ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8812150013 DOC.DATE: 88/12/07 NOTARIZED: NO DOCKET #
FACIL:50-397 WPPSS Nuclear Project, Unit 2, Washington Public Powe 05000397
AUTH.NAME AUTHOR AFFILIATION
SORENSEN,G.C. Washington Public Power Supply System
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Provides description of process used to determine channel functional test boundaries for second level UP.

DISTRIBUTION CODE: A001D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 55+2
TITLE: OR Submittal: General Distribution

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD5 LA	1	0	PD5 PD	2	2
	SAMWORTH,R	1	1			
INTERNAL:	ACRS	6	6	ARM/DAF/LFMB	1	0
	NRR/DEST/ADS 7E	1	1	NRR/DEST/CEB 8H	1	1
	NRR/DEST/ESB 8D	1	1	NRR/DEST/MTB 9H	1	1
	NRR/DEST/RSB 8E	1	1	NRR/DOEA/TSB 11	1	1
	NRR/PMAS/ILRB12	1	1	NUDOCS-ABSTRACT	1	1
	OGC/HDS2	1	0	REG FILE 01	1	1
	RES/DSIR/EIB	1	1			
EXTERNAL:	LPDR	1	1	NRC PDR	1	1
	NSIC	1	1			

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 25 ENCL 22

RIDS/ADDS

RIDS/ADDS

566

m/A-2

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

December 7, 1988
G02-88-261

Docket No. 50-397

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

Gentlemen:

Subject: **NUCLEAR PLANT NO. 2**
4.16 KV EMERGENCY BUS UNDERVOLTAGE DEGRADED VOLTAGE (SECOND LEVEL UNDERVOLTAGE) PROTECTION

Reference: Letter, R.B. Samworth (NRR) to G.C. Sorensen (SS), "Confirmation of Commitment for Emergency Bus Undervoltage Protection Circuitry", dated December 5, 1988

The purpose of this letter is to provide a description of the decision process used to determine the Channel Functional Test (CFT) boundaries for the second level undervoltage protection utilized at WNP-2.

This letter is written in response to a telephone discussion between the Supply System and the NRR on November 30, 1988 and the referenced letter. The conversation included Messrs R. Samworth and R. Burrows of NRR, P. Johnson of I&E Region V, H. Aeschliman, R. Koenigs, R. Matthews and T. Meade of the Supply System.

It is the position of the Supply System that Channel Functional Testing as required by the WNP-2 Technical Specifications does not include relays that result in trip system actuation. The manner in which the designed eight second time delay associated with second level undervoltage protection was implemented relied upon two relays; an integral five second time delay and a separate three second time delay relay. Because the five second time delay was integral to the undervoltage sensing device, it was included in the channel. The additional three second time delay relay was designed to execute various trip system functions (bus deenergization, load shed, bus reenergization, subsequent load sequencing and annunciation) and as such was not included in the CFT.

A001
1/1

4.16 KV EMERGENCY BUS UNDERVOLTAGE DEGRADED VOLTAGE
(SECOND LEVEL UNDERVOLTAGE) PROTECTION

Based upon prior NRC approval of the existing configuration, the Supply System prepared the required technical specification surveillance procedures. Testability capabilities were included in the Technical Specification and design review processes. Other utilities design similarities also suggest that the WNP-2 configuration is typical. Although, the Supply System recognizes its responsibility to ensure the technical accuracy of the LCO, this problem is resolvable via a Tech Spec amendment that explicitly delineates what type of testing is required for each division.

The Engineering staff at the Supply System has reviewed the existing design and the design criteria provided to the Supply System by NRR in FSAR Question 040.036. The results of this review indicate that the second level undervoltage protection circuitry utilized at WNP-2 meet the criteria established by the NRC. The designs of the division one and two, second level undervoltage protection as well as the design for the division three, second level undervoltage protection remain unchanged from that transmitted to NRR for review during the licensing process. The submittal to the NRC prior to initial startup included the present design of the division one and division two, five second and three second sequential time delays. The letters which transmitted these documents to NRR are attached for your review (Attachments 5 and 6). A requirement to incorporate all the time delay relay functions into the channel would involve a significant redesign effort.

It is the position of the Supply System and was the position of the NRR at the time of the licensing process to not require functional testing during power operation which would result in actuation (in this case the separation of the onsite safety related busses from the offsite power sources). This circuitry as reviewed and subsequently approved by NRR, did not include the ability to test the three second time delay relays associated with division one and two. That portion of the logic that was designed to be testable included only the five second time delay based upon the requirements of FSAR Question 040.036. The five second time delay is integral to the undervoltage relay and is not a separate time delay relay. The configuration relied upon the three second time delay relay as an end point relay. In other words, that which was channelized by design is testable and included in the CFT.

The Supply System has obtained several other Technical Specifications from facilities similar to WNP-2. These Technical Specifications vary considerably from no required testing to monthly Channel Functional Testing. Some Technical Specifications such as Grand Gulf specifically exempt the time delay relays from testing.

Attachment 3 provides excerpts from several other utility Technical Specifications. Below is a summary of these Technical Specifications. It is our belief that other utilities implement testing consistent with our position.

- o Grand Gulf - Implements monthly Channel Functional Testing but specifically exempts time delay relays from this testing. Division three degraded voltage protection is specifically exempted.

- o LaSalle - Channel Functional Testing is not implemented.

Due to the variety of designs which implement the second level undervoltage protection, it can be concluded from the above that performance of periodic functional testing at power which includes the time delay relays is not typical.

Conclusion

The existing design meets the original criteria established by the NRC in FSAR Question 040.036. The present functional testing appears consistent with that implemented by other utilities on second level undervoltage protection. WNP-2 believes the existing functional testing content and scope to be acceptable and in compliance with NRR requirements at the time of the licensing.

The WNP-2 Technical Specification requires an amendment relative to the second level undervoltage protection. It is the belief of the Supply System that the associated LCO, absent interpretation, must be amended to reflect present configurations.

As a result of this issue, a review of each divisions test procedures was conducted and an additional problem was discovered. The division three second level undervoltage protection is not testable during operation and will also require reconciliation by Technical Specification amendment.

Because this issue affects the monthly CFT on division one, two and three, a Technical Specification amendment is required by January 12, 1989.

As requested in the letter from NRR received Monday, December 5, we have conducted an initial review of our class 1E relay calibration program and have identified 169 time delay relays which are tested as part of the Logic System Functional Testing and not included in Channel Functional Tests. We are presently aware of only four time delay relays which are required to be included in the Channel Functional Testing by the WNP-2 Technical Specifications. (Division 1 and 2 LPCI pump start second start time delay and division 1 and 2 ADS actuation 105 second time delay.)

In summary, the Supply System considers that the present Channel Functional Testing performed on the second level undervoltage protection circuitry is adequate and meets the interpretation of the requirements prevailing at the time of licensing for WNP-2.

The Supply System proposes a meeting with the NRR to discuss this issue and present the proposed Technical Specification amendment.

Very truly yours,

GC Sorensen

G. C. Sorensen, Manager
Regulatory Programs

TLM/bk

Attachments:
1) Channel Functional Testing
2) Second Level Undervoltage Logic Descriptions
3) Other Utility Technical Specification Excerpts
4) Channel Functional Test Procedure PPM 7.4.3.3.1.67 Rev. 4
5) Letter, LT Harrold to FA MacLean, "Second Level Undervoltage Protection for Division 3", dated September 27, 1983
6) Letter, GC Sorensen to A Schwencer, "Branch Technical Position SPB-1 Commitment Implementation Status", dated October 14, 1983
7) FSAR Question 040.036
8) Related Electrical Design Drawings

cc: JB Martin - NRC RV
NS Reynolds - BCP&R
RB Samworth - NRC
DL Williams - BPA/399
NRC Site Inspector - 901A
A Rapacz - BPA

ATTACHMENT 1

CHANNEL FUNCTIONAL TESTING

The following is a description of the periodic testing performed on the division one and two, second level undervoltage logic at WNP-2.

