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Director of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Attn: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing
Washington, DC 20555

Reference: Beaver Valley Power Station
Docket No. 50-334, License No. DPR-66
Supplemental Information to Fire Protection -
Appendix R Review Report

Gentlemen:

Based on discussions with your staff on October 14, 1982, the attached supplemental information is being provided to clarify certain exemptions previously documented as part of our Fire Protection Appendix R Review report dated June 30, 1982. Specifically, supplemental information is enclosed for Section 11.2 - Reactor Containment (RC-1) and Section 11.6 - Primary Auxiliary Building (PA-1G), Elevation 722-ft. 6-in., of our report.

Provided in the enclosures is additional information for the above exemptions previously requested to substantiate that the original justifications submitted in our report are still valid. The reactor containment instrumentation and equipment required for safe shutdown, which is listed in Section 11.2 of the report, was analyzed to the criteria set forth in Appendix R, Section III.G(2) d, e, or f for noninerted containments. Section 11.6 of our report listed the equipment in the Primary Auxiliary Building, Elevation 722, required to achieve safe shutdown, which was analyzed to the criteria set forth in Appendix R, Section III.G(2).

Based on the NRC staff reviewers interpretation of requirements for hot shutdown, our proposed modification to install a Backup Indication Panel (Section 6.11) is revised to permanently install and hardwire this Backup Instrumentation Panel into one train (Train B) of equipment. Key-lock switches for the transfer function will be provided.

In our discussions, the charging pump cubicle ventilation system and our proposed modification (section 6.4) to add 1½ hour fire rated dampers was questioned by your review staff. A detailed explanation is given in Section 3.4.14 "Charging Pump Cubicles (PA-1f, 1g, and 1h)" of our submittal and a sketch of the proposed modification is detailed

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in Figure 6.4-1. We feel adequate documenation and technical justification is provided to establish our position that equivalent protection to that which would be achieved by conformance to Section III.G(2) is provided.

Please contact my staff if additional information or clarification is necessary.

Very truly yours,

Robert A. Balcerak for

J. J. Carey
Vice President, Nuclear Division

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Enclosures

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11.2 REACTOR CONTAINMENT (RC-1)
(Clarification of exemption information)

A. The letdown orifice isolation valves [TV-CH-200A, B, C] were included in paragraph 11.2.3, but are not required for safe shutdown. These valves are addressed in Chapter 8 as part of the High/Low Pressure interface review. In addition, the pressurizer pressure devices [PT-RC-444, 455, 456 and 457] should be deleted from paragraph 11.2.3 as it is not an essential meter for cooldown under natural circulation conditions.

B. Containment ventilation was previously included in our exemption request 11.2 to address the potential for deviating from the requirement to maintain plant parameters within those precipitated by a loss of off-site power transient. This function is covered by the inclusion of fans [VS-F-1A, B, and C] and the associated cooling water valves [TV-CC-110A, B, C, D and E3].

We have included Figures 11.2-12 and 11.2-13 and various electrical drawings which further detail the spatial separation of the component relating to this function.

If this function was lost, the stations capability to maintain ho shutdown or the eventual maintenance of cold shutdown would not be lost. The equipment located inside containment required to achieve these conditions are qualified by virtue of conformance to IE Bulletin 79-01B to a more severe transient than that resulting from a loss of containment ventilation.

A review of the referenced figures indicates that the containment recirculation fans meet the requirements of III.G(2) given that the only instance where the power leads come within 20 ft. of each other, at least one lead is encapsulated in conduit which qualifies as a noncombustible radiant energy shield. Failure of the associated control cabling can be tolerated because the breakers, located in the Emergency Switchgear Rooms [ES-1 and 2], can be manually positioned.

Cabling associated with the cooling water valves [TV-CC-110A, B, C, D and E3] over a significant amount of their routing inside containment run in the same tray. Inspection of Figures 11.2-12 and 11.2-13 reveals that the cooler isolation valves [CC-110A, B, C] are widely separated while the containment isolation valves are located at the same elevation within approximately 8-10 ft. All these valves are air operated and fail closed.

To preclude any potential long term loss of this function would require modifying the cooler isolation valves to fail "as is" (open) and to modify the containment isolation detail to one allowed by General Design Criterion 57 (closed systems) resulting in single isolation valves per header located outside containment.

Strict conformance with GDC 57 for missle protection would be doubtful because of the scope and location of the containment piping runs.

An alternative would be to redesign the penetration in a way which would violate GDC 65. This would entail replacing the inside containment isolation valve on the supply header with a spring loaded isolation valve and moving the inside containment isolation valve on the return header to a location outside containment in series with the existing valve.

We have not proposed these modifications due to the resultant decrease in the containment isolation design, the large expense involved to accomplish this modification, the low combustible loading in the pipe penetration area, the low probability of utilization, and ultimately, that sufficient qualified equipment will be available to the operators to maintain shutdown conditions without containment cooling available.

C. We have enclosed the following routing descriptions and referenced drawings to clarify the previously submitted information relative to the actual routing and protection inside containment.

