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Nuclear Generation

February 3, 1992
JPN-92-004

U.S. Nuclear Regulatory Commission
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Washington, D.C. 20555

SUBJECT: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
Response to Generic Letter 91-11

Reference: NRC Generic Letter 91-11, Resolution of Generic Issues 48, "LCOs for Class 1E Vital Instrument Buses," and 49, "Interlocks and LCOs for Class 1E Tie Breakers Pursuant to 10 CFR 50.54(f)," (JAF-91-243/IP-91-220), dated July 18, 1991.

Dear Sir:

The Authority has reviewed the referenced Generic Letter and has evaluated the proposed recommendations against the FitzPatrick design bases contained in the FSAR. The design of the FitzPatrick electrical distribution system results in many of the recommended actions contained in the Generic Letter being not applicable.

Details of the evaluation are provided in the attachment to this letter.

If you have any questions, please contact J. A. Gray, Jr.

Very truly yours,

Ralph E. Beedle
Executive Vice President
Nuclear Generation

STATE OF NEW YORK
COUNTY OF WESTCHESTER

Subscribed and sworn to before me
this 3 day of FEBRUARY 1992.

DELAIDE SHARNEE HARRIS
Notary Public, State of New York
No. 4900438
Qualified in Westchester County
Commission Expires January 6, 1994

Notary Public

cc: See next page

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Introduction

Generic Letter 91-11 provides licensees with information and recommendations to resolve Generic Safety Issues 48, "LCOs for Class 1E Vital Instrument Buses," and 49, "Interlocks and LCOs for Class 1E Tie Breakers." Licensees must provide certification that they have implemented appropriate procedures conforming to the guidance of the letter or prepare justification that such procedures are not needed. The Authority has reviewed the Generic Letter. The evaluation for the FitzPatrick plant is provided below and is summarized in Table 1.

Background

120V AC Power System Description

The design basis of the FitzPatrick 120V AC power system is to provide a source of control and instrument power to Class 1E and non-1E buses. The plant's 4160V AC buses supply power to 600V unit substations, which in turn supply power to 120V instrument buses. FitzPatrick's 120V AC power system does not include inverters or other similar power sources to the instrument buses. The Class 1E instrument buses are powered from the emergency diesel generators if there is a loss of offsite power.

Class 1E buses supply power to the safeguards and emergency 120V AC power system and to the Reactor Protection System (RPS) logic.

Non-1E instrument buses supply power to the normal instrument power system. The non-1E Uninterruptible Power System (UPS) is a control and instrument bus powered from multiple Class 1E sources. It has been evaluated to ensure that no single failure in the UPS system can affect redundant Class 1E buses.

As shown in FSAR Figure 8.9-1, the two divisions of Class 1E 120V AC power are electrically redundant and physically independent. A copy of FSAR Figure 8.9-1 is attached. There are no cross-ties between Class 1E buses nor between Class 1E and non-1E buses. When the plant is operating, the electrical buses are normally powered from the main generator. When the plant is off-line, the electrical buses are powered from the reserve station transformers. Under loss of offsite power conditions, the Class 1E electrical buses are powered from the emergency diesel generators and the non-1E buses with the exception of the UPS bus are deenergized. The non-1E UPS bus will remain energized through either its DC drive motor or Class 1E alternate feed as described later in this evaluation.

125V DC Power System Description

The design basis of the FitzPatrick 125V DC power system is to provide a source of power to all 125V DC loads for normal operating conditions and for safe shutdown following transients and accidents. The 125V DC power system consists of two separate and independent power sources. Each source consists of a battery, charger, and associated distribution equipment.

Normal 125V DC loads are supplied by the battery chargers while the batteries are kept fully charged. The battery chargers are powered from the Class 1E AC power system. Short term demands, caused by heavy duty emergency loads in excess of charger capacities, are supplied from energy stored in the charged batteries to supplement the chargers. During electrical

transients or accidents with the chargers unavailable, the DC loads are supplied directly from the batteries.

As shown in FSAR Figure 8.7-1, the two divisions of Class 1E 125V DC power are electrically redundant and physically independent.

24V DC Power System Description

The design basis of the FitzPatrick 24V DC power system is to provide a source of power to neutron monitoring instrumentation, process radiation monitoring instrumentation, and auxiliary trip devices. The 24V DC power system consists of two separate and independent power sources. Each source consists of two 24V batteries, two chargers, and associated distribution equipment arranged in a three-wire system to provide $\pm 24V$ DC power relative to ground.