Each month a Channel Functional Test is performed which removes the voltage input from the relay and verifies that each undervoltage relay drops out and that its output contact closes. This contact is the contact within the two out of three contact array. This method simulates a loss of voltage to these undervoltage relays which are considered bistable devices.

A Channel Calibration is implemented each refueling outage on these undervoltage relays. This calibration determines the as found setpoint and time delays and then recalibrates and resets the definite time undervoltage relays if necessary. The functional testing requirement is peformed by the Logic System Functional Test (LSFT) which always occur following the divisional outage during which the relay calibrations are performed.

The Logic System Functional Test results in the transfer of the safety bus to the backup source and then verifies the trip of the backup source from these undervoltage relays. This iteration is completed three times in order to test each channel input to the logic train.

These tests as well as other 18 month surveillance tests are performed at WNP-2 on an annual basis.

It is noted that on other ECCS logic channels, such as the low reactor water level initiation of HPCS, the Channel Functional Test and Channel Calibration Testing requirements are combined into one procedure. This procedure incorporates a setpoint verification which records the as found setpoint. This value is compared to the allowable value in the Technical Specification. If this value is exceeded a NCR and a Channel Calibration are initiated.

The as found value is also compared to an administrative limit. This limit is based upon the trip setpoint value in the Technical Specifications. If the as found value is outside the administrative limit the device is recalibrated. The purpose of this activity is to ensure that the device drift will not result in the setpoint exceeding the Technical Specification allowable limit during the next period of the functional test.

The Channel Functional Testing of the second level undervoltage relays, ITE27Ns, has been modified to be consistent with this method of Channel Functional Testing. These modified tests have been implemented in the field during the December 88 outage.

The Supply System has initially adopted the policy of determining the as found trip value of bistable devices which is beyond the testing required by the Technical Specification.

Channel Functional Testing Scope

The logic for the ECCS systems is a two out of four logic. A contact from each instrument energizes a relay. Contacts from these four relays are arranged in a two by two array.

The existing Channel Functional Tests for these ECCS systems isolate the instrument from the sensing line and inject a simulated signal into the instrument to actuate the instrument. Instrument contact closure is monitored at the instrument rack, Resulting contact closure of the supporting relay (K5-K8) causes annunciation in the control room and this is verified. In the case of RPS this results in a half scram. Note that the actuation relays (K94, etc.) are not energized due to the contact array. Thus the channel is defined as the instrument up to the contact within the two out of four contact array. These ECCS Channel Functional Tests fall within the same Technical Specification section as the second level undervoltage protection and also do not include the end point relays.

The annual Logic System Functional Tests complete the logic testing from the actuating device to the actuated device. In the case of the ECCS systems, the pumps are started and aligned in the test return mode of operation to simulate full flow condition. This is implemented both with and without the emergency diesel generator supplying the emergency bus.

The second level undervoltage logic is similar. As previously described, the channel has been defined as the instrument up to the contact within the two out of three contact array. The design drawings for this logic have been provided and can be reviewed.

A copy of the Channel Functional Test procedures has been provided for your review.

ATTACHMENT 2
SECOND LEVEL UNDERVOLTAGE LOGIC DESCRIPTIONS

The division one (and division two) undervoltage protection consists of three ITE static type definite time undervoltage relays. These relays monitor the three phases of the 4160 volt safety busses. These three relays each provide two contacts which contribute to a two out of three logic array. These relays are set to actuate at approximately 87.3% of nominal bus voltage and will change the state of their contacts following a 5 second time delay.

Actuation (contact closure) of two of these relays will energize two of three secondary time delay relays. These three second time delay relays contribute to the eight second time delay referenced in the FSAR and the Technical Specification. The logic discussed to this point is described on EWD-46E-106A. Each of these three second time delay relays will be discussed individually.

E-RLY-27/S7/UV

The relay 27/S7/UV contact schedule is shown on EWD-46E-106A. Contact 3/5 of this relay feeds into an annunciator circuit shown on E521 sheet 9. This annunciator is located within the control room. This annunciator indicates SM-7 degraded voltage. Contact 2/6 of this relay is shown on EWD-46E-106A Zone H-6. This contact closes to energize four additional logic relays. These relays are part of the original primary undervoltage logic and are also actuated following the two second time delay associated with the primary undervoltage logic. Two of these relays are time delay relays, a five second and a two second.

E-RLY-62X/7

The first of these relays is E-RLY-62X/7. Contacts 1/2 and contact 5/6 of this relay are shown on EWD-58E-001. These contacts are located in the trip circuit of SW-P-1A. They provide for the load shed of the division one standby service water pump. Two contacts are used for this purpose due to the alternate shutdown capability associated with the division one standby service water pump.

Contact 7/8 is shown on EWD-46E-106A. This contact disables the energization of the relay 3TR42. This is another time delay relay used in original load sequencing logic.

Contact 9/10 of this relay is shown on EWD-46E-130. This contact causes the load shed of the non-1E load, MCC-7C, from the class 1E safety bus SM-7.

E-RLY-62/1/7

This relay is a five second time delay relay. Contact 1/5 is the only contact used on this relay and is shown on EWD-47E-003. EWD-47E-003 depicts the control circuitry for the division one diesel generator output circuit breaker. This relay provides for the enabling signal from the safety bus SM-7 undervoltage logic.

E-RLY-62X1/7

This relay is also used to provide load shedding following a bus undervoltage condition. Contact 1/2 of this relay is shown on EWD-9E-001. This contact provides for the load shed of RHR-P-2A.

Contact 3/4 of this relay is shown on EWD-8E-001. This contact provides for the load shedding of LPCS-P-1.

Contact 5/6 of this relay is shown on EWD-80E-005. This contact provides for the load shedding of REA-FN-1A. Note that this load is a 480 volt load fed from S1-71.

Contact 7/8 of this relay is shown on EWD-80E-001. This contact provides for the load shedding of ROA-FN-1A. Note that this load is also a 480 volt load supplied from SL-73.

Contact 9/10 of this relay is shown on EWD-46E-132. This contact provides for the load shedding of the non-class 1E motor control center MCC-7E.

Contact 11/12 of this relay is shown on EWD-13E-001. This contact provides for the load shedding of CRD-P-1A.

E-RLY-62/2/7

This relay is a two second time delay relay. Only one contact is used off this relay. Contact 1/5 of this relay is shown on EWD-46E-092. EWD-46E-092 depicts the control circuitry of circuit breaker B-7, the backup supply circuit breaker for SM-7. This contact initiates closure of the backup source to SM-7 if other closure prerequisites are completed. Example: backup supply voltage 94%.

This completes the secondary relay structure initiated by E-RLY-27/S7/UV.

E-RLY-27/S71/UV

This three second time delay relay can be actuated only if the preferred source circuit breaker (7-1) for SM-7 is closed.

Contact 4/5 of this relay is shown on EWD-46E-89. This contact initiates a computer input which prints out in the control room on the control room alarm typer for the SM-7 degraded voltage condition.

Contact 1/5 of this relay is shown on EWD-46E-106A Zone H-6. This contact closure energizes relay E-RLY-27X/UV. This relay contact schedule is shown on drawing EWD-46E-106A and described below. These are the only contacts used off this relay.

E-RLY-27X/UV

Only one contact is used off this relay. Contact 1/2 is shown on EWD-46E-80. EWD-46E-080 depicts the control circuitry for the preferred source circuit breaker for SM-7, circuit breaker 7-1. Contact 1/2 of E-RLY-27X/UV initiates a trip of circuit breaker 7-1. This isolates the safety bus SM-7 from the preferred source on completion of the second level undervoltage protection logic.