1. PRESSURIZER POWER OPERATED RELIEF VALVES
PCV-RC-455C D AND 456

NOTE: SOV-RC-544 is included due to its associated circuit status.

The routings for [PCV-RC-455C, D and 456] and [SOV-RC-544] are shown on drawing 11700-RE-34AK, 46A, 46E and 46F which are labeled [PCV-RC-455C, D, and 456], sheets 1 through 4. The Train A and Train B control cables for [PCV-RC-455C, D and 456] are run from the valves (located above the pressurizer cubicle) in conduit, to points just outside the crane wall.

Outside the crane wall, the control cables enter trays which run to the penetration area on either side of column 10 ¼. The control cables then drop down at the penetration area and are separated by approximately 25 feet. The cables are also separated by a fire barrier and a fire detection and suppression system.

The associated circuit, [SOV-RC-544] Train A control cable, runs in conduit from the solenoid to trays in the penetration area. The control cable does not run close to the above PCV control cable until the penetration area, and at that time, only in the vicinity of Train A.

These valves have been considered in the analysis because of inclusion in the High/Low Pressure Interface discussion (Chapter 8) of our initial submittal. See the following section covering the blocking valves for additional justification of the existing layout.

2. PRESSURIZER RELIEF BLOCKING VALVES

The routings of the power and control cables for [MOV-RC-535, 536 and 537] are depicted on (2) two drawings RE-34AK and RE-46A, labeled as [MOV-RC-535, 536 and 537] sheets 1 and 2 respectively.

The power cables for both Train A & B are run in conduit, from the motor operated valves located in the pressurizer cubicles to the penetration area at column 10¼. In this area the cable enters tray which is separated by a fire barrier and are protected by a fire suppression and detection system.

These blocking valves [MOV-RC-535, 536 and 537] would be used to isolate a leaking or stuck open Power Operated Relief Valve [PCV-RC-455C, D and 456]. Each PCV is blocked by an MOV of the opposite train. As can be seen by the referenced drawings whenever these trains are routed in accessible areas they are separated by approximately 25 ft. and protected by a suppression system, or they are enclosed in conduit (PZR cubicle). In the one area where they run together in close proximity, they are routed at least 20 ft. off the floor in covered tray.

Based on the above layout and previously provided justification, we contend that this layout affords an equivalent level of protection to that required by III G-2 of Appendix R.

3. PRESSURIZER HEATERS A, B, D, AND E

The routing for pressurizer heater power cables for heaters A and C (Train A) and B and D (Train B) are depicted on the following three drawings: 11700-RE-34AK, 11700-RE-34AS and 11700-RE-34AG (labeled Pressurizer Heaters, sheets 1 through 3).

The power cables of those Train A and Train B heaters run entirely in tray from the pressurizer cubicle to either side of column 10 ¼, as shown on the drawings. The trays run parallel to each other at a height of 20 feet, in close proximity until they reach either side of column 10 ¼. At this point, the cables turn down in to four trays which run vertically, and are separated by 18 feet. The traverse runs of tray above the operating floor are covered trays.

Based upon the routing demonstrated by the referenced drawings and the previous justification presented in paragraph 11.2.3, this function is covered by an equivalent level of protection to that required by Appendix R to 10 CFR 50.

4. STEAM GENERATOR LEVEL

The routing of the Steam Generator Level transmitter cables are depicted on drawings RE-57U, Q, R, S and T labeled as sheets 1 through 5, respectively.

The instrument cables for channels I, II and III are run in separate conduits from the penetration area where the trays are protected by suppression and detection. The conduit runs around the containment and returns to the penetration area from opposite directions; Channels I and III from the north, and Channel II from the south.

We consider this layout acceptable because the routing provides the minimum separation and shielding requirements of paragraph III.G(2) of Appendix R to 10 CFR 50. Regardless of the area chosen at least one channel of Steam Generator Level indication will be available based on the criteria of III.G(2).

5. PRESSURIZER LEVEL TRANSMITTERS LT-RC-459 and 460

The routings for level transmitters [LT-RC-459 and 460] are depicted on drawings 11700-RE-57Q, S, and 57U, which are labeled [LT-RC-459 and 460], sheets 1 through 3.

As shown on sheets 1 and 2, the instrument cables for the two transmitters are in close proximity. The valves are enclosed in conduit at these critical points and continue in conduit with increasing separation. The cables eventually enter trays in the penetration area which are separated by a fire barrier at column 10 ¼, and are protected by a fire detection and suppression system. We consider this routing acceptable based on our prior justification and our above review, which shows that when the two functions are in close proximity, each is enclosed in a separate conduit.

6. REACTOR COOLANT HOT AND COLD LEG TEMPERATURES
TRB-RC-410, 420, 430, 413, 423, 433

The routing for the TRB's is depicted on drawings RE-57Q, R, S, T, and U sheets 1 through 5.

These TRB's are separated into (2) two instrument channels. Hot leg instruments comprise channel I while cold leg instruments comprise channel II. The conduit system for each channel approaches the penetration area from a different direction. The individual channels run around the containment to local pull boxes. From these boxes separate conduits continue to the TRB's.

