REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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SUBJECT: Forwards addl info re electrical design of containment purge valves,in response to NRC 800328 ltr,Forwards oversize elementary drawings. (see drawings)

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Iowa Electric Light and Power Company

May 5, 1980
LDR-80-129

LARRY D. ROOT
ASSISTANT VICE PRESIDENT
NUCLEAR GENERATION

Mr. Thomas A. Ippolito
Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, MD 20034

Dear Mr. Ippolito:

This letter is in response to your letter of March 28, 1980 regarding additional information concerning the electrical design of the containment purge valves.

Attached is an item-by-item response to the questions listed in the enclosure to your letter. Please note that we have limited our response to address only the containment purge valve electrical design. As we discussed in a telecon between Karl Meyer (ie:) and Tom Kevern (NRC) on April 14, 1980 concerning this subject, electrical design of other ESF equipment is being reviewed as part of our program to respond to IE Bulletins 79-01B and 80-06.

Very truly yours,

Larry D. Root

Larry D. Root
Assistant Vice President
Nuclear Generation

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LDR/RFS/mz
Attachments: 1) Written Responses
2) Figure 1, Containment Purge & Vent System Diagram
3) Table 1, Specific Electrical Data on Purge & Vent Valves Drawings
4) Drawings
a. GE Schematic Diagram 791E401RS, Sheet 14 (2 copies)
b. GE Schematic Diagram 791E401RS, Sheet 15 (2 copies)

cc: all w/o dwgs.
R. Salmon J. Van Sickle
D. Arnold T. Kevern (NRC)
L. Liu File: A-107a, LC800328
S. Tuthill
D. Mineck

Item 1, Criterion 1

In keeping with the requirements of General Design Criteria 55 and 56, the overriding of one type of safety actuation signal (e.g., radiation) should not cause the blocking of any other type of safety actuation signal (e.g., pressure) for those valves that have no function besides containment isolation.

Response

As shown in Figure 1, the DAEC containment purge and vent isolation system contains 9 valves, arranged in 3 groups of 3 valves each. Each grouping consists of an outboard isolation valve and 2 inboard isolation valves. One group provides containment isolation of the purge supply line, one group isolates the drywell ventilation exhaust line, and one group isolates the suppression pool exhaust line. The outboard valves are isolated by electrical division 2 isolation circuitry, whereas the inboard valves are associated with division 1 isolation circuits. The purge and vent valves automatically isolate on any one of the following plant conditions:

1. High drywell pressure
2. Low reactor vessel level
3. High fuel pool exhaust radiation
4. High reactor building ventilation radiation

As we indicated in our letter of December 14, 1979, the override circuitry for the subject valves has been modified to satisfy Criterion 1. Specifically, the containment isolation logic for these valves now provides individual override capability of each isolation parameter without the bypassing of the remaining parameters, such that the valves will isolate if any non-overridden isolation parameter is exceeded. With this design modification, Criterion 1 is satisfied by the ability of the purge and vent valves to reisolate following an isolation/override/reopen valve sequence and the subsequent occurrence of a second (or third or fourth) trip parameter.

Item 1, Criterion 2

Sufficient physical features (e.g., key lock switches) are to be provided to facilitate adequate administrative controls.

Response

Criterion 2 is satisfied by the use of key lock control switches for the override function described under Criterion 1. Specifically, the switches used are General Electric Model CR2940 Form UN200D.

Item 1, Criterion 3

A system level annunciation of the overridden status should be provided for every safety system impacted when any override is active (See R.G. 1.47)

Response

Criterion 3 is satisfied by 2 separate methods. First, each individual override switch provides one contact which lights an amber lamp in the

control room when the switch is placed in the override position to display the bypass condition for each individual trip parameter to the operator. Second, the four override switches in each division of isolation logic are ganged to a common annunciator window in the control room, such that any one of the four key switches placed in the override position results in an alarm which requires operator acknowledgement.

