



**New York Power
Authority**

February 17, 1984
JPN-84-13

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. Domenic B. Vassallo, Chief
Operating Reactors Branch No. 2
Division of Licensing

Subject: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
Qualification of ADS Accumulators
NUREG-0737 Item II.K.3.28

References: 1. NRC letter, D. B. Vassallo to
J. P. Bayne dated May 11, 1983.

Dear Sir:

Attachment I to this letter is our response to your
May 11, 1983 request for additional information regarding
ADS accumulator qualifications (Reference 1).

As described in the attachment, we have not been able to
confirm the original design requirements for certain check
valves associated with the ADS accumulators. Therefore,
the Authority will replace these valves with qualified
valves by June 29, 1985 dependent on the availability of
replacement valves.

If you require additional information, please contact
J. A. Gray, Jr. of my staff.

Very truly yours,

C. M. Wilverding

for
J. P. Bayne
Executive Vice President
Nuclear Generation

cc: Office of the Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 136
Lycoming, New York 13093

8402240094 840217
PDR ADOCK 05000333
P PDR

A046
1/1

NEW YORK POWER AUTHORITY

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

ATTACHMENT I to JPN-84-13

Response to NRC 5/11/83 request (Reference 5) for additional information regarding NUREG-0737 Item II.K.3.28, "Qualification of ADS Accumulators."

Q1. When taking into account leakage, seismic events and a harsh environment, what is the length of time the accumulators are available to perform their function, both at normal containment pressure and at a specified percent (i.e., 70%) of drywell pressure following an accident? Does this meet the requirements specified in the plant's FSAR?

A1. As described in our responses to Questions 5, 9 and 10, the Authority has conducted analyses of the ADS to consider seismically induced piping stresses and the environmental qualification of electrical and mechanical components.

Under normal environmental conditions and normal containment pressure, the ADS accumulators are capable of performing their function for approximately 260 minutes (Leakage from the ADS is discussed in our response to Questions 4 and 7). At seventy percent of peak drywell pressure following an accident, the ADS accumulators are capable of performing their function for approximately 200 minutes. Peak drywell pressure during a design basis event is 45 psig. For pipe breaks resulting in drywell pressures greater than 70 percent of accident drywell pressure (31.5 psig), sufficient reactor depressurization occurs due to the break to preclude the need for ADS (Reference 9). The accumulators are sized to provide two actuations at a drywell pressure of 43.4 psig. This is significantly higher than 31.5 psig. Therefore, the FitzPatrick design provides an adequate short term capability to place the reactor in the shutdown cooling mode.

Q2. Describe the ADS accumulator system design and operation (e.g., trains, air supply, capacity, alarms and instrumentation and their location, etc.).

A2. There are a total of eleven safety relief valves at FitzPatrick including the seven ADS valves. (The mechanical design of these valves is described in Section 4.4 of the FSAR, Reference 6. This same section also describes the purpose of the ADS and it's operation. All eleven safety relief valves open on excess steam pressure. In addition, each valve can be opened manually from the control room. Seven of the eleven valves are opened by the ADS actuation logic. A remote ADS control panel for manual control of the safety relief valves is provided so that the plant can be placed in a cold shutdown condition in the event of a severe fire in the relay room, control room or cable room.

The ADS accumulator system consists of seven accumulators. Each accumulator supplies a single ADS safety relief valve. These accumulators are ASME Boiler & Pressure Vessel Code Section VIII tanks. The purpose of the ADS accumulators is to assure that safety relief valves can be opened and held open in the event of the loss of nitrogen supply.

The accumulator vessels were inspected for structural adequacy using nondestructive techniques. In addition, the tanks are designed and supported to withstand a design basis earthquake. (Supply piping and supports are addressed in our response to Question 9.) Each accumulator has a volume of approximately 226 cubic inches. Each accumulator is normally pressurized by the instrument air system which supplies nitrogen at approximately 110 pounds per square inch. Nitrogen is supplied to the drywell instrument air lines from a nitrogen storage unit. The instrument air lines are configured as a ring-header within the drywell. Approximately half of the ADS accumulators are supplied from each side of the ring-header. The line supplying the drywell ring-header is equipped with a low/high pressure alarm which indicates in the main control room. Similarly, loss of pneumatic pressure to the ADS is annunciated in the control room. Actuation of the ADS does not require any source of offsite power. Safety relief valves use safety related DC power from the plant batteries for control while the accumulators supply pneumatic motive power.

