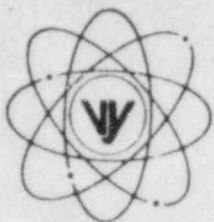


VERMONT YANKEE NUCLEAR POWER CORPORATION



RD 5, Box 169, Ferry Road, Brattleboro, VT 05301

REPLY TO:
ENGINEERING OFFICE

1671 WORCESTER ROAD
FRAMINGHAM, MASSACHUSETTS 01701
TELEPHONE 617-872-8100

December 5, 1983
FVY/123

United States Nuclear Regulatory Commission
Washington, D. C. 20555

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

References: (a) License No. DPR-28 (Docket No. 50-271)
(b) Letter, USNRC to VYNPC, NVC 83-114, dated May 11, 1983
(c) Letter, VYNPC to USNRC, FVY 83-87, dated August 4, 1983

Subject: NUREG-0737, Item II.K.3.28

Dear Sir:

By Reference (b) you requested additional information with regard to NUREG-0737, Item II.K.3.28, "Qualification of ADS Accumulators". The purpose of this letter is to provide the enclosed information in response to your request.

We trust that this information is deemed acceptable; however, should you have further questions in this matter, please contact us.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

J. B. Sinclair

J. B. Sinclair
Licensing Engineer

JBS/bal

Enclosure

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

NUREG-0737, ITEM II.K.3.28

QUALIFICATION OF ADS ACCUMULATOR SYSTEMS

VERMONT YANKEE NUCLEAR POWER STATION

Question No. 1

When taking into account leakage, seismic events, and 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 of drywell pressure (i.e., 70%) following an accident? Does this meet the requirements specified in the plant's FSAR?

Response

Vermont Yankee Test Procedure No. OP 4028 (currently Revision 1) provides the instructions and acceptance criteria for ADS Accumulator System leakage. This test procedure insures that the ADS Accumulator System will retain a pressure of at least 64 psig for three hours in the event of the loss of normal instrument air supply.

A seismic event should not increase leakage, as the system is classified as a Seismic Category I System.

A harsh environment should not increase leakage, as the only parts of the system subject to damage in an accident situation are the solenoids and the seats of the check valves. Both of these components are designed for a harsh environment. (See response to Question No. 5.)

As described in our May 15, 1981 response on this subject, the ADS accumulators need only provide operability for 10 minutes following an accident to satisfy the FSAR analysis.

In the FSAR analysis, the ADS valves need be activated only once - when the automatic control signal calls for it.

The original design basis for the accumulators was to provide for two (2) operations of each ADS valve when the containment atmosphere is at accident pressure. This is at 100% conservatism in the accumulator system design basis. General Electric assumed the small break accident pressure in the drywell to be 70% of the containment design pressure in the design basis for plants without plant-specific containment pressure response data.

Question No. 2

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

Response

The function of the ADS Accumulator System is to provide a reserve of compressed nitrogen (or air) for operation of the ADS System Safety/Relief Valves, in case of a failure (including line break) of the drywell instrument air supply.

An individual ADS accumulator is associated with each ADS Safety/Relief Valve (4 total). Each accumulator has 0.189 ft³ (1.414 gal) capacity. The accumulators are connected to the drywell instrument air supply by one-inch carbon steel piping. Each ADS S/RV solenoid is connected to the one-inch supply line by 3/8 inch stainless steel flexible tubing.

A "NUPRO" stainless steel, soft-seated check valve is installed in the instrument air supply line to each accumulator and solenoid. The purpose of this check valve is to keep the ADS Accumulator System pressurized by sealing off the instrument air supply line, in case of a loss of drywell instrument air supply pressure. As a result of I&E Bulletin 80-01, the original "Hancock" hard-seated check valves were replaced with the present "NUPRO" check valves to insure ADS accumulator leak-tightness.

The original S/RV solenoids were discovered to be a source of air leakage and were also replaced with "ASCO 206 Series (NP)" solenoids. The present solenoids are environmentally qualified for post-LOCA and seismic conditions per IEEE-323-1974, IEEE-382-1972, and IEEE-344-1975. The soft seats on the "NUPRO" check valves are designed for their expected environmental conditions.

All piping and components from the "NUPRO" check valves to both the ADS accumulators and the S/RV solenoids (inclusive of these components) is classified as Nuclear Safety Class 2 and Seismic Category I. This defines the boundaries of the ADS Accumulator System.