Item 1, Criterion 4

Diverse signals should be provided to initiate isolation of the containment ventilation system. Specifically, containment high radiation, safety injection actuation, and containment high pressure (where containment high pressure is not a portion of safety injection actuation) should automatically initiate CVI.

Response

Diversity of containment ventilation system isolation parameters required by this criterion is satisfied by the four isolation parameters listed in Criterion 1. The instrumentation providing the isolation signals is powered from the same electrical division as the isolation valves, to satisfy the redundancy and electrical separation criteria of IEEE Standard 279.

Item 1, Criterion 5

The instrumentation and control systems provided to initiate the ESF should be designed and qualified as safety grade equipment.

Response

As described in Section 7.3.4 of our FSAR, the instrumentation and control system which initiates containment isolation is designed to meet the criteria of IEEE Standard 279, which in turn requires that nuclear power plant protection systems be designed and qualified as safety grade equipment.

Item 1, Criterion 6

The overriding or resetting of the ESF actuationssignal should not cause any valve or damper to change position.

Response

Our response to NUREG-0578, submitted to you on January 3, 1980, identified specific containment isolation valves which could change position upon reset of the isolation circuitry. In our response, we also committed to modify the isolation logic to prevent isolation valves from changing position on reset of the isolation signal. As a result, Criterion 6 is satisfied for the containment purge and vent valves. Following either override or reset of the isolation signal(s), the operator must manipulate the control switch for each purge and vent valve individually to reopen the valve.

Item 2, Part 1

In addition to responding to the general questions above, please provide the following specific information:

Provide an "as built" tabulation of all Engineered Safety Features (ESF)/Auxiliary Supporting Features (ASF) valves and dampers required to be operated automatically following an accident. This tabulation should include the following:

a. Component designation
b. System served
c. Safety function (e.g., containment isolation, spray initiation)
d. Actuation signal sources
e. Reference to control circuitry (see 2.(3) below)
f. Indication whether or not the component safety function indicated in 2.(1) above can be defeated through the use of a manual override or bypass in either the control system or actuation signal system circuitry.

Response

The tabulation requested for this item is being prepared as part of our response to IE Bulletin 80-06. Further, the requested information is now contained in FSAR Table 7.3-1 for containment isolation valves, with the exception of your request for control circuit references. To respond to this item for containment purge and vent valves, we have attached Table 1 which lists the requested information. Also refer to our response to Part (3) below for more detail on the trip, reset, and override control circuitry.

Item 2, Part 2

For each manual bypass or override feature identified in 2(1) above, provide a description of the physical feature(s) provided to prevent inadvertent operation and to satisfy the requirements of IEEE Std. 279-1971, Section 4.14.

Response

As stated under Item 1, Criterion 2 above, key lock switches are provided for enabling the override function. The switches are General Electric Model CR2940, Form UN200D. The switch action of this model is a 2 position key switch with the key being removable only in the left (counterclockwise) position. The purge and vent valve isolation override switches enable the override function in the right (clockwise) position. Therefore, the key cannot be removed from the switch while the switch is in the override position, which enhances the administrative control aspects of the override feature. All keys required for deliberate override or manual bypassing safety systems are under the direct control of the Shift Supervising Engineer. The preceding controls are supplemented by the alarm and annunciation of the override condition described under Item 1, Criterion 3 above.

Item 2, Part 3

For each actuation signal system and component actuation system identified in 2(1)d and 2(1)e above, incorporating a manual reset, override or bypass feature, provide a complete circuit description, including detailed pictorial information (i.e., as built circuit diagram, schematics, logics), sufficient to allow a thorough understanding of the operation of such circuitry including the function and effect of all control devices (e.g., relays, contacts, switches, diodes, etc.).

Response

The detailed circuitry of the containment isolation logic for the purge and vent valves is shown on the following diagrams.