E-RLY-27/SB7/UV

This three second time delay relay can be actuated only if the backup source circuit breaker (B-7) for SM-7 is closed. The contact schedule for this relay is shown on EWD-46E-106A. Contact 4/6 of this relay is shown on EWD-46E-089. This contact initiates a computer input which prints out in the control room on the control room alarm printer for a SM-7 degraded voltage condition.

Contact 1/5 of this relay is shown on EWD-46E-092. EWD-46E-092 depicts the control circuitry for the backup supply circuit breaker (B-7) for the safety bus SM-7. Contact 1/5 of the E-RLY-27/SB7/UV initiates a trip of circuit breaker B-7. This isolates the safety bus SM-7 from the backup source following the completion of the logic associated with the second level undervoltage protection.

The trip of circuit breaker B-7 is accomplished as follows: Contact 1/5 of E-RLY-27/SB7/UV closes to energize E-RLY-SM7/UV. Contacts off this relay (E-RLY-SM7/UV) trip B-7 and disable the auto closure of B-7. The circuitry associated with this relay, as shown on the very right of EWD-46E-092, is required to prevent continuous cycling of the backup circuit breaker B-7 if a Potential Transformer (PT) fuse were to clear. This circuitry enables the backup circuit breaker to remain closed upon a detection of a blown PT fuse.

The second level undervoltage protection circuitry on the division two safety related bus SM-8 is identical to that on SM-7. The division 3 second level undervoltage logic is somewhat different. This logic was designed by General Electric. The division one and two logic was designed by the AE for WNP-2, Burns and Roe. Note that there is no backup offsite source available to SM-4. It has only the preferred source via SM-2 and its associated emergency diesel generator.

Division Three Second Level Undervoltage Protection

The division three second level undervoltage logic consists of two ITE static type definite time undervoltage relays. These relays monitor SM-4 via PTs in the same manner as the primary undervoltage logic relays. Their designations are E-RLY-2762/4/1 and E-RLY-2762/4/2. These relays contribute to a two out of two logic system. This logic is redundant, i.e. there are two channels for this logic. Both of these channels are shown on EWD-46E-327. The left-most channel will be described.

Following the detection of a second level undervoltage condition on SM-4, both relays will actuate. These relays will time out in eight seconds and close their respective contacts. This contact closure energizes E-RLY-62/4/S1 and E-RLY-27/NX. Note that the second level undervoltage protection is disabled when circuit breaker 4-2 is not closed and providing the power to SM-4.

E-RLY-27/NX trips the preferred source circuit breaker 4-2 and opens a contact in the close circuit of circuit breaker 4-2. This isolates the class 1E bus SM-4 from the offsite source following the detection of the degraded condition and subsequent time delay of eight seconds.

Following a one second time delay E-RLY-62/4/S1 will open its contact 3/7 to deenergize E-RLY-27NX and thus remove the trip signal from circuit breaker 4-2. Also following this one second time delay E-RLY-62/4/S1 will also close its contact 8/10 to energize E-RLY-27/SX and E-RLY-27/4/SX1.

E-RLY-SX

The contact schedule for E-RLY-SX is shown on EWD-46E-327. Contact 3/4 of this relay is shown on EWD-7E-004. This contact initiates a start of the emergency diesel generator for the HPCS system.

Contact 7/8 of this relay is shown on EWD-7E-031. This contact actuates an annunciator on H13-P601 in the control room indicating a undervoltage condition on SM-4.

Contact 9/10 of this relay is shown on EWD-7E-001. This contact enables the closure of the emergency diesel generator output circuit breaker. This circuit breaker will close when the diesel generator output obtains sufficient frequency and voltage.

E-RLY-27/4/SX1

Only one contact off this relay is used. Contact 2/7 is shown on EWD-7E-022. This contact enables the closure of the HPCS pump.

INSTRUMENTATION

3/4.3.3 EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3 The emergency core cooling system (ECCS) actuation instrumentation channels shown in Table 3.3.3-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.3-2 and with EMERGENCY CORE COOLING SYSTEM RESPONSE TIME as shown in Table 3.3.3-3.

APPLICABILITY: As shown in Table 3.3.3-1.

ACTION:

a. With an ECCS actuation instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.3-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With one or more ECCS actuation instrumentation channels inoperable, take the ACTION required by Table 3.3.3-1.

c. With either ADS trip system "A" or "B" inoperable, restore the inoperable trip system to OPERABLE status within:

1. 7 days, provided that the HPCS and RCIC systems are OPERABLE.

2. 72 hours.

Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to less than or equal to 135 psig within the following 24 hours.

SURVEILLANCE REQUIREMENTS

4.3.3.1 Each ECCS actuation instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.3.1-1.

TABLE 3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION[a]	APPLICABLE OPERATIONAL CONDITIONS	ACTION
C. DIVISION 3 TRIP SYSTEM			
1. HPCS SYSTEM			
a. Reactor Vessel Water Level - Low, Low, Level 2	4[b]	1, 2, 3, 4*, 5*	35
b. Drywell Pressure - High	4[b]	1, 2, 3	35
c. Reactor Vessel Water Level-High, Level 8	2[c]	1, 2, 3, 4*, 5*	32
d. Condensate Storage Tank Level-Low	2[d]	1, 2, 3, 4*, 5*	36
e. Suppression Pool Water Level-High	2[d]	1, 2, 3, 4*, 5*	36
f. Pump Discharge Pressure-High (Bypass)	1	1, 2, 3, 4*, 5*	31
g. HPCS System Flow Rate-Low (Permissive)	1	1, 2, 3, 4*, 5*	31
h. Manual Initiation	1/division	1, 2, 3, 4*, 5*	34

D. LOSS OF POWER	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM OPERABLE CHANNELS	APPLICABLE OPERATIONAL CONDITIONS	ACTION
1. 4.16 kV Emergency Bus Undervoltage (Loss of Voltage)	1/bus	1/bus	1/bus	1, 2, 3, 4**, 5**	37
2. 4.16 kV Emergency Bus Undervoltage (Degraded Voltage) (Division 3)	1/bus	1/bus	1/bus	1, 2, 3, 4**, 5**	37

TABLE NOTATION

(a) A channel may be placed in an inoperable status for up to 2 hours during periods of required surveillance without placing the trip system in the tripped condition provided at least one other OPERABLE channel in the same trip system is monitoring that parameter.
(b) Also actuates the associated division diesel generator.
(c) Provides signal to close HPCS pump discharge valve only on 2-out-of-2 logic.
(d) Provides signal to HPCS pump suction valves only.
* Applicable when the system is required to be OPERABLE per Specification 3.5.2 or 3.5.3.
** Required when ESF equipment is required to be OPERABLE.
\# Not required to be OPERABLE when reactor steam dome pressure is $\leq$ 122 psig.

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

ACTION

ACTION 30 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. With one channel inoperable, place the inoperable channel in the tripped condition within one hour* or declare the associated system inoperable.

b. With more than one channel inoperable, declare the associated system inoperable.

ACTION 31 - With the number of OPERABLE channels less than required by the Minimum OPERABLE channels per Trip Function, place the inoperable channel in the tripped condition within one hour; restore the inoperable channel to OPERABLE status within 7 days or declare the associated system inoperable.

ACTION 32 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, declare the associated ADS trip system or ECCS inoperable.

ACTION 33 - With the number of OPERABLE channels less than the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel in the tripped condition within one hour.

ACTION 34 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within 8 hours or declare the associated ADS valve or ECCS inoperable.