- Q3. Define the basis for the allowable leakage criteria for the ADS accumulator system (e.g., boundary conditions, environmental, and seismic parameters, operator interface, margin, etc.).
- A3. See response to Question No. 4.
- Q4. What margin is in the allowable leakage criteria to account for possible increase in leakage resulting from the effects of a harsh environment and/or a seismic event.
- A4. The ADS accumulators are sized to provide two actuations at 70% of maximum allowable drywell pressure (43.4 psig). This is based upon several factors:
- a. Maximum allowable leakage past the check valves upstream of the accumulators is less than or equal to 0.12 SCFH. This is the acceptance criteria for the leak rate test of ADS pneumatic supply check valves. (In the single test conducted to date, the leakage rates typically seen are much less than the allowable).
 - b. ADS accumulator are pressurized to normal system pressure (110 psig).

The Authority has analyzed the ADS pneumatic supply system allowing variation in supply pressure, leak rates and drywell pressure. Results indicate that operation of ADS is possible

over a wide range of system initial pressures and drywell pressures. The time period after loss of pneumatic supply for which ADS can be operated is dependent upon initial conditions and leak rates. The lower limit (based upon a leak rate of 0.12 SCFH) is 200 minutes assuming normal supply pressure is available before loss of pneumatic supply. If initial supply pressure is less than 110 psig, then approximately 2.5 minutes per psi difference below 110 psig is subtracted from the 200 minute limit. A supply pressure of 96 psig at 70% of maximum drywell pressure (43.4 psig) will permit two ADS actuations within 65 minutes of loss of pneumatic supply.

- Q5. A statement that test and/or analysis performed verified that a harsh environment and/or seismic event would not increase the leakage rate.
- A5. As stated in our response to Question No. 9, the seismic stress levels are on the order of one-tenth of the maximum allowable stress levels. While no specific analysis or test has been performed to determine the susceptibility of this system to seismically induced leaks, the Authority considers the low stress levels and high degree of structural integrity adequate to preclude any significant increases in leak rate. The electrical components of the ADS accumulator system (relief valve pilot solenoid valves) have been qualified for a harsh environment as part of the Authority's environmental qualification program.
- Q6. A statement that verifies that no credit was taken for non-safety related equipment and instrumentation when establishing the allowable leakage criteria.
- A6. The test procedure described in response no. 7 determines leakage from the ADS accumulator pressure boundary (including the upstream check valves, discharge solenoid valves, intervening pipe and fittings and accumulator.) All components comprising the accumulator pressure boundary are safety-grade components with the exception of the two check valves installed in the pneumatic supply line to each accumulator. (Refer to our response to question no. 10 for further information regarding these check valves.)
- Q7. Define the periodic leak testing of the ADS accumulator system (i.e., the time interval between these leak tests, along with a concise description of the test procedure employed).
- A7. ADS accumulator system leak testing is performed as required; no specific test interval is currently in effect.

The test procedure employed determines the leakage rate of two soft-seated check valves (series arrangement) in the instrument air supply piping to each ADS valve and accumulator. The leak rate of these check valves is determined by isolating the instrument air supply and measuring any drop in pressure at the pilot valve. After

allowing for a brief stabilization period, pressure decrease over a 30 minute interval is observed and recorded. Leak rate is then calculated based upon the observed pressure drop.

- Q3. A concise description of the surveillance performed, and how frequent, on alarms and instrumentation associated with the ADS accumulator system.
- A8. Section 4.5.D of the FitzPatrick Technical Specifications requires the following surveillance of the ADS at least once per operating cycle:
1. A simulated automatic initiation which opens all pilot valves.
 2. Manually open each relief/safety valve while bypassing steam to the condenser. Observe a ten percent (or greater) closure of the turbine bypass valves, to verify that the relief/safety valve has opened.
 3. A logic system functional test. (As defined in Section 1.F.6 of the FitzPatrick Technical Specifications a logic system functional test is a test of relays and contacts of a logic circuit from sensor to activated device to ensure components are operable per design intent. Where practicable, action will go to completion: i.e., pumps will be started and valves operated.)