1. GE Schematic Diagram 791E401RS, sheet 14

   a. Copy of DCR 907
   b. Copy of DCR 918

2. GE Schematic Diagram 791E401RS, sheet 15

   a. Copy of DCR 907
   b. Copy of DCR 918

The above drawings are attached for your use. Please note the following:

1. The latest revision of each schematic diagram is the combination of drawings issued by the Iowa Electric Design Change Request (DCR) Procedure. Two DCR's (907 and 918) have been prepared to incorporate our commitments on NUREG 0578 and in our letter dated December 14, 1979 regarding the circuitry. A review of this circuitry must consider both DCR copies of each schematic concurrently.

2. The developement of the trip relay for each isolation parameter is shown on a separate drawing not enclosed. The development of the individual isolation parameter trip contacts is not essential to understanding the purge and vent valve isolation, reset, and override circuitry.

3. The containment purge and vent valves are pneumatically operated, with a fail-close actuator. The isolation signal causes the air supply solenoid to deenergize, which vents air from the actuator and allows actuator spring force to close the valve.

Item 2, Part 4

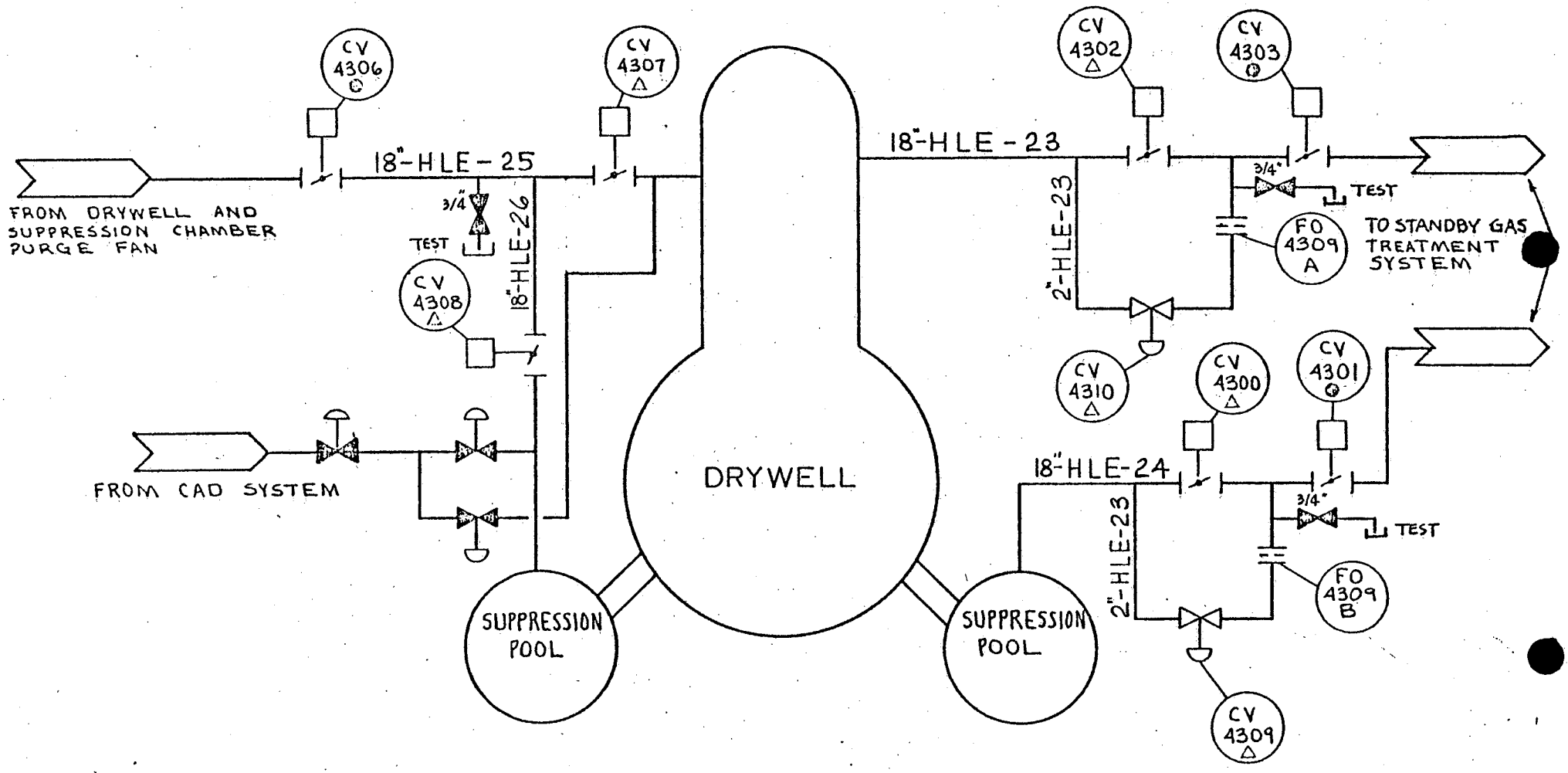
For each actuation signal identified in 2(1) above, identify the design standards, quality assurance requirements, and component qualification standards involved to ensure that the systems will perform their designated safety function upon demand.