All equipment is located in the drywell. There are no alarms or instrumentation directly associated with the system; however, a high-low pressure alarm exists on the non-safety class instrument air supply line to the drywell.

See the attached sketch (Attachment 1) for a diagram of the ADS Accumulator System.

Question No. 3

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.).

Response

Calculations were performed which provide the basis for the ADS Accumulator System allowable leakage criteria. It has been determined that an accumulator pressure of 64 psig will provide at least two (2) actuations of the ADS valves at containment atmosphere accident pressure (70% of containment design pressure).

Test procedure OP 4028 (currently Revision 1) insures that an accumulator pressure of at least 64 psig can be maintained for three hours after a loss of instrument air supply.

As noted in response to Question 1, seismic events and harsh environments should not increase the amount of ADS Accumulator System leakage, as the system is designed for these events.

Question No. 4

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.

Response

As noted previously, the ADS Accumulator System is designed for seismic events and harsh environments; therefore, leakage rates should not be affected. However, the following conservatisms exist in the system:

- The system is designed to provide at least two (2) ADS valve actuations. The Vermont Yankee FSAR analysis requires only one (1) actuation per valve. This provides a 100% conservatism.
- There is another 25% conservatism in ADS Accumulator System design to account for single failure. Each ADS valve provides 33 1/3% of required capacity, and four (4) reliefs are provided.
- General Electric has specified that an accumulator of one-gallon capacity will provide a final pressure of 70 psig after five actuations, starting from 90 psig. Vermont Yankee's ADS accumulators have a capacity of over 1.4 gallons each.

Question No. 5

A statement that test and/or analysis performed verified that a harsh environment and/or seismic event would not increase the leakage rate.

Response

A harsh environment and/or seismic event should not increase the ADS Accumulator System leakage rate. This statement is based upon the following:

- A seismic review was conducted and a support upgrade performed in order to insure that the ADS Accumulator System is seismically qualified.
- The only components susceptible to damage in a harsh environment are the solenoids and the seats of the check valves. The "ASCO" solenoids used are environmentally qualified, as noted in response to Question 2. The "NUPRO" check valves are designed for 350°F service in an accumulated radiation environment of 10^5 rads.

Question No. 6

A statement that verifies that no credit was taken for non-safety related equipment and instrumentation when establishing the allowable leakage criteria.

Response

No credit was taken for non-safety-related equipment in establishing the allowable leakage criteria. There is no instrumentation associated with the ADS Accumulator System.

Question No. 7

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).

Response

The purpose of plant Procedure OP 4028, "ADS Air Supply Accumulator Surveillance", is "to provide a safe, efficient, and reliable means of leak rate testing of the Safety Relief Valve air supply accumulator, check and solenoid valves and associated piping of the Automatic Depressurization System".

The test procedure calls for testing during each refueling outage. The ADS Accumulator System is located exclusively in the drywell and, as such, is inaccessible during normal plant operation due to drywell atmosphere nitrogen inerting.

Briefly, testing is performed as follows:

- Instrument air supply to the ADS Accumulator System is isolated and air vented from the system.
- A pressure gauge is installed in place of the accumulator drain plug.
- The ADS System is repressurized by the instrument air supply and then re-isolated.
- A pipe union is opened upstream of the check valve and wedged open to insure a vent path.
- Time is recorded.
- Final acceptance criteria is a minimum pressure of 64 psig after 3 hours.
- System is returned to service.

There are also provisions in the test procedure for removing the ADS Accumulator System from the drywell and performing a bench test due to "ALARA" considerations.

The actual test procedure can be made available for review at the plant site.

Question No. 8

A concise description of the surveillance performed, and how frequently, on alarms and instrumentation associated with the ADS Accumulator System.

Response

There are no alarms or instrumentation associated with the ADS Accumulator System.

Question No. 9

A statement that confirms that the ADS Accumulator System, associated equipment, and control circuitry are seismically qualified.

Response

The ADS Accumulator System is classified as Seismic Category I. See response to Question 5.

Question No. 10

A statement that confirms that the ADS Accumulator System and associated equipment and control circuitry are environmentally qualified for conditions associated with normal operation, maintenance, testing, and postulated accidents.