Additionally, the remaining neutral temperature indication from the RTD bypass manifold is routed in conduit from each loop to the penetration area.

7. CONTAINMENT RECIRCULATION FANS
VS-F-1A B, and C

The routing of power cables for [VS-F-1A, B, and C] is shown on drawings RE-34AK, AG, AU, and RE-46C, E, F and are labeled as sheets 1 through 6 respectively.

The power cables for [VS-F-1A, B and C] are run from the fans in conduit.

The power cables for [VS-F-1A and 1C] enter trays near the orange side or the north side of the penetration area. The power cables for [VS-F-1B] enter tray on the purple or south side of the penetration area.

At the point outside the penetration area where the three (3) fan power cables are closest proximity, between columns 7 and 8 on RE-46C, [VS-F-1A and 1C] are enclosed in conduit.

Within the penetration area [VS-F-1A and 1C] power cables are separated from [VS-F-1B] power cables by approximately 20 feet. They are also separated by a fire barrier and protected by a fire suppression and detection system.

We consider this acceptable based on [VS-F-1C] being run in conduit and over its entire distance other than in the penetration area where it is protected by suppression and detection.

11.6 Primary Auxiliary Building PA-1G El 722 ft. 6 in.
(Clarifications to exemption information)

A. The temperature monitoring system referenced in section 11.6.5(k) of our initial submittal is comprised of an array of thermocouples (for indication) and electronic temperature switches (valve actuation only). These devices are installed in selected areas of PA-1G, PT-1, CV-1, and CV-2. Their placement in PA-1G is shown on Figure 11.6-6. The thermocouple design is delineated on Figure 11.6-7. These thermocouples have a time constant of approximately 4 seconds and meet ISA calibration requirements.

These thermocouples, noted on Figure 11.6-6 as T/C's, provide input to microprocessor (DL-MS100) in the control room. Their alarm setpoint for all the thermocouples is 105°F. High energy line valve closure at 110°F is precipitated by the temperature switches, annotated on Figure 11.6-6 as TS's, the temperature switches provide no control room indication.

With no alarms present, an hourly log is printed containing the following data for each T/C: T/C number location, low temperature for the hour, high temperature for the hour average temperature for the hour, and T/C status. Status is indicated as normal or disabled.

If any T/C exceeds the alarm setpoint, the microprocessor commences an accident log. The temperature readings of all T/C's are recorded at 5 second intervals and are printed out every 10 minutes. These temperature logs will be printed every 10 minutes or until the end of the accident.

B. As noted in paragraph 11.6.3b, there are no intervening combustibles permanently installed between equipment of interest. There are, however, cable trays on this elevation as denoted on Figure 11.6.1. This is in contradiction to the statement made in paragraph 11.6.5.1 that all cable on this elevation is contained in conduit. Cable location in tray accounts for 5,520 lbs. of insulation resulting in a fire loading of 7.745 BTU/FT^2. The cable trays run along the perimeter of the general access area with the exception of the trays which contain the charging pump motor feeders. These trays are shown in Figure 11.6.1, Revision 1 and are further described in section C. The charging pump feeders are three conductor cables in an interlocked steel armor construction. One train of these functions which require short term actuation or implementation (charging pumps and the charging pump interface with the RWST) has at least 20 feet separation with no intervening combustibles from the cable trays located on this elevation (See Figure 11.6.1, Rev. 1 of this submitted, and 11.6.2, of the original submitted report).

C. The routing paths in the auxiliary building for the power cables from charging pumps [CH-P-1A, CH-P-1B and CH-P-1C] to the point where the cables leave the building, are shown on Figure 11.6.1, Revision 1 with dark heavy lines, and are described below:

1. CH-P-1A, in cubicle PA-1F:

   The interlocked steel armor cables run from the charging pump to tray 1TH7240 on the 722 ft-6 in level. The cables travel up to the 735 ft-6 in level through tray 1TH7250. On elevation 735 ft-6 in, they are routed through tray 1TH7260, then pass through floor sleeve 1FH125002, back to the 722 f5-6 in level. Tray 1TH7040 takes the cables to the north wall of the auxiliary building, where the cables pass through wall sleeve 1WH102022, into the service building.

2. CH-P-1B, in cubicle PA-1G:

   The interlocked steel armor cables run from the charging pump on the 722 ft-6 in level in tray 1TH702P, to tray 1TH701P and through cubicle wall sleeve 1WH110P01. The cables continue on this elevation in tray 1TH700P to tray 1TH703P. At this point, they are routed to the 735 ft-6 in level through floor sleeve 1FH116P02, then run west through tray 1TH721P to tray 1TH720P, and into the cable vault through wall seeve 1WH156P01.

3. CH-P-1C, incubicle PA-1H:

   The interlock steel armor cables run from the charging pump on the 722 ft-6 in level in tray 1TH714G, through the cubicle's north wall via wall sleeve 1WH171G01 and continues north on the 722 ft-6 in level in tray 1TH501G. They proceed through wall sleeve 1WH170G01 into tray 1TH705G, and into the service building via wall sleeve 1WH101G08.