During normal operation, the 24V DC loads are supplied by the battery chargers while the batteries are kept fully charged. Upon failure of the chargers, the 24V DC loads are supplied from the batteries.

As shown in FSAR Figure 8.8-1, the two divisions of Class 1E 24V DC power are electrically redundant and physically independent.

Evaluation - Class 1E Instrument Buses

Emergency AC Buses

The FitzPatrick emergency AC system consists of two independent and redundant subsystems, each powering five 120V AC Class 1E control and instrument buses, self contained within the plant site and independent of offsite power. The attached FSAR Figure 8.9-1 shows all of the Class 1E control and instrument buses except buses 71ACA5 and 71ACB5, powered from 600V emergency buses 115200 and 116200 respectively. These two buses are original plant equipment. Their omission from FSAR Figure 8.9-1 was discovered during the Authority's review of Generic Letter 91-11 and will be rectified as part of the July, 1992 FSAR update. The redundant Class 1E control and instrument buses are neither crosstied nor transferable. Upon a loss of offsite power, the Class 1E buses are deenergized for up to 11 seconds until picked up by the emergency diesel generators.

If an instrument bus is out of service, the LCOs of systems supplied by the instrument bus will be invoked.

The NRC identified a potential deviation regarding manual transfer switches that select which emergency bus powers certain plant emergency lighting loads (Reference 1). Reference 2 provided the NRC with the Authority's corrective actions which consist of administrative controls of the transfer switches.

Reactor Protection System

The Reactor Protection System (RPS), described in FSAR Section 8.9.5.b, consists of two independent and redundant RPS buses. Each RPS bus is powered from a motor-generator (M-G) set which in turn is powered from an Emergency 600V AC bus. An alternate source of emergency AC power is provided to each RPS bus from the same division. The alternate feed is through a 600-120V transformer and is selected by a "break before make" manual transfer switch. Two

Class 1E electrical protection assemblies (EPA) each with a dedicated circuit breaker are provided in series on the output of each RPS M-G set and on each alternate supply. Each EPA signals its dedicated breaker to trip the respective RPS bus on undervoltage, overvoltage and underfrequency. In addition, the EPA breakers themselves trip on overcurrent. The arrangement of the RPS power supplies is shown on the attached drawing 11825-FE-1AB at location 8B.

Operability requirements for the RPS buses are provided in Technical Specification 3.9.G which defines the LCOs for the RPS electrical protection assemblies and provides time limitations for operating with an RPS bus on its alternate supply. RPS bus surveillances are provided in Technical Specification 4.9.G. These requirements provide adequate time limitations and surveillances requested by Generic Letter 91-11.

125V and 24V DC Buses

FitzPatrick's emergency DC system consists of two independent and redundant subsystems at two voltage levels, self contained within the plant site and independent of offsite power. The redundant DC buses are neither cross-tied nor transferable.

Operability and surveillance requirements for the 125V DC buses are provided in Technical Specifications 3.9.E and 4.9.E respectively. These requirements provide adequate time limitations and surveillances requested by Generic Letter 91-11.

If a 24V DC bus is out of service, the LCOs of systems supplied by the bus will be invoked. Plant procedures provide surveillances for the 24V DC system similar to those required by the Technical Specifications for the 125V DC system. These procedures provide adequate time limitations and surveillances requested by Generic Letter 91-11.

Evaluation - Non-1E Instrument Buses

Uninterruptable Power System

The non-1E Uninterruptable Power System (UPS) consists of a double motor - single generator M-G set as the power source to the UPS bus. The generator is driven by either an AC or DC motor. Normal drive is from the AC motor supplied from a B division 600V emergency AC bus. On a loss of this AC supply, the DC motor, powered from the B division 125V DC station battery, is automatically energized. Transfer back to the AC motor is performed manually. On a loss of the M-G set (loss of both the AC and DC drive motors), AC power is automatically supplied directly to the UPS bus from a 600-120/240V transformer from the A division of the Emergency AC power system. Transfer back to the M-G set is performed manually. The arrangement of the UPS bus power supply is shown on the attached drawing 11825-FE-1AB at location 3D.

The Authority has considered the possibility of an inadvertent closure of the alternate feeder breaker onto the UPS bus while the UPS bus is being powered from the M-G set. In this scenario, redundant buses of emergency AC power could be simultaneously affected. The A division alternate feed supply would be mechanically coupled to the B division M-G set supply. In this highly unlikely event, UPS bus fault and/or M-G set generator fault signals will isolate the input breaker from the AC bus to the M-G set and/or the output breaker from the M-G set to the UPS bus, maintaining separation of the redundant Class 1E buses.