ACTION 35 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement

a. For one trip system, place that trip system in the tripped condition within one hour* or declare the HPCS system inoperable.

b. For both trip systems, declare the HPCS system inoperable.

ACTION 36 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within one hour* or declare the HPCS system inoperable.

ACTION 37 - With the number of OPERABLE channels less than the Total Number of Channels, declare the associated emergency diesel generator inoperable and take the ACTION required by Specification 3.8.1.1 or 3.8.1.2, as appropriate.

*The provisions of Specification 3.0.4 are not applicable.

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

ACTION

ACTION 38 With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per trip function requirements:

a. With one channel inoperable, remove the inoperable channel within one hour; restore the inoperable channel to OPERABLE status within 7 days or declare the associated ECCS systems inoperable.

b. With both channels inoperable, restore at least one channel to OPERABLE status within one hour or declare the associated ECCS system inoperable.

TABLE 3.3.3-2 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
C. DIVISION 3 TRIP SYSTEM		
1. HPCS SYSTEM		
a. Reactor Vessel Water Level - Low Low, Level 2	$\geq$ - 50 inches*	$\geq$ - 57 inches*
b. Drywell Pressure - High	$\leq$ 1.69 psig	$\leq$ 1.89 psig
c. Reactor Vessel Water Level - High, Level 8	$\leq$ 55.5 inches*	$\leq$ 56 inches*
d. Condensate Storage Tank Level - Low	$\geq$ 715'7"	$\geq$ 715'3"
e. Suppression Pool Water Level - High	$\leq$ 700'1"	$\leq$ 700'2"
f. Pump Discharge Pressure - High	$\geq$ 120 psig	$\geq$ 110 psig
g. HPCS System Flow Rate - Low	$\geq$ 1000 gpm	$\geq$ 900 gpm
h. Manual Intiation	N.A.	N.A.
D. LOSS OF POWER		
1. 4.16 kV Emergency Bus Undervoltage (Loss of Voltage)#		
a. 4.16 kV Basis		
1) Divisions 1 and 2	2625 ± 131 volts with $\leq$ 10 second time delay	2625 ± 262 volts with $\leq$ 11 second time delay
	2496 ± 125 volts with $\geq$ 4 second time delay	2496 ± 250 volts with $\geq$ 3 second time delay
2) Division 3	2870 ± 143 volts with $\leq$ 10 second time delay	2870 ± 287 volts with $\leq$ 11 second time delay
2. 4.16 kV Emergency Bus Undervoltage (Degraded Voltage)		
a. 4.16 kV Basis		
1) Division 3	3814 ± 76 volts with 10 ± 1 second time delay	3814 ± 76 volts with 10 ± 1 second time delay

TABLE NOTATIONS

*See Bases Figure B 3/4 3-1.
#These are inverse time delay voltage relays or instantaneous voltage relays with a time delay. The voltages shown are the maximum that will not result in a trip. Lower voltage conditions will result in decreased trip times.
N.A. Not Applicable

TABLE 3.3.3-3

EMERGENCY CORE COOLING SYSTEM RESPONSE TIMES

ECCS		RESPONSE TIME (Seconds)
1.	LOW PRESSURE CORE SPRAY SYSTEM	$\leq$ 40*
2.	LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM (Pumps A, B, and C)	$\leq$ 40*
3.	AUTOMATIC DEPRESSURIZATION SYSTEM	NA
4.	HIGH PRESSURE CORE SPRAY SYSTEM	$\leq$ 27
5.	LOSS OF POWER	NA

*Injection valves shall be fully OPEN within 20 seconds after receipt of the reactor vessel pressure and ECCS Injection Line Pressure Interlock signal concurrently with power source availability and receipt of an accident initiation signal.

TABLE 4.3.3.1-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
C. DIVISION 3 TRIP SYSTEM				
1. HPCS SYSTEM				
a. Reactor Vessel Water Level - Low Low, Level 2	S	M	R	1, 2, 3, 4*, 5*
b. Drywell Pressure-High	NA	M	Q	1, 2, 3
c. Reactor Vessel Water Level-High Level 8	S	M	R	1, 2, 3, 4*, 5*
d. Condensate Storage Tank Level - Low	NA	M	Q	1, 2, 3, 4*, 5*
e. Suppression Pool Water Level - High	NA	M	Q	1, 2, 3, 4*, 5*
f. Pump Discharge Pressure-High	NA	M	Q	1, 2, 3, 4*, 5*
g. HPCS System Flow Rate-Low	NA	M	Q	1, 2, 3, 4*, 5*
h. Manual Initiation	NA	R	NA	1, 2, 3, 4*, 5*
D. LOSS OF POWER				
1. 4.16 kV Emergency Bus Under-voltage (Loss of Voltage)	NA	NA	R	1, 2, 3, 4**, 5**
2. 4.16 kV Emergency Bus Under-voltage (Degraded Voltage) (Division 3)	NA	NA	R	1, 2, 3, 4**, 5**

TABLE NOTATIONS

#Not required to be OPERABLE when reactor steam dome pressure is less than or equal to 122 psig.

*When the system is required to be OPERABLE after being manually realigned, as applicable, per Specification 3.5.2.

**Required when ESF equipment is required to be OPERABLE.

TABLE 3.

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION[a]	APPLICABLE OPERATIONAL CONDITIONS	ACTION
A. DIVISION 1 TRIP SYSTEM			
1. RHR-A (LPCI MODE) & LPCS SYSTEM			
a. Reactor Vessel Water Level - Low Low Low, Level 1	2[b]	1, 2, 3, 4*, 5*	30
b. Drywell Pressure - High	2[b]	1, 2, 3	30
c. LPCI Pump A Start Time Delay Relay	1	1, 2, 3, 4*, 5*	31
d. Manual Initiation	1/system[b]	1, 2, 3, 4*, 5*	32
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "A"#			
a. Reactor Vessel Water Level - Low Low Low, Level 1	2[b]	1, 2, 3	30
b. Drywell Pressure - High	2[b]	1, 2, 3	30
c. ADS Timer	1	1, 2, 3	31
d. Reactor Vessel Water Level - Low, Level 3 (Permissive)	1	1, 2, 3	31
e. LPCS Pump Discharge Pressure-High (Permissive)	2	1, 2, 3	31
f. LPCI Pump A Discharge Pressure-High (Permissive)	2	1, 2, 3	31
g. Manual Initiation	2/system	1, 2, 3	32
B. DIVISION 2 TRIP SYSTEM			
1. RHR B & C (LPCI MODE)			
a. Reactor Vessel Water Level - Low, Low Low, Level 1	2[b]	1, 2, 3, 4*, 5*	30
b. Drywell Pressure - High	2[b]	1, 2, 3	30
c. LPCI Pump B Start Time Delay Relay	1	1, 2, 3, 4*, 5*	31
d. Manual Initiation	1/system[b]	1, 2, 3, 4*, 5*	32
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "B"#			
a. Reactor Vessel Water Level - Low Low Low, Level 1	2[b]	1, 2, 3	30
b. Drywell Pressure - High	2[b]	1, 2, 3	30
c. ADS Timer	1	1, 2, 3	31
d. Reactor Vessel Water Level - Low, Level 3 (Permissive)	1	1, 2, 3	31
e. LPCI Pump B and C Discharge Pressure - High (Permissive)	2/pump	1, 2, 3	31
f. Manual Initiation	2/system	1, 2, 3	32

