backup scram pilot valve. Upon a scram signal, these three-way solenoid valves close off the air supply and vent the instrument air header. This will scram any drive should either of its scram pilot valves fail to vent.

C. Scram Valves: Inlet and outlet scram valves are normally held closed by control air pressure supplied to the diaphragm actuators by the scram pilot valves. The inlet scram valve is a globe valve which is opened by the force of an internal spring and closes when air pressure is applied on top of the diaphragm operator. The opening force of the spring is approximately 700 pounds. Each valve has a position indicator switch which energizes a light in the control room as soon as the valve starts to open. The scram valve is selected based on the high operating force, fast opening time, and satisfactory operating history on similar units.

The outlet scram valve is identical to the inlet scram valve, but smaller. Both valves are provided with soft teflon seats to minimize seat leakage.

D. Discharge Piping and Instrumentation: The scram discharge piping is provided to contain the water exhausted from all 129 control rod drives during a scram, thereby limiting loss of water from the reactor. During normal operation, the discharge piping is empty and the vent and drain valves remain open. The scram discharge piping consists of 2 - four inch headers and 3 - six inch headers which interconnect to an eight inch instrument loop. Attachment 3 shows which drives empty to which headers. During a scram, the vent and drain valves close and the discharge piping partially fills with water. Upon completion of the scram, water leakage past the seals continues into the discharge headers until the pressure in the discharge piping equals reactor pressure. A relief valve is provided on the discharge piping to relieve pressure at approximately 1250 pounds per square inch. When the scram signal is cleared, the vent and drain valves open and the water is drained to the Reactor Building equipment drain tank.

A series of six liquid level switches (RD08A-RD08F) are connected to the discharge piping instrument loop to monitor water level and guard against an abnormal quantity of water in the piping. Switch RD08F energizes the DISCHARGE VOLUME NOT DRAINED annunciator and is set at three gallons. Switch RD08E annunciates the VOLUME HIGH WATER LEVEL alarm in the control room and is set at 18 gallons. Switches RD08A through RD08D are connected to channels 11 and 12 of the RPS system and are set to activate at 37 gallons. Upon activiation of these switches, a scram is initiated.

The discharge piping vent and drain valves are normally held open by the application of instrument air pressure to their diaphragm operators. They close by internal spring pressure when the air pressure is removed. Both valves are provided with stem mounted position switches. Control air pressure is provided by 2 - three way solenoid operated air valves. During normal operation, each of the two channels of the RPS energize one of the two solenoid valves so that control air is supplied to the vent and drain valve diaphragm operators. Upon scram initiation, the solenoid valves are de-energized and the control air system vented, causing the vent and drain valves to close. This action limits loss of water from the reactor.

2. Pneumatic System

Air is supplied to diaphragm operators of the scram valves, vent valves, and drain valves through the instrument air system at a pressure between 70 psig and 100 psig. Instrument air is supplied by 2 - 485 cfm flange mounted, motor driven, two stage, teflon ring air compressors which draw air from outside the building. All air is passed through a dryer and filter before being sent to the instrument air lines. A separate 1/2 inch line runs from a 3/4 inch header line to each set of scram valves (see

Attachment 1). Each header line, in turn, is connected to the 1-1/2 inch mainline. Vent and drain valves are also connected to the 1-1/2 inch mainline via a 1/2 inch line. All air directed to the CRD system is passed through a second high efficiency filter to further protect the system from malfunction. Any failure of the pneumatic system will result in venting the line, and a scram will be initiated.

3.8 System Logic

A dual redundant fail-safe reactor protection system is provided to automatically initiate appropriate action whenever specific Station conditions reach pre-established limits. The protective system logic is made up of two independent logic channels (channel 11 & channel 12), each having two subchannels (a&c for channel 11, b&d for channel 12) of tripping devices. Thus, the system has a total of four independent subchannels. Each subchannel has an independent sensor monitoring each of the critical parameters. The outputs of the two subchannels are arranged in a one out of two logic. An input from either or both of the subchannels will produce a logic channel trip. Both channels 11 & 12 must be tripped to initiate a scram. Figure 4 is a schematic of logic channel 11. Channel 12, which is identical to channel 11, is not shown.

During normal operation, all sensor and trip contacts are closed and all vital relays are operated energized. All pilot scram valve solenoids are energized and instrument air pressure is supplied to all scram valves.

The following action would ensue from a high water level in the dump volume. Assuming the level rises to the trip point, the following sequence occurs. The dump volume high level sensor contacts open and the corresponding relays are de-energized. Contacts 11K7 and 11K8 open, relays 11K51 and 11K52 are de-energized, contacts 11K51 and 11K52 open, and the pilot scram valve solenoids in groups 1, 2, 3, and 4 are de-energized (Attachment 4 indicates which group the individual drives are in). Under the foregoing conditions, the scram pilot valves associated with channel 11 are de-energized and instrument air continues to be supplied to the scram valves via the pilot scram valves associated with channel 12. A similar sequence of events occurs in channel 12 causing those pilot valves associated with channel 12 to de-energize. The instrument air lines are then vented and the scram valves are opened, initiating a scram.