FitzPatrick abnormal operating procedure F-AOP-21 is in place to provide guidance to operators in the event that the UPS bus becomes deenergized.

Normal Instrument Power System

The non-1E normal instrument power system is powered from independent 600-120V transformers. The primaries of the transformers are connected to the 600V buses of the normal AC power distribution system. The secondaries are connected to individual distribution panels containing manually operated circuit breakers. There are several non-1E instrument buses which may transfer automatically from one power source to another to maintain reliability of these buses during normal operation.

There are no crossties between the non-1E instrument buses and the Class 1E instrument buses.

Conclusion

The Authority has reviewed the recommendations of Generic Letter 91-11 and has concluded that no hardware or procedure changes are required. The three recommendations of the Generic Letter are summarized below:

1. Ensure administrative control of vital instrument buses (typically 120V AC buses).

As described above, The FitzPatrick plant has administrative controls for Class 1E instrument buses. The RPS and 125V DC buses are controlled by the Technical Specifications. Operability of the other Class 1E instrument buses are governed by the requirements of the supported systems.

As part of FitzPatrick design, Class 1E AC instrument buses may be subjected to momentary power interruptions which are considered in the safety analysis of the plant. The Class 1E DC buses and the non-1E UPS bus will remain energized during loss of normal power sources.

2. Ensure administrative control of inverters or other onsite power sources to the vital instrument buses.

This concern is not applicable to the FitzPatrick plant since the Class 1E AC instrument buses are fed directly from stepdown transformers from 600V emergency buses. The Class 1E RPS buses are fed from M-G sets through electrical protection assemblies which have administrative controls. The Class 1E DC systems are supplied from battery chargers during normal operation and the directly coupled batteries when the charger is out of service. The Authority interprets "inverters or other onsite power sources" as referring to electrical equipment which normally supplies power to instrument buses, and not to the onsite emergency diesel generators.

3. Provide administrative controls of tie breakers that can connect redundant Class 1E buses (AC or DC) at one unit or that can connect Class 1E buses between units at the same time.

The FitzPatrick plant is a single unit facility and has no tie breakers between redundant Class 1E buses. Therefore, Recommendation 3 is not applicable to the FitzPatrick plant.

Attachment to JPN-92-004
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References

1. NRC letter, J. P. Durr to W. Fernandez, dated August 14, 1990, transmitting Inspection Report 50-333/90-19.
2. NYPA letter, J. C. Brons to the NRC (JPN-90-063), "Response to Notice of Deviation, Inspection Report 50-333/90-19."
3. FitzPatrick Updated Final Safety Analysis Report, Sections 8.6, 8.7, 8.8, and 8.9.
4. FitzPatrick Operating Procedure F-OP-46B, "120V AC POWER SYSTEM," Revision 5, dated June 6, 1991.
5. FitzPatrick Abnormal Operating Procedure AOP-21, "LOSS OF UPS," Revision 8, dated June 12, 1990.