Response

The circuitry for the DAEC primary containment isolation system was designed and manufactured by General Electric Company as NSS supplier. The governing design standard for the system was IEEE Standard 279-1968. The equipment in use at DAEC is similar to equipment supplied to other BWR-4 plants and is qualified to operate over for the 40 year life of the plant in the benign environment of the control room. A more complete description of the qualification criteria for the isolation circuitry will be provided in our response to IE Bulletin 79-01B.

To assure that the above objectives are met, Iowa Electric established a comprehensive Quality Assurance Program encompassing the design, manufacturing, fabrication and construction activities at the DAEC. The program was developed to meet the requirements of Appendix B to 10 CFR 50. In detail, the program assures adherence to specified standards of workmanship and implementation of all applicable specifications. It also includes the observance of proper preoperational and operational testing and maintenance procedures as well as the documentation of the foregoing by keeping appropriate records. These records are available so that any desired items of information is retrievable for reference. These records will be maintained during the life of the operating license.

FIGURE 1



● ELECTRICAL DIVISION 2

△ ELECTRICAL DIVISION 1

CONTAINMENT PURGE & VENT ISOLATION SYSTEM

TABLE 1

CONTAINMENT PURGE AND VENT VALVE ELECTRICAL DESIGN INFORMATION

Component Designation	Safety Function	Actuation Signals (See Notes)	Electrical Reference Drawings	Manual Override/Bypass Feature
CV-4306	Purge inlet	F,A,Z	7884-E-122, Sh 13 APED-A71-3(15)	Keylock switch provided for override of each actuation signal
CV-4307	Drywell purge inlet	F,A,Z	7884-E-122, Sh 12 APED-A71-3(14)	Keylock switch provided for override of each actuation signal
CV-4308	Torue purge inlet	F,A,Z	7884-E-122, Sh 12 APED-A71-3(14)	Keylock switch provided for override of each actuation signal
CV-4302	Drywell vent	F,A,Z	7884-E-122, Sh 12 APED-A71-3(14)	Keylock switch provided for override of each actuation signal
CV-4310	Drywell vent valve bypass	F,A,Z	7884-E-122, Sh 12 APED-A71-3(14)	Keylock switch provided for override of each actuation signal
CV-4303	Drywell vent	F,A,Z	7884-E-122, Sh 12 APED-A71-3(15)	Keylock switch provided for override of each actuation signal
CV-4300	Torus vent	F,A,Z	7884-E-122, Sh 12 APED-A71-3(14)	Keylock switch provided for override of each actuation signal
CV-4309	Torus vent valve bypass	F,A,Z	7884-E-122, Sh 12 APED-A71-3(14)	Keylock switch provided for override of each actuation signal
CV-4301	Torus vent	F,A,Z	7884-E-122, Sh 13 APED-A71-3(15)	Keylock switch provided for override of each actuation signal

NOTES:

A. Reactor vessel low water level
F. High drywell pressure
Z. High radiation, reactor building and/or fuel pool ventilation exhaust