Response

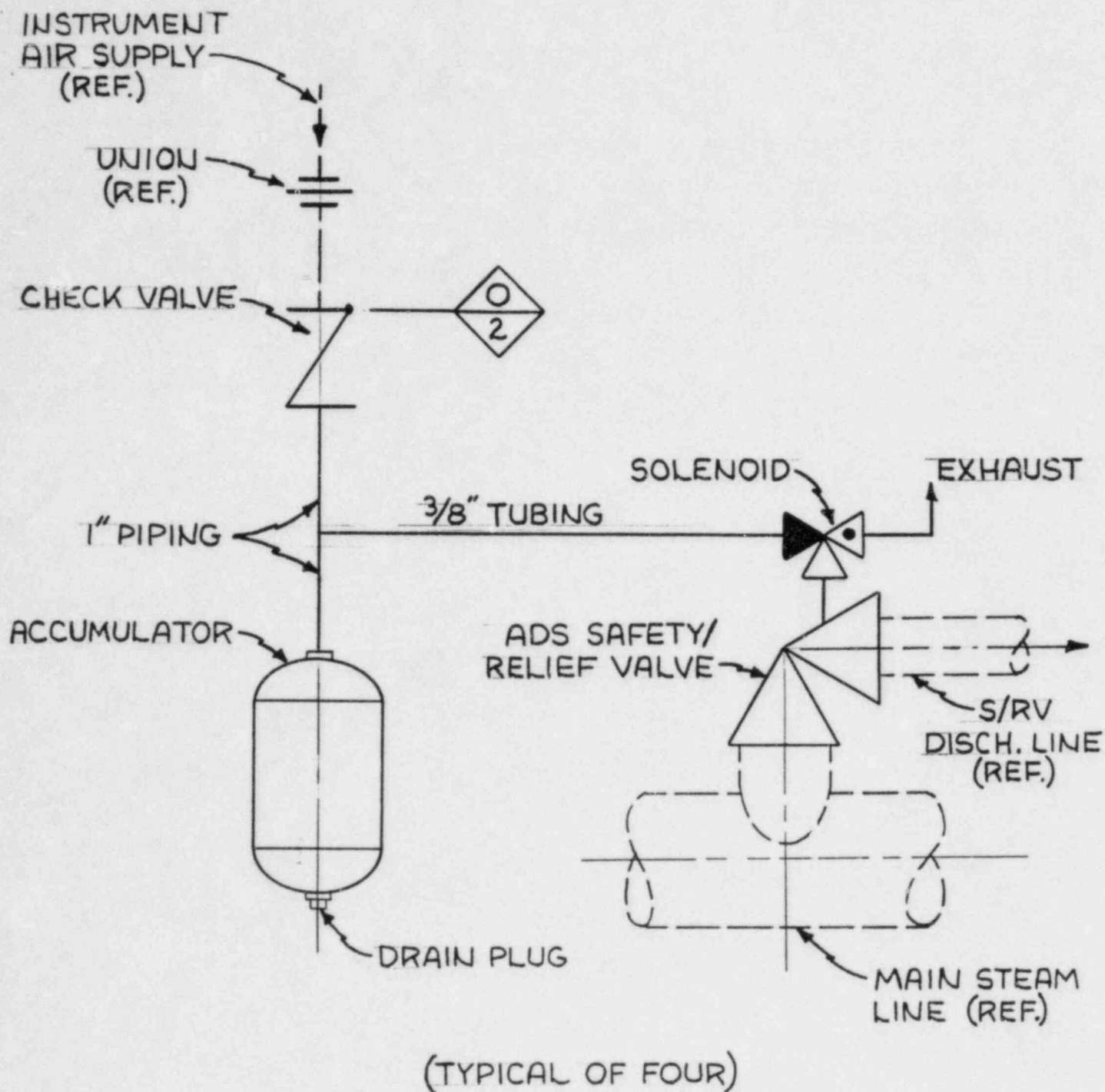
The ADS Accumulator System is qualified for conditions associated with normal operation, maintenance, testing, and postulated accidents. See Response to Question 5.

Question No. 11

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.

Response

The ADS Accumulator System, as defined in response to Question 2, is qualified to perform its function as defined in the Vermont Yankee FSAR during and following an accident situation. No non-nuclear safety equipment is required to perform this function. There is no instrumentation associated with the ADS Accumulator System.



ADS ACCUMULATOR SYSTEM

ATTACHMENT #1

L.A.T. , 10/21/83