A detailed description of the instrumentation and controls associated with the ADS can be found in (Reference 6) Section 7.4.3.3 of Revision 1 of the updated FitzPatrick FSAR.

- Q9. A statement that confirms that the ADS accumulator system, associated equipment and control circuitry, are seismically qualified.
- A9. In response to I.E. Bulletin No. 80-01 (Reference 3) ("Operability of ADS Valve Pneumatic Supply"), the Authority reviewed the seismic capability of the pneumatic supply and accumulator system servicing the ADS valves. The existing techniques for the design and construction of small bore piping insures that such piping, with its small mass and large flexibility, will withstand seismic events without damage. Computer aided analysis is neither necessary or required. Notwithstanding, the Authority has analyzed two of the seven systems. The results indicate that seismic stresses are less than one-tenth of the maximum allowable stress. Based on this analysis, the ADS pneumatic supply system from the accumulator isolation check valves to the ADS valve operators is seismically adequate. The pneumatic supply ring header will be analyzed to determine its seismic adequacy.

The ADS accumulators are designed and supported to withstand design basis seismic events. ADS controls and instrumentation are designed as Class I seismic equipment.

- Q10. A statement that confirms that electrical and mechanical components of the ADS accumulator system and associated equipment and control circuitry are environmentally qualified for conditions associated with normal operation, maintenance, testing, and postulated accidents.
- A10. The FitzPatrick ADS accumulators were designed and fabricated to the requirements of ANSI B31.1. ANSI B31.1 invoked the requirements of ASME Section VIII for unfired pressure vessels. In addition, augmented quality assurance provisions were imposed on the ADS accumulators to assure that the safety standards in effect at the time of plant design for safety-related components were complied with. Specifically, mechanical properties and chemical composition were certified, material traceability was established, and nondestructive examinations (liquid penetrant and radiography) were conducted. Based upon this information, the ADS accumulators are adequate to perform their intended function.

As described in our Response to question No. 7, two check valves arranged in series are installed in the pneumatic supply line to each ADS accumulator. The Authority has not been able to confirm the environmental qualification of these valves. Therefore, the Authority will replace these valves.

Additional information concerning the environmental qualifications of the ADS can be found in Section 7.4.3.3.5 of the updated FitzPatrick FSAR.

- Q11. A statement verifying that the ADS valves, accumulators, associated equipment and instrumentation are capable of performing their function during and following an accident situation while taking no credit for non-safety related equipment and instrumentation.
- A11. The FitzPatrick Automatic Depressurization System is capable of performing its intended function during and following an accident situation while taking no credit for non-safety related equipment and instrumentation. Two check valves in the pneumatic supply line to each ADS accumulator will be replaced because records to document the environmental qualification of the existing valves are not currently available.

References:

1. PASNY 4/1/82 letter, J.P. Bayne to D. B. Vassallo; (JPN-82-35) regarding NUREG-0737 Item II.K.3.28, Qualification of ADS Accumulators
2. PASNY 1/11/82 letter, J. P. Bayne to T. A. Ippolito, (JPN-82-7) regarding NUREG-0737 January 1, 1983 modification and submittals

3. PASNY 1/18/80 letter, J. D. Leonard to B. H. Grier, (JAFP-80-053) regarding I. E. Bulletin No. 80-01 "Operability of ADS Valve Pneumatic Supply"
4. NYPA 6/9/83 letter, J. P. Bayne to D. B. Vassallo, (JPN-83-53) regarding NUREG-0737 Item II.K.3.28, Qualification of ADS Accumulator
5. NRC 5/11/83 letter, D. B. Vassallo to J. P. Banye regarding NUREG-0737 Item II.K.3.28, Qualification of ADS Accumulators
6. James A. FitzPatrick Nuclear Power Plant Updated Final Analysis Report (FSAR), Revision 1, dated July 1983.
7. PASNY 5/20/83 letter, J. P. Bayne to D. B. Vassallo (JPN-83-45) regarding response to 10 CFR 50.49-Equipment Qualification.
8. NYPA 6/6/83 letter, J. P. Bayne to D. B. Vassallo (JPN-83-52) regarding safety evaluation - environmental qualification of safety related electrical equipment.
9. General Electric Report, "BWR ADS Pneumatic System-Comparison to NUREG-0737 Requirement II.K.3.28", NEDE-24956 dated August, 1981.