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September 14, 2001
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U. S. Nuclear Regulatory Commission
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Washington, DC 20555-0001

SUBJECT: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
**Response to NRC Request for Additional
Information Concerning GE SIL 630 (TAC No. MB1020)**

References:


1. NRC letter, G. S. Vissing to M. Kansler, dated June 26, 2001 regarding request for additional information concerning GE SIL 630 (TAC No. MB1020).
2. General Electric Services Information Letter 630, dated July 17, 2000, "Physical Separation of Circuits for Low Pressure Emergency Core Cooling Systems."

Dear Sir:

Attached is Entergy Nuclear Operations' Inc. response to the NRC staff's June 26, 2001 request for additional information (Reference 1) regarding General Electric's (GE) Service Information Letter (SIL) 630 (Reference 2).

No new commitments are contained in this letter. If you have any questions, please contact Mr. Andrew Halliday at 315-349-6055.

Very truly yours,


T. A. Sullivan
Vice President, Operations - JAF

cc: Next page.

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Attachments:

1. Oath of Mr. Ted Sullivan, Vice President, Operations, Entergy Nuclear Operations, Inc.
2. Response to NRC Request for Additional Information Concerning GE SIL 630 (TAC No. MB1020), James A. FitzPatrick Nuclear Power Plant
3. Figure 1 of JPN-00-010, "LPCI & CS Bus/Injection Valve/Pump Power Configuration"

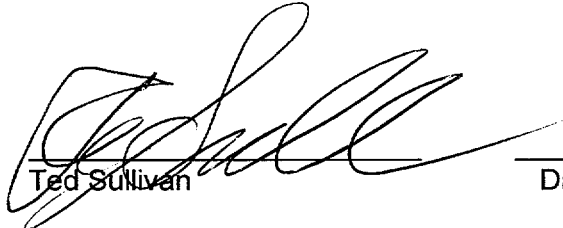
cc:

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For Entergy Nuclear Operations, Inc., and
Entergy Nuclear FitzPatrick, LLC

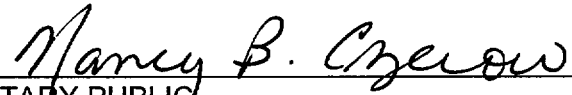

Ted Sullivan Date 9/14/01

State of New York)
County of Oswego)

Then personally appeared before me, Ted Sullivan, who being duly sworn, did state that he is Vice President, Operations for Entergy Nuclear Operations, Inc., and that he is duly authorized to execute and file the submittal contained herein in the name and on behalf of the Entergy Nuclear Operations, Inc. and that the statements attributable to Entergy Nuclear Operations, Inc. are true to the best of his knowledge and belief.

My commission expires:

1/26/03
Date


NOTARY PUBLIC

NANCY B. CZEROW
Notary Public, State of New York
Qualified in Oswego County #4884811
Commission Expires 1-26-03

**Response to NRC June 26, 2001 Request for Additional Information
Concerning GE SIL 630 (TAC No. MB1020)**

Entergy Nuclear Operations Inc.
James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333

Introduction

This attachment is Entergy Nuclear Operations Inc. (ENOI) response to the NRC staff's June 26, 2001 request for additional information (Reference 1) regarding FitzPatrick and General Electric's Service Information Letter (SIL) 630 (Reference 2). ENOI has submitted two earlier responses (References 4 and 7) on related issues as a result of NRC staff questions.

While the questions did not limit themselves to FitzPatrick's low-pressure ECCS (emergency core cooling systems), ENOI's responses focus on cable routing and electrical separation for these systems. This is based upon ENOI's April 2, 2001 telephone conversation with the NRC staff, ENOI's earlier submittals (References 4 and 7) and our understanding of the staff's request.

Question 1

Please clarify the meaning of functionally redundant cables.