TABLE 1
CLASS 1E 120VAC INSTRUMENT BUS SUMMARY

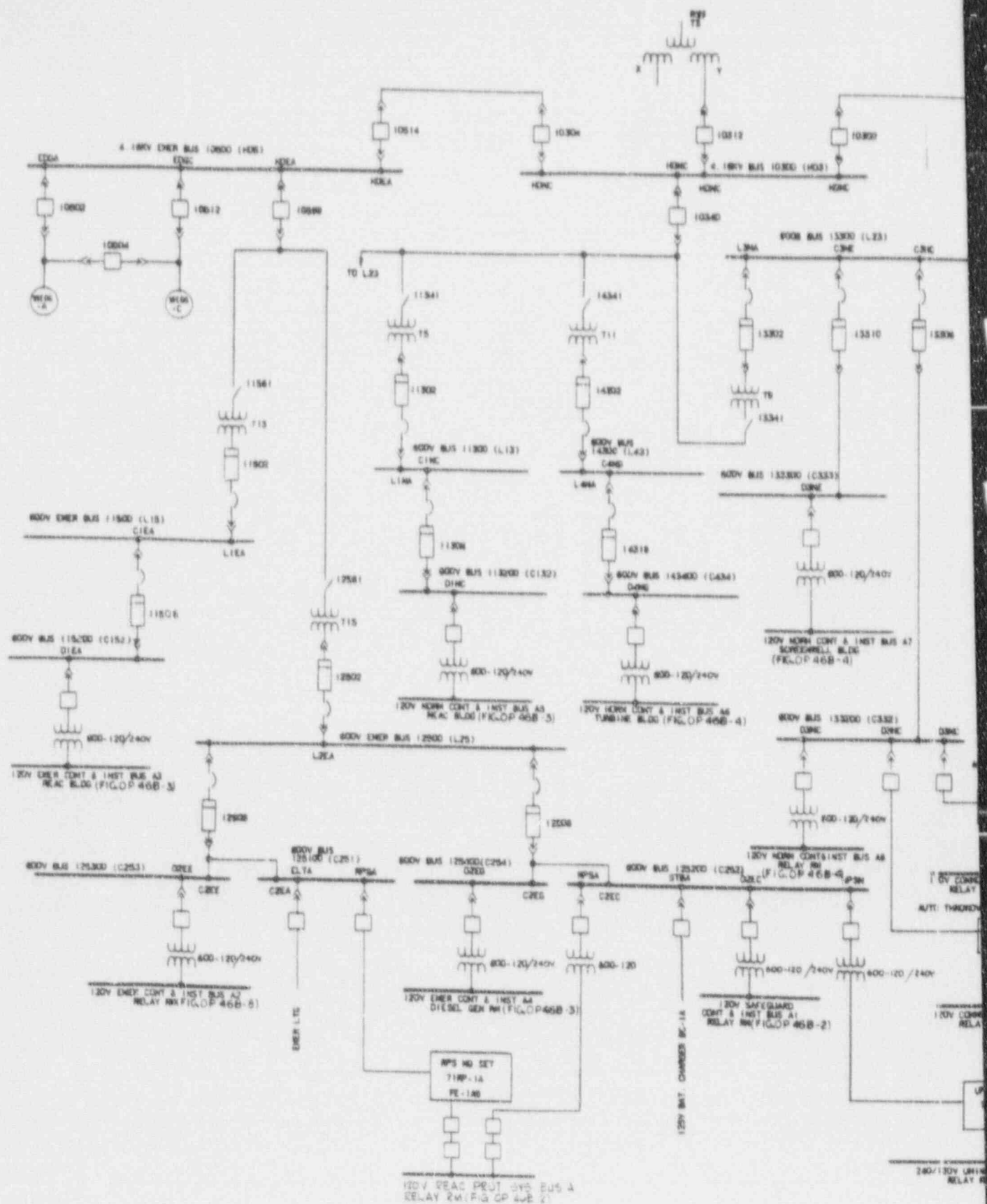
DIVISION A

<u>BUS</u>	<u>POWER SOURCE</u>	<u>NOTES</u>
71-05-6A (RPS-A)	71MCC-251 (AC supply to M-G set) 71RP-1A (output from M-G set) 71PT-05-6A from 71MCC-252 (Alt. feed)	<ul style="list-style-type: none"> No cross-ties between redundant RPS buses. Supply and alt. feed from same division with breakers manually interlocked.
71-ESSA1 (Inst. Bus A1)	71MCC-252	Single Feed
71ACA2 (Inst. Bus A2)	71MCC-253	Single Feed
71ACA3 (Inst. Bus A3)	71MCC-152	Single Feed
71ACA4 (Inst. Bus A4)	71MCC-254	Single Feed
71ACA5 (Inst. Bus A5)	71MCC-152	Single Feed