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION[(a)]	APPLICABLE OPERATIONAL CONDITIONS	ACTION
C. DIVISION 3 TRIP SYSTEM			
1. HPCS SYSTEM			
a. Reactor Vessel Water Level - Low, Low, Level 2	4[(b)]	1, 2, 3, 4*, 5*	33
b. Drywell Pressure - High##	4[(b)]	1, 2, 3	33
c. Reactor Vessel Water Level-High, Level 8	2[(c)]	1, 2, 3, 4*, 5*	31
d. Condensate Storage Tank Level-Low	2[(d)]	1, 2, 3, 4*, 5*	34
e. Suppression Pool Water Level-High	2[(d)]	1, 2, 3, 4*, 5*	34
f. Manual Initiation##	1	1, 2, 3, 4*, 5*	32
D. LOSS OF POWER			
1. Division 1 and 2			
a. 4.16 kV Bus Undervoltage (Loss of Voltage)	4	1, 2, 3, 4**, 5**	30
b. 4.16 kV Bus Undervoltage (BOP Load Shed)	4	1, 2, 3, 4**, 5**	30
c. 4.16 kV Bus Undervoltage (Degraded Voltage)	4	1, 2, 3, 4**, 5**	30
2. Division 3			
a. 4.16 kV Bus Undervoltage (Loss of Voltage)	4	1, 2, 3, 4**, 5**	30

(a) A channel may be placed in an inoperable status for up to 2 hours during periods of required surveillance without placing the trip system in the tripped condition provided at least one other OPERABLE channel in the same trip system is monitoring that parameter.
(b) Also actuates the associated division diesel generator.
(c) Provides signal to close HPCS pump discharge valve only.
(d) Provides signal to HPCS pump suction valves only.
* Applicable when the system is required to be OPERABLE per Specification 3.5.2 or 3.5.3.
** Required when applicable ESF equipment is required to be OPERABLE.
\# Not required to be OPERABLE when reactor steam dome pressure is less than or equal to 135 psig.
\#\# Prior to STARTUP following the first refueling outage, the injection function of Drywell Pressure - High and Manual Initiation are not required to be OPERABLE with indicated reactor vessel water level on the wide range instrument greater than Level 8 setpoint coincident with the reactor pressure less than 600 psig.

INSTRUMENTATION

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

ACTION

ACTION 30 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. With one channel inoperable, place the inoperable channel in the tripped condition within one hour* or declare the associated system(s) inoperable.

b. With more than one channel inoperable, declare the associated system(s) inoperable.

ACTION 31 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, declare the associated ADS trip system or ECCS inoperable.

ACTION 32 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within 8 hours or declare the associated ADS trip system or ECCS inoperable.

ACTION 33 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel(s) in the tripped condition within one hour* or declare the HPCS system inoperable.

ACTION 34 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within one hour* or declare the HPCS system inoperable.

*The provisions of Specification 3.0.4 are not applicable.

TABLE 3.3

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
A. DIVISION 1 TRIP SYSTEM		
1. RHR-A (LPCI MODE) AND LPCS SYSTEM		
a. Reactor Vessel Water Level - Low Low Low, Level 1	$\geq$ -150.3 inches*	$\geq$ -152.5 inches
b. Drywell Pressure - High	$\leq$ 1.39 psig	$\leq$ 1.44 psig
c. LPCI Pump A Start Time Delay Relay	$\leq$ 5 seconds	$\leq$ 5.25 seconds
d. Manual Initiation	NA	NA
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "A"		
a. Reactor Vessel Water Level - Low Low Low, Level 1	$\geq$ -150.3 inches*	$\geq$ -152.5 inches
b. Drywell Pressure - High	$\leq$ 1.39 psig	$\leq$ 1.44 psig
c. ADS Timer	$\leq$ 105 seconds	$\leq$ 117 seconds
d. Reactor Vessel Water Level-Low, Level 3	$\geq$ 11.4 inches*	$\geq$ 10.8 inches
e. LPCS Pump Discharge Pressure-High	145 psig, increasing	125-165 psig, increasing
f. LPCI Pump A Discharge Pressure-High	125 psig, increasing	115-135 psig, increasing
g. Manual Initiation	NA	NA
B. DIVISION 2 TRIP SYSTEM		
1. RHR B AND C (LPCI MODE)		
a. Reactor Vessel Water Level - Low Low Low, Level 1	$\geq$ -150.3 inches*	$\geq$ -152.5 inches
b. Drywell Pressure - High	$\leq$ 1.39 psig	$\leq$ 1.44 psig
c. LPCI Pump B Start Time Delay Relay	$\leq$ 5 seconds	$\leq$ 5.25 seconds
d. Manual Initiation	NA	NA
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "B"		
a. Reactor Vessel Water Level - Low Low Low, Level 1	$\geq$ -150.3 inches*	$\geq$ -152.5 inches
b. Drywell Pressure - High	$\leq$ 1.39 psig	$\leq$ 1.44 psig
c. ADS Timer	$\leq$ 105 seconds	$\leq$ 117 seconds
d. Reactor Vessel Water Level-Low, Level 3	$\geq$ 11.4 inches*	$\geq$ 10.8 inches
e. LPCI Pump B and C Discharge Pressure-High	125 psig, increasing	115-135 psig, increasing
f. Manual Initiation	NA	NA
C. DIVISION 3 TRIP SYSTEM		
1. HPCS SYSTEM		
a. Reactor Vessel Water Level - Low Low, Level 2	$\geq$-41.6 inches*	$\geq$-43.8 inches
b. Drywell Pressure - High	$\leq$ 1.39 psig	$\leq$ 1.44 psig
c. Reactor Vessel Water Level - High, Level 8	$\leq$ 53.5 inches*	$\leq$ 55.7 inches
d. Condensate Storage Tank Level - Low	$\geq$ 0 inches	$\geq$ -3 inches
e. Suppression Pool Water Level - High	$\leq$ 5.9 inches	$\leq$ 7.0 inches
f. Manual Initiation	NA	NA

TABLE 3.3-2 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
D. LOSS OF POWER		
1. Division 1 and 2		
a. 4.16 kV Bus Undervoltage (Loss of Voltage)	1. 4.16 kV Basis 2912 volts	2912 +0, -291 volts
	2. 120 volt Basis 83.2 volts	83.2 +0, -8.3 volts
	3. Time Delay 0.5 seconds	0.5 +0.5, -0.1 seconds
b. 4.16 kV Bus Undervoltage (BOP Load Shed)	1. 4.16 kV Basis 3328 volts	3328 +0, -167 volts
	2. 120 volt Basis 95.1 volts	95.1 +0, -4.8 volts
	3. Time delay 0.5 seconds	0.5 +0.5, -0.1 seconds
c. 4.16 kV Bus Undervoltage (Degraded Voltage)	1. 4.16 kV Basis 3744 volts	3744 +93.6, -0 volts
	2. 120 volt Basis 107 volts	107 +2.7, -0 volts
	3. Time Delay 9.0 seconds	9.0 ± 0.5 seconds
2. Division 3		
a. 4.16 kV Bus Undervoltage (Loss of Voltage)	1. 4.16 kV Basis 3045 volts	3045 ± 51 volts
	2. 120 volt Basis 87 volts	87 ± 1.7 volts
	3. Time Delay 2.3 seconds	2.3 + 0.2, -0.3 seconds

*See Bases Figure B 3/4 3-1.

TABLE 3.3.3-3

EMERGENCY CORE COOLING SYSTEM RESPONSE TIMES (SECONDS)

1.	LOW PRESSURE CORE SPRAY SYSTEM	$\leq$ 40
2.	LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM PUMPS A, B AND C	$\leq$ 40
3.	AUTOMATIC DEPRESSURIZATION SYSTEM	NA
4.	HIGH PRESSURE CORE SPRAY SYSTEM	$\leq$ 27
5.	LOSS OF POWER	NA

TABLE 4.3.