Answer 1

The term "functionally redundant" was used to distinguish redundancy based on identical structures, systems, or components (SSC) from situations where dissimilar SSCs are used to accomplish the identical (or very similar) functions. When applied to cables, the term "functionally redundant" means cables in dissimilar systems which serve the identical (or very similar) function (i.e., core cooling, etc.). (Note that FitzPatrick relies on different response sets of structures, systems and components (SSCs) to mitigate the consequences of an accident. These can include mitigation using only redundant (identical) SSCs, or the use of combinations of redundant and "functionally redundant" (dissimilar) SSCs. The set of SSCs used to respond to any particular scenario depends on the accident conditions postulated.)

The introduction of this concept can be traced to modifications made to BWR low-pressure ECCSs in the mid-1970's. FitzPatrick was originally designed with low-pressure ECCS consisting of a LPCI subsystem and a Core Spray (CS) subsystem to provide diverse core cooling methods (flooding and spray cooling). Originally, two 100% capacity CS subsystems and one LPCI subsystem (with four 33.3% capacity pumps) were separated into two electrical divisions, and redundant electrical circuits from two divisions were provided for certain motor-operated valves in the LPCI subsystem.

As the result of the issuance of new ECCS performance requirements (10 CFR 50.46, Appendix K) in the 1970's, modifications were developed to improve post-LOCA core cooling capability and to minimize the effects of the new rule on core operating limits. Often referred to as the "Vermont-Yankee fix to the LPCI-loop-selection" modification, FitzPatrick implemented

plant changes that took credit for the availability of more than one of the three low pressure ECC subsystems -- either two CS subsystems, or one CS subsystem and at least partial functionality of the LPCI subsystem. As implemented at FitzPatrick, this modification introduced functionally redundant combinations for low-pressure ECCS. Although no modifications were made to the CS system as part of the "Vermont-Yankee fix", new combinations were introduced, including the power and control cables that serve the CS and LPCI pumps, and their associated valves. These modifications were authorized by Amendment 8 to the FitzPatrick operating license (Reference 3). GE SIL 630 provides additional background information regarding this modification.

Question 2

Additionally, are power cables of all low-pressure emergency core cooling systems (ECCS) routed in such a manner that a failure of any wireway that carries these cables would not result in a reduction in ECCS capacity below the level assumed in the FitzPatrick loss-of-coolant accident analysis?

Answer 2

NYPA's October 12, 2000 response (Reference 4) to NRC Questions 2, 3 and 4 describe electrical power arrangements for FitzPatrick's Core Spray (CS) pumps, low-pressure injection pumps (LPCI), and injection valves. Figure 1 of Reference 4 shows the power configuration for LPCI and CS. (A copy of this figure has been included as Attachment 2.) The table in Response 4 indicates which components share raceways for some portion of the routing of their power cables. This table has been reproduced in Table 1.

The separation of cables into the seven "raceway groups" described by Table 1 was a consequence of the arrangement of the components in the plant. In general, the use of "raceway groups" to assure the availability of ECCS equipment is not a requirement of the FitzPatrick design or licensing bases. Raceway groups were used to illustrate the extent of cable separation, e.g. that the loss of any single raceway group (1-7) would only affect those components in that group and would not result in a reduction in ECCS capability below the level assumed in the FitzPatrick loss-of-coolant analysis.

Question 3

With regard to the control and instrumentation or power (if applicable) cables of ECCS systems which share common wireways, what test or analysis has been conducted to demonstrate that a faulted cable will not affect the intended function of the safety-related adjacent cables within the same wireway assuming failure of the protective device?

Answer 3

Entergy is not aware of any test or analyses that are part of the FitzPatrick design and licensing basis that were conducted to demonstrate this point.

The "Vermont-Yankee fix" introduced some new design concepts into the FitzPatrick design and licensing base. A failure modes and effects analysis (FMEA) was performed in 1999 to assess if any credible electrical fault or external hazard could prevent the FitzPatrick automatic

depressurization system (ADS) from performing its safety function (Reference 5). That analysis concluded that there is no single credible failure from external mechanical sources or power cables which would preclude the ADS system from performing its safety function during a loss-of-coolant accident.