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DIVISION B

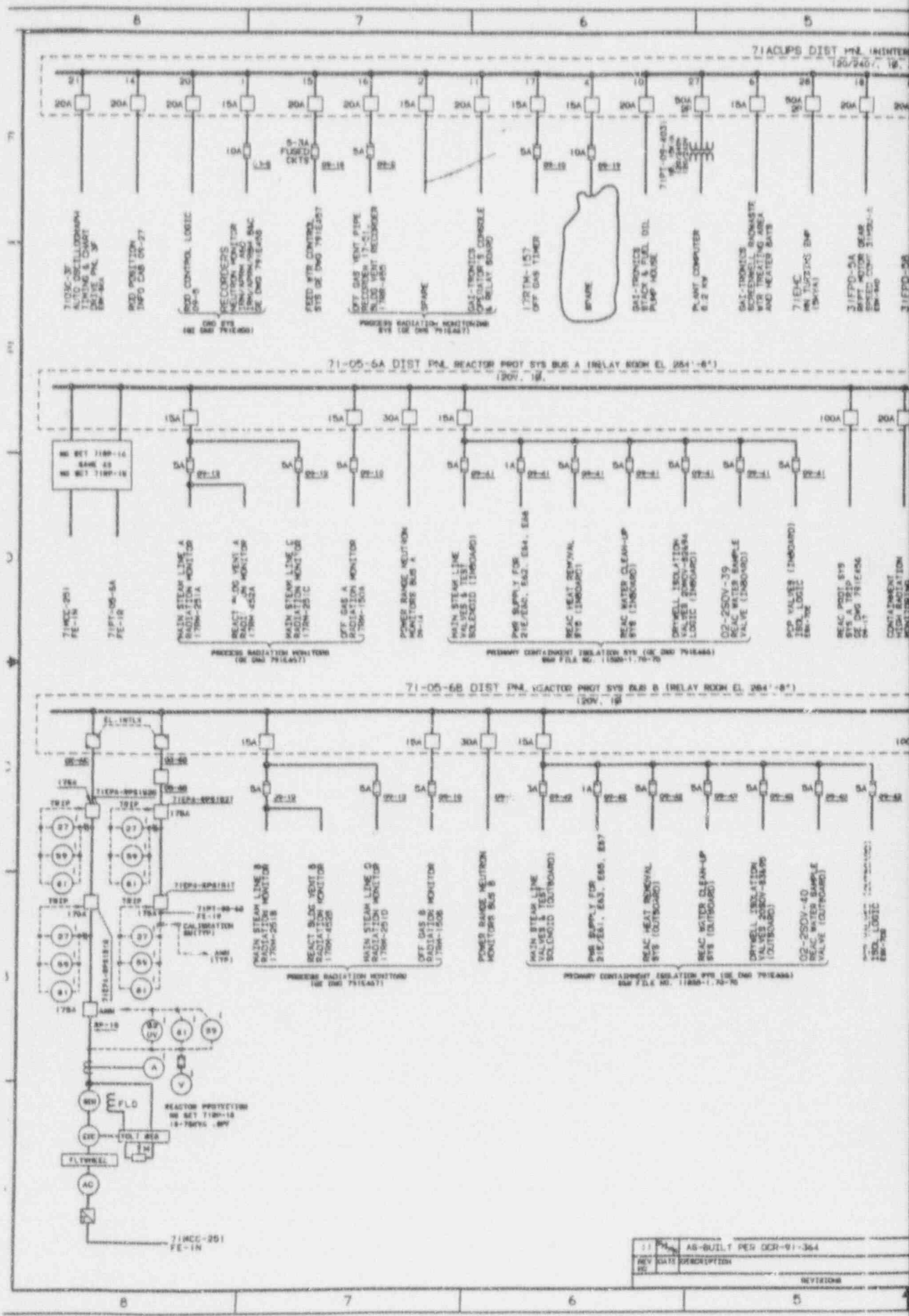
<u>BUS</u>	<u>POWER SOURCE</u>	<u>NOTES</u>
71-05-6B (RPS-B)	71MCC-261 (AC supply to M-G set) 71RP-1B (output from M-G set) 71PT-05-6B from 71MCC-262 (Alt. feed)	<ul style="list-style-type: none"> No cross-ties between redundant RPS buses. Supply and alt. feed from same division with breakers manually interlocked.
71-ESSB1 (Inst. Bus B1)	71MCC-262	Single Feed
71ACB2 (Inst. Bus B2)	71MCC-263	Single Feed
71ACB3 (Inst. Bus B3)	71MCC-162	Single Feed
71ACB4 (Inst. Bus B4)	71MCC-264	Single Feed
71ACB5 (Inst. Bus B5)	71MCC-162	Single Feed