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
A. DIVISION I TRIP SYSTEM				
1. RHR-A (LPCI MODE) AND LPCS SYSTEM				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M	R(a)	1, 2, 3, 4*, 5*
b. Drywell Pressure - High	S	M	R(a)	1, 2, 3
c. LPCI Pump A Start Time Delay Relay	NA	M(b)	Q	1, 2, 3, 4*, 5*
d. Manual Initiation	NA	R(b)	Q	1, 2, 3, 4*, 5*
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "A"#				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M	R(a)	1, 2, 3
b. Drywell Pressure-High	S	M	R(a)	1, 2, 3
c. ADS Timer	NA	M	Q	1, 2, 3
d. Reactor Vessel Water Level - Low, Level 3	S	M	R(a)	1, 2, 3
e. LPCS Pump Discharge Pressure-High	S	M	R(a)	1, 2, 3
f. LPCI Pump A Discharge Pressure-High	S	M	R(a)	1, 2, 3
g. Manual Initiation	NA	R(b)	NA	1, 2, 3
B. DIVISION 2 TRIP SYSTEM				
1. RHR B AND C (LPCI MODE)				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M	R(a)	1, 2, 3, 4*, 5*
b. Drywell Pressure - High	S	M	R(a)	1, 2, 3
c. LPCI Pump B Start Time Delay Relay	NA	M(b)	Q	1, 2, 3, 4*, 5*
d. Manual Initiation	NA	R(b)	Q	1, 2, 3, 4*, 5*

TABLE 4.3.[illegible] (Continued)
EMERGENCY CORE COOLING SYSTEM ACTUATION [illegible]RUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
B. DIVISION 2 TRIP SYSTEM (Continued)				
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "B"#				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M	R(a)	1, 2, 3
b. Drywell Pressure-High	S	M	R(a)	1, 2, 3
c. ADS Timer	NA	M	Q	1, 2, 3
d. Reactor Vessel Water Level - Low, Level 3	S	M	R(a)	1, 2, 3
e. LPCI Pump B and C Discharge Pressure-High	S	M	R(a)	1, 2, 3
f. Manual Initiation	NA	R(b)	NA	1, 2, 3
C. DIVISION 3 TRIP SYSTEM				
1. HPCS SYSTEM				
a. Reactor Vessel Water Level - Low Low, Level 2	S	M	R(a)	1, 2, 3, 4*, 5*
b. Drywell Pressure-High##	S	M	R(a)	1, 2, 3
c. Reactor Vessel Water Level-High, Level 8	S	M	R(a)	1, 2, 3, 4*, 5*
d. Condensate Storage Tank Level - Low	S	M	R(a)	1, 2, 3, 4*, 5*
e. Suppression Pool Water Level - High	S	M	R(a)	1, 2, 3, 4*, 5*
f. Manual Initiation##	NA	R(b)	NA	1, 2, 3, 4*, 5*
D. LOSS OF POWER				
1. Division 1 and 2				
a. 4.16 kV Bus Undervoltage (Loss of Voltage)	NA	M(e)	R	1, 2, 3, 4**, 5**
b. 4.16 kV Bus Undervoltage (BOP Load Shed)	NA	M(e)	R	1, 2, 3, 4**, 5**
c. 4.16 kV Bus Undervoltage (Degraded Voltage)	NA	M(e)	R	1, 2, 3, 4**, 5**
2. Division 3				
a. 4.16 kV Bus Undervoltage (Loss of Voltage)	NA	NA	R	1, 2, 3, 4**, 5**

TABLE 4.3.3.1-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

NOTATION

\# Not required to be OPERABLE when reactor steam dome pressure is less than or equal to 135 psig.

Prior to STARTUP following the first refueling outage, the injection function of Drywell Pressure - High and Manual Initiation are not required to be OPERABLE with indicated reactor vessel water level on the wide range instrument greater than Level 8 setpoint coincident with the reactor pressure less than 600 psig.

* Applicable when the system is required to be OPERABLE per Specification 3.5.2 or 3.5.3.

** Required when ESF equipment is required to be OPERABLE.

(a) Calibrate trip unit at least once per 31 days.

(b) Manual initiation switches shall be tested at least once per 18 months during shutdown. All other circuitry associated with manual initiation shall receive a CHANNEL FUNCTIONAL TEST at least once per 31 days as a part of circuitry required to be tested for automatic system actuation.

(c) DELETED

(d) DELETED

( ) Functional Testing of Time Delay Not Required

UNCONTROLLED

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

PLANT PROCEDURES MANUAL

WNP-2

PROCEDURE NUMBER	APPROVED	DATE
*7.4.3.3.1.67	GW Baker	12/02/88

VOLUME NAME
7 SURVEILLANCE PROCDURES

SECTION
7.4.3 INSTRUMENTATION (ECCS ACTUATION)

TITLE
*7.4.3.3.1.67 4.16 KV EMERGENCY BUS DEGRADED UNDERVOLTAGE (SM7) - CFT

E. P. NUMBER	SETPOINT	ALLOWABLE VALUE	MANUFACTURER	MODEL
E-RLY-27/7-3	106.7V	103.8V ± 6V	ITE	27N
E-RLY-27/7-4	106.7V	103.8V ± 6V	ITE	27N
E-RLY-27/7-5	106.7V	103.8V ± 6V	ITE	27N

Task #_____ Permission To Perform Test _____ Date _____ Time _____
Shift Manager

Test Performed By _____

_____

Test Satisfactory |____| Yes |____| No _____
Signoff

NCR Issued |____| Yes |____| No NCR # _____

Procedure Completed _____ Date _____ Time _____
Shift Manager

Assigned Reviewer _____ Date _____

Comment: _____

_____

_____

7.4.3.3.1.67.1 Purpose

The purpose of this procedure is to provide instructions to test the setpoints of the secondary undervoltage relays and to verify their functional capabilities. This procedure accomplishes the surveillance requirements of Technical Specification 4.3.3.1.

7.4.3.3.1.67.2 Prerequisites

A. Obtain permission and signature from the Shift Manager before starting this test.

B. Coordinate all testing with responsible Control Room Operator.

C. Notify the Control Room Operator that Annunciator P800-C1 Drop 2-4 (Bus 7 Degraded Undervoltage) will alarm during the performance of this test.

7.4.3.3.1.67.3 Limitations

A. All discrepancies encountered during this test shall be noted and reported to your immediate supervisor and the Shift Manager and perform an evaluation per PPM 1.3.12.

B. Any temporary use of jumpers or lead lifting is to be performed in accordance with PPM 1.3.9.

C. During performance of this procedure it should be noted that all steps preceded by a .# sign denote a Technical Specifications requirement. Failure to meet the acceptance criteria on these items requires immediate referral to the Shift Manager.

7.4.3.3.1.67.4 Precautions

A. Care should be taken to slowly vary the voltage when testing these relays.

B. Dangerous voltages are exposed when the relay is uncovered.

C. Do not attempt to manually operate the target vanes on these relays. Although the targets return their indication under shock, they can be damaged by manual operation with a pencil or pointed object.

7.4.3.3.1.67.5 Special Test Equipment

A. Certified Test Equipment

NOTE: Make certain the calibration date is current.

1. Fluke AC/DC Differential Voltmeter, Model 887AB (or equivalent)
2. Dranetz Polymeter (or equivalent)
3. Fluke 8060A Digital AC Voltmeter (or equivalent)

B. Other

1. (2 ea) 25 Kilohm Rheostats (or equivalent)
2. (2 ea) 120 Volt AC Variac (or equivalent)
3. Single Pole Snap Action Switch
4. Modified Extender Card and Relay Support Piece
5. DC Power Supply
6. Fine Adj. XFMR for Variac
7. Ohmmeter
8. Precision Regulated AC Power Supply Powertron 500S (or equivalent)
9. Stabiline Voltage Regulator SURS88101CU (or equivalent)

7.4.3.3.1.67.6 Reference

A. NRC Inspection Report 84-18, Dated 01/27/84, Item 84-18-03 (This concerns "Secondary Verification" of jumper removal.) (A)

7.4.3.3.1.67.7 Procedure

NOTE: All steps in the body of this procedure must be completed and initialed.