Although FMEAs have not been completed for all of FitzPatrick's ECCS systems, the results of this analysis provides Entergy an additional level of confidence that FitzPatrick's emergency core cooling systems -- as modified by the "Vermont-Yankee fix" -- are functional and capable of performing their intended safety functions.

Question 4

If (the answer to Question 3 is) none, how do you assure that failure of a wireway that causes these cables to fail would not result in a reduction of ECCS capability below the level assumed in the FitzPatrick accident analysis?

Answer 4

The current FitzPatrick licensing and design basis permits redundant cables of the same division to share common wireways, subject to certain restrictions. These restrictions limit the probability that a faulted cable will affect the function of an adjacent cable. These restrictions consider factors like the voltage of the cables, duty cycles, cables that are derated for continuous operation, and service (control, instrumentation, power, etc.) These restrictions were based on good engineering judgement, and common engineering standards applied during the design and licensing of FitzPatrick.

A report "Design Criteria for Independence of Redundant Electrical Circuits," (JAF-RPT-ELEC-02075, Rev.2, Reference 6) details these restrictions. The report consolidates criteria from General Electric (GE), Stone and Webster Engineering Corp. (SWEC), updated FitzPatrick FSAR commitments and applicable industry standards and testing. It details the physical separation criteria required to maintain the independence of redundant circuits at FitzPatrick. It also provides alternate methods of achieving independence of redundant circuits by analysis. Section 7.1.9 "Cable Design and Installation Criteria" of the FitzPatrick UFSAR was amended in May 1999 to incorporate a reference to this report.

Refer to Response 1 and 2 of Reference 7 for additional information regarding the adequacy of installed fault current limiting devices. Reference 7 points out that for a cable to fail in a raceway, two active failures are required to occur. First the failure of the load creating an electrical short circuit and second, the failure of a protective device.

TABLE 1

**LPCI and CS Components shown on Figure 1
of JPN-00-039 which Share a Raceway for
Some Portion of their Power Cables**

RACEWAY GROUP	AFFECTED COMPONENT(S)		
1	A-CS Pump	A-RHR Pump	B-RHR Pump
2	B-CS Pump	D-RHR Pump	
3	C-RHR Pump		
4	14MOV-11A	14MOV-12A	
5	14MOV11B	14MOV-12B	
6	10MOV-66A	10MOV-27A	10MOV-25A
7	10MOV-66B	10MOV-27B	10MOV-25B

References

1. NRC letter, G. S. Vissing to M. Kansler, dated June 26, 2001 regarding request for additional information concerning GE SIL 630 (TAC No. MB1020).
2. General Electric Services Information Letter 630, dated July 17, 2000, "Physical Separation of Circuits for Low Pressure Emergency Core Cooling Systems."
3. NRC letter, Robert W. Reid to G. T. Berry (PASNY) dated January 15, 1976 regarding amendment number 8 to the FitzPatrick operating license.
4. NYPA letter, H. P. Salmon, Jr. to USNRC (JPN-00-039), dated October 12, 2000 regarding response to request for additional information related to the James A. FitzPatrick Suppression Pool.
5. EPM Report, "The Automatic Depressurization System Cable Separation Issue and Failure Modes and Effects Analysis for the James A. FitzPatrick Nuclear Power Plant," EPM Intermediate Report, Rev. 1, February 1, 1999, JAF-RPT-MISC-03086.
6. Engineering Report, JAF-RPT-ELEC-02075, Rev. 2, "Design Criteria for Independence of Redundant Electrical Circuits," June 1999.
7. Entergy letter, M. J. Colomb to USNRC (JAFP-00-0311) dated December 21, 2000 regarding verbal request for additional information related to the James A. FitzPatrick suppression pool.
8. NYPA letter, M. Colomb to USNRC, dated May 29, 1998, regarding LER-98-003, "A Design Condition and Assumed Single Failure Results in Loss of Redundant ECCS Function (HPCI and ADS) Required for Small Break LOCA."
9. Engineering Report, JAF-RPT-MISC-03038, Rev. 1, "Licensing & Design Basis Issues Concerning ADS & HPCI," November 1999.

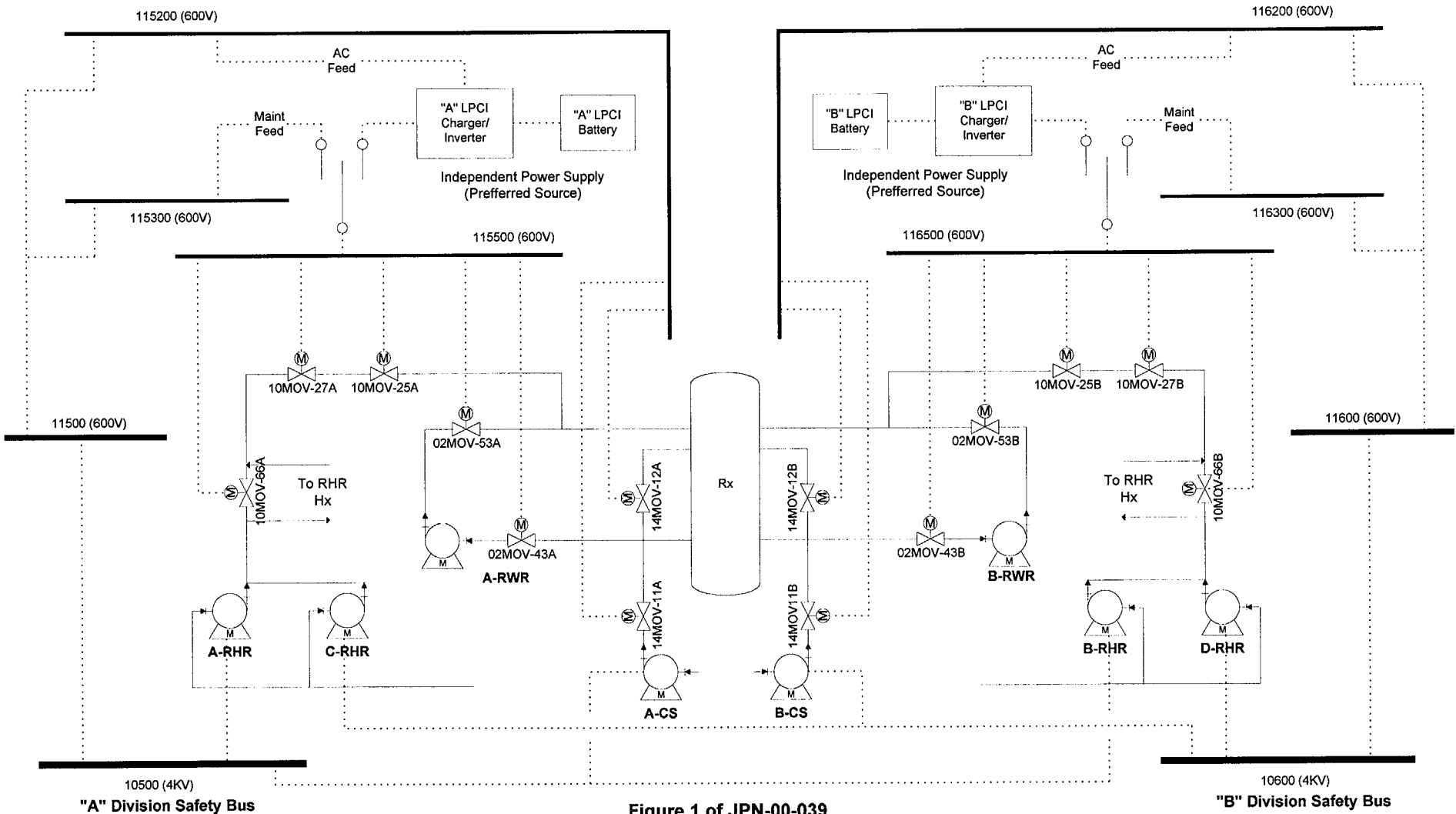


Figure 1 of JPN-00-039

LPCI & CS Bus/Injection Valve/
Pump Power Configuration