Also Available On
Aperture Card

JAMES A. FITZPATRICK		FSAR UPDATE
120 V A-C POWER SYSTEM		
REV. 1	JULY, 1983	FIGURE NO. 8.9-1

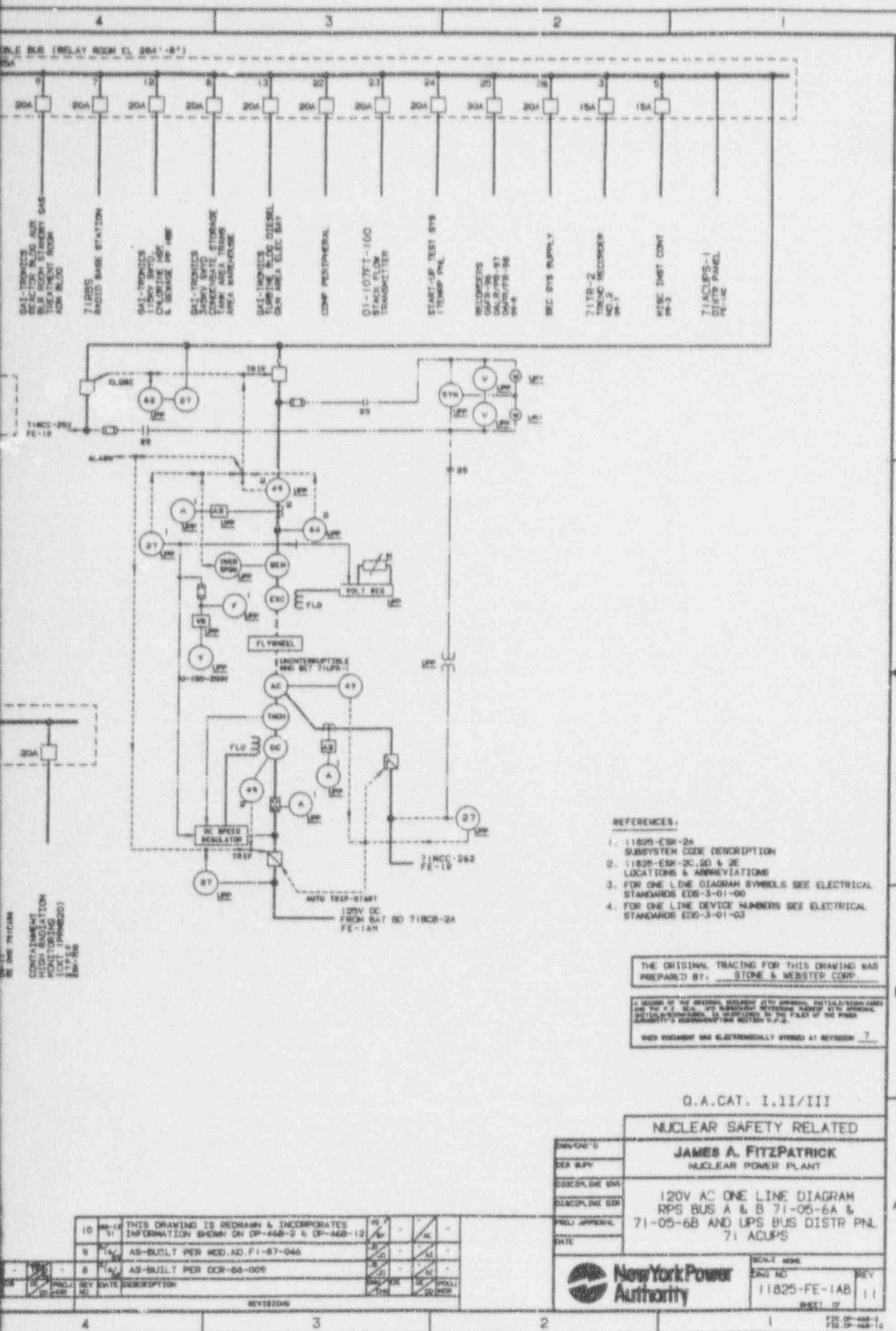
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SI APERTURE CARD

Also Available On
Aperture Card

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REFERENCES:

1. 11825-ESK-2A
SUBSYSTEM CODE DESCRIPTION
2. 11825-ESK-2C, 2D & 2E
LOCATIONS & ABBREVIATIONS
3. FOR ONE LINE DIAGRAM SYMBOLS SEE ELECTRICAL
STANDARDS EDS-3-01-00
4. FOR ONE LINE DEVICE NUMBERS SEE ELECTRICAL
STANDARDS EDS-3-01-03

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G.A.CAT. I.II/III

NUCLEAR SAFETY RELATED

JAMES A. FITZPATRICK
NUCLEAR POWER PLANT

120V AC ONE LINE DIAGRAM
RPS BUS A & B 71-05-6A &
71-05-6B AND UPS BUS DISTR PNL
71 ACUPS

New York Power
Authority

SCALE HERE
SHEET NO. 11825-FE-1A8
REV 11

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