NOTE: The Data Sheet attached should be filled out as noted in the procedure and a copy of the completed Data Sheet placed in the Electrical Shop Relay Data File. This procedure is to be retained in the permanent Plant File.

A. Set Up

NOTE: Relays 27/7-3, 27/7-4 and 27/7-5 and test switch 7TS involved with this procedure are located at SM-7, Cubicle No. 10.

Step 1) Open door of Cubicle No. 10. _____

Step 2) Set multimeter on 250 VDC scale. Place the + meter lead on Terminal 11 of Relay 27/7-3 and the - meter lead to GND. Verify voltage to relay (approximately 60 VDC). _____

Step 3) Place the + meter lead on Terminal 15 and - meter lead to GND. Verify voltage to relay (approximately 60 VDC). _____

Step 4) Place the + meter lead on Terminal 12 and the - meter lead to GND. Verify voltage less than 10 volts. _____

Step 5) Place the + meter lead on Terminal 14 and the - meter lead to GND. Verify voltage less than 10 volts. _____

Step 6) Place the + meter lead on Terminal 11 of Relay 27/7-4 and the - meter lead to GND. Verify voltage to relay (approximately 60 VDC). _____

Step 7) Place the + meter lead on Terminal 15 and the - meter lead to GND. Verify voltage to relay (approximately 60 VDC). _____

Step 8) Place the + meter lead on Terminal 12 and the - meter lead to GND. Verify voltage less than 10 volts. _____

Step 9) Place the + meter lead on Terminal 14 and the - meter lead to GND. Verify voltage less than 10 volts. _____

Step 10) Place the + meter lead on Terminal 11 of Relay 27/7-5 and the - meter lead to GND. Verify voltage to relay (approximately 60 VDC). _____

Step 11) Place the + meter lead on Terminal 15 and the - meter lead to GND. Verify voltage to relay (approximately 60 VDC). _____

Step 12) Place the + meter lead on Terminal 12 and the - meter lead to GND. Verify voltage less than 10 volts. _____

Step 13) Place the + meter lead on Terminal 14 and the - meter lead to GND. Verify voltage less than 10 volts. _____

B. <u>As Found for Relay 27/7/3</u>

Step 1) Cut lead wire/lead seal from Relay E-RLY-27/7/3 cover, loosen screws and remove. _____

Step 2) Place the test switch 7TS in the 27/7/3 position. _____

Step 3) Remove Relay E-RLY-27/7/3 by pulling gently on the bottom of the relay with pulling knobs. _____

<u>NOTE</u>: This test may be performed in the field or on the test bench. The case referred to may be the installed case or a spare 27N case.

Step 4) For testing with a spare case, verify that the resistor (5K) is installed between Terminals 1 and 9 on the back of the relay case. N/A this step for field testing. _____

Step 5) Insert extender card into relay case. _____

Step 6) Attach support bracket to relay case. _____

Step 7) Plug relay into extender card. _____

Step 8) Connect relay to test equipment for voltage pickup and dropout tests per Attachment A, adjusting both 25K ohm pots for maximum resistance. _____

Step 9) Verify that 125 V D-C is present on relay extender card Terminals 3 and 4. _____

Step 10) Set up the differential voltmeter as follows:

Mode Switch: AC
Range Switch: 1000
Null Switch: 1
Range Dials: 107.800 _____

NOTE: The differential voltmeter will read 107.800 volts at center scale and (-) 1 volt left, (+) 1 volt right.

Step 11) Close switch "A" and using the A-C digital voltmeter (DMV), increase voltage by adjusting the coarse and fine variacs to approximately 106 volts. Slowly increase the voltage until the differential voltmeter shows indication. Monitoring the differential voltmeter and the relay trip indicating light, increase the voltage in small increments (with pauses in-between) until the light goes OFF. Record the differential voltmeter reading "As Found" on the data sheet. _____

#Step 12) Set the differential voltmeter range dials for 106.700 volts and using the A-C DVM, adjust for approximately 109 volts. Slowly decrease the voltage until the differential voltmeter shows indication. Monitoring the differential voltmeter and the relay trip light, slowly decrease the voltage in small increments (with pauses in-between) until the trip light comes on. Record the differential voltmeter readings "As Found" on the data sheet. #_____

Step 13) Close switch "A" and set the voltage output of the transformer to 100% of relay operating voltage (120 volts) by adjusting the coarse and fine variacs. _____

Step 14) Open switch "A" and set the voltage across the relay coil to 50% of the operating voltage (60 volts) by adjusting the 25K ohm rheostats (pots). _____

Step 15) Close switch "A" on the timer start circuit. This puts 100% voltage on the relay and sets the circuit. _____

Step 16) Reset timer. _____

Step 17) Open switch "A" on the timer start circuit. Record "As Found" time from Dranetz on the data sheet. _____

Step 18) Remove AC and DC voltages from relay. _____

Step 19) Disconnect test wiring from relay. _____

Step 20) Remove relay from extender card. _____

Step 21) Remove support bracket. _____

Step 22) Remove extender card. _____

Step 23) Install Relay 27/7/3 in case and replace cover and seal with a lead seal. _____

Step 24) Place test switch in the "OFF" position. _____

Step 25) Reset target. _____

C. <u>As Found for Relay 27/7/4</u>

Step 1) Cut lead wire/lead seal from Relay E-RLY-27/7/4 cover, loosen screws and remove. _____

Step 2) Place the test switch 7TS in the 27/7/4 position. _____

Step 3) Remove Relay E-RLY-27/7/4 by pulling gently on the bottom of the relay with pulling knobs. _____

<u>NOTE</u>: This test may be performed in the field or on the test bench: The case referred to may be the installed case or a spare 27N case.

Step 4) For testing with a spare case, verify that the resistor (5K) is installed between Terminals 1 and 9 on the back of the relay case. N/A this step for field testing. _____

Step 5) Insert extender card into relay case. _____

Step 6) Attach support bracket to relay case. _____

Step 7) Plug relay into extender card. _____

Step 8) Connect relay to test equipment for voltage pickup and dropout tests per Attachment A, adjusting both 25K ohm pots for maximum resistance. _____

Step 9) Verify that 125 V D-C is present on relay extender card Terminals 3 and 4. _____

Step 10) Set up the differential voltmeter as follows:

Mode Switch:	AC
Range Switch:	1000
Null Switch:	1
Range Dials:	107.800

_____

NOTE: The differential voltmeter will read 107.800 volts at center scale and (-) 1 volt left, (+) 1 volt right.