The system may be scrammed manually by depressing the manual scram buttons. This causes relay 11K55 and 12K55 to de-energize, which in turn opens the corresponding contacts. The events which then occur are similar to the automatic scram sequence.

II. Analysis

An analysis of the scram discharge volume and related vent and drain system has been performed and indicates the present design to be adequate. No design deficiencies have been identified. Vent and drain system analyses have shown that siphoning will not occur, as neither of these contains submerged pipe exits in the Reactor Building equipment drain tank. A review of scram histories and the results of recent tests performed demonstrate the effectiveness of this system. Attachment 5 is a summary of the recent testing of the scram system required by I. E. Bulletin 80-17. The testing showed that all scram related components functioned as designed. The system also contains a computer printout indicating the position (open or closed) of the vent and drain valves associated with the scram system. A review of the computer printout during past scrams also showed that the vent and drain valves have functioned properly. A·walkthrough of the hydraulic system verified that pipes in the header system slope toward the scram discharge instrument volume, further enhancing the drainage ability of the discharge volume. The system is designed to scram should a failure of the valves, instrument air system or electrical system occur. Requirements in the technical specifications (Section 4.1.1c, 4.1.1d) also serve to ensure the reliability of the system.

Based on the above information, the scram system at Nine Mile Point Unit 1 is believed to be reliable and adequate to ensure safety.

Item·A:2

Revise and implement Operating Procedures as necessary to provide clear guidance to the licensed operator in the control room regarding when he should initiate the SLCS without obtaining prior supervisory approval. Provide a description of the implemented procedural requirements.

Response

Presently at Nine Mile Point Unit 1 there are three Special Operating Procedures which could lead to initiation of the Standby Liquid Control System. These procedures are as follows:

SOP-17	Emergency Shutdown With SLCS
SOP-28	Anticipated Transient Without Scram
SOP-31	Failure of Control Rods to Scram

In all cases these procedures provide clear guidance to the licensed operator in the control room regarding when he should initiate SLCS without obtaining prior supervisory approval. Hence, no revisions to these procedures are necessary to comply with this item.

The implemented procedural requirements are lengthy due to the consideration of a number of different plant response possibilities. These procedures are at the plant site for your review.

Item·A:3

Assure that procedures exist and are implemented for specifying remedial action to be taken if water is found in the SDV system at times when it should be free of water. Provide a description of the implemented procedural requirements.

Response

Surveillance Test Procedure No. N1-ST-D1, Ultrasonic Examination For Water in Scram Discharge Volume Piping is currently being performed on a daily basis at Nine Mile Point Unit 1. This procedure includes a section which specifies remedial action to be taken if water is found in the SDV system at times when it should be free of water. The implemented procedural requirements are as follows.

1. Cycle the SDV vent and drain valves from open to close to open and visually verify that they operate.

2. Perform a 100 percent UT examination of the SDV piping sections that indicate the presence of water to determine the extent of accumulation.

3. If the water has drained out of the SDV no further action is necessary.

4. If water is still indicated commence a normal orderly shutdown and initiate a Work Request to investigate and correct the problem.

Item A:4

Revise and implement Administrative Procedures as necessary to ensure that the SLCS key shall be readily available to the licensed operator in the control room. Provide a description of the implemented procedural requirements.

Response

Presently at Nine Mile Point Unit 1 the SLCS key is readily available to the licensed operator in the control room. The key, GE-75, is located in the Chief Shift Operator's desk in the main control room with several duplicate keys maintained in the key cabinet in the Station Shift Supervisor office which is adjacent to the main control room. Since this key is also used to operate the Reactor Mode Switch, it is readily available. In addition, a reminder as to the location and function of key #GE-75 has been issued to all licensed operators via the "Station Shift Supervisor's Instructions." Hence no revisions to Administrative Procedures are necessary to comply with this item.

Item A.5

Continue daily monitoring of water levels in all scram discharge volumes until continuous monitoring system(s) (discussed in B.1 below) is (are) installed and operational (this requirement supersedes the requirements of Item 5 of IE Bulletin 80-17 which required daily surveillance for only 6 days).

Response

Surveillance Test Procedure N1-ST-D1, Ultrasonic Testing for Water in Scram Discharge Volume Piping is performed daily during power operation, after every scram and before every startup. This procedure will continue until Item B1 of I. E. Bulletin 80-17 is resolved.