Step 11) Close switch "A" and using the A-C digital voltmeter (DMV), increase voltage by adjusting the coarse and fine variacs to approximately 106 volts. Slowly increase the voltage until the differential voltmeter shows indication. Monitoring the differential voltmeter and the relay trip indicating light, increase the voltage in small increments (with pauses in-between) until the light goes OFF. Record the differential voltmeter reading "As Found" on the data sheet. _____

#Step 12) Set the differential voltmeter range dials for 106.700 volts and using the A-C DVM, adjust for approximately 109 volts. Slowly decrease the voltage until the differential voltmeter shows indication. Monitoring the differential voltmeter and the relay trip light, slowly decrease the voltage in small increments (with pauses in-between) until the trip light comes on. Record the differential voltmeter readings "As Found" on the data sheet. #_____

Step 13) Close switch "A" and set the voltage output of the transformer to 100% of relay operating voltage (120 volts) by adjusting the coarse and fine variacs. _____

Step 14) Open switch "A" and set the voltage across the relay coil to 50% of the operating voltage (60 volts) by adjusting the 25K ohm rheostats (pots). _____

Step 15) Close switch "A" on the timer start circuit. This puts 100% voltage on the relay and sets the circuit. _____

Step 16) Reset timer. _____

Step 17) Open switch "A" on the timer start circuit. Record "As Found" time from Dranetz on the data sheet. _____

Step 18) Remove AC and DC voltages from relay. _____

Step 19) Disconnect test wiring from relay. _____

Step 20) Remove relay from extender card. _____

Step 21) Remove support bracket. _____

Step 22) Remove extender card. _____

Step 23) Install Relay 27/7/4 in case and replace cover and seal with a lead seal. _____

Step 24) Place test switch in the "OFF" position. _____

Step 25) Reset target. _____

D. <u>As Found for Relay 27/7/5</u>

Step 1) Cut lead wire/lead seal from Relay E-RLY-27/7/5 cover, loosen screws and remove. _____

Step 2) Place the test switch 7TS in the 27/7/5 position. _____

Step 3) Remove Relay E-RLY-27/7/5 by pulling gently on the bottom of the relay with pulling knobs. _____

NOTE: This test may be performed in the field or on the test bench. The case referred to may be the installed case or a spare 27N case.

Step 4) For testing with a spare case, verify that the resistor (5K) is installed between Terminals 1 and 9 on the back of the relay case. N/A this step for field testing. _____

Step 5) Insert extender card into relay case. _____

Step 6) Attach support bracket to relay case. _____

Step 7) Plug relay into extender card. _____

Step 8) Connect relay to test equipment for voltage pickup and dropout tests per Attachment A, adjusting both 25K ohm pots for maximum resistance. _____

Step 9) Verify that 125 V D-C is present on relay extender card Terminals 3 and 4. _____

Step 10) Set up the differential voltmeter as follows:

Mode Switch:	AC
Range Switch:	1000
Null Switch:	1
Range Dials:	107.800

_____

NOTE: The differential voltmeter will read 107.800 volts at center scale and (-) 1 volt left, (+) 1 volt right.

Step 11) Close switch "A" and using the A-C digital voltmeter (DMV), increase voltage by adjusting the coarse and fine variacs to approximately 106 volts. Slowly increase the voltage until the differential voltmeter shows indication. Monitoring the differential voltmeter and the relay trip indicating light, increase the voltage in small increments (with pauses in-between) until the light goes OFF. Record the differential voltmeter reading "As Found" on the data sheet. _____

#Step 12) Set the differential voltmeter range dials for 106.700 volts and using the A-C DVM, adjust for approximately 109 volts. Slowly decrease the voltage until the differential voltmeter shows indication. Monitoring the differential voltmeter and the relay trip light, slowly decrease the voltage in small increments (with pauses in-between) until the trip light comes on. Record the differential voltmeter readings "As Found" on the data sheet. #_____

Step 13) Close switch "A" and set the voltage output of the transformer to 100% of relay operating voltage (120 volts) by adjusting the coarse and fine variacs. _____

Step 14) Open switch "A" and set the voltage across the relay coil to 50% of the operating voltage (60 volts) by adjusting the 25K ohm rheostats (pots). _____

Step 15) Close switch "A" on the timer start circuit. This puts 100% voltage on the relay and sets the circuit. _____

Step 16) Reset timer. _____

Step 17) Open switch "A" on the timer start circuit. Record "As Found" time from Dranetz on the data sheet. _____

Step 18) Remove AC and DC voltages from relay. _____

Step 19) Disconnect test wiring from relay. _____

Step 20) Remove relay from extender card. _____

Step 21) Remove support bracket. _____

Step 22) Remove extender card. _____

Step 23) Install Relay 27/7/5 in case and replace cover and seal with a lead seal. _____

Step 24) Place test switch in the "OFF" position. _____

Step 25) Reset target. _____

E. Test E-RLY-27/7-3

NOTE: The following steps demonstrate correct functioning of the relay. Two contacts are to be checked, 11 and 12, and 14 and 15. There will be voltages to these contacts until the test switch 7TS is moved from the OFF position. The test switch should be moved to the correct position as identified, 27/7-3, and meter leads placed across contact to be tested before 5 seconds time has elapsed.

CAUTION: Multimeter should not be connected to relay contacts prior to switch 7TS being placed in 27/7-3 position. Voltage is present and placement of meter leads could cause inadvertent trip or fuses to blow.

Step 1) Place the multimeter on OHMS, RX1 scale. _____

#Step 2) Place test switch 7TS in the 27/7-3 position. Place meter test leads across Terminals 11 and 12 and verify contact closure. _____

NOTE: Contact should close approximately five seconds after test switch 7TS is placed in 27/7-3 position.

Step 3) Verify the target drops on relay. _____

Step 4) Remove test leads from Terminals 11 and 12 of 27/7-3 Relay. _____

Step 5) Place test switch 7TS in OFF position. _____

#Step 6) Place test switch 7TS in the 27/7-3 position. Place meter test leads across Terminals 14 and 15 and verify contact closure. _____

NOTE: Contact should close approximately five seconds after test switch 7TS is placed in 27/7-3 position.

Step 7) Remove test leads from Terminals 14 and 15 of of 27/7-3 relay. _____

Step 8) Place test switch 7TS in OFF position. _____

Step 9) Reset target on relay. _____

F. Test E-RLY-27/7-4

NOTE: The following steps demonstrate correct functioning of the relay. Two contacts are to be checked, 11 and 12, and 14 and 15. There will be voltages to these contacts until the test switch 7TS is moved from the OFF position. The test switch should be moved to the correct position as identified, 27/7-4, and meter leads placed across contact to be tested before 5 seconds time has elapsed.

CAUTION: Multimeter should not be connected to relay contacts prior to switch 7TS being placed in 27/7-4 position. Voltage is present and placement of meter leads could cause inadvertent trip or fuses to blow.

Step 1) Place the multimeter on OHMS, RX1 scale. _____

#Step 2) Place test switch 7TS in the 27/7-4 position. Place meter test leads across Terminals 11 and 12 and verify contact closure. _____

NOTE: Contact should close aproximately five seconds after test switch 7TS is placed in 27/7-4 position.

Step 3) Verify the target drops on relay. _____

Step 4) Remove test leads from Terminals 11 and 12 of 27/7-4 Relay. _____

Step 5) Place test switch 7TS in OFF position. _____

#Step 6) Place test switch 7TS in the 27/7-4 position. Place meter test leads across Terminals 14 and 15 and verify contact closure. _____

NOTE: Contacts should close approximately five seconds after test switch 7TS is placed in 27/7-4 position.

Step 7) Remove test leads from Terminals 14 and 15 of of 27/7-4 relay. _____

Step 8) Place test switch 7TS in OFF position. _____

Step 9) Reset target on relay. _____

G. Test E-RLY-27/7-5

NOTE: The following steps demonstrate correct functioning of the relay. Two contacts are to be checked, 11 and 12, and 14 and 15. There will be voltages to these contacts until the test switch 7TS is moved from the OFF position. The test switch should be moved to the correct position as identified, 27/7-5, and meter leads placed across contact to be tested before 5 seconds time has elapsed.

CAUTION: Multimeter should not be connected to relay contacts prior to switch 7TS being placed in 27/7-5 position. Voltage is present and placement of meter leads could cause inadvertent trip or fuses to blow.

Step 1) Place the multimeter on OHMS, RX1 scale. _____

#Step 2) Place test switch 7TS in the 27/7-5 position. Place meter test leads across Terminals 11 and 12 and verify contact closure. _____

NOTE: Contact should close aproximately five seconds after test switch 7TS is placed in 27/7-5 position.

Step 3) Verify the target drops on relay. _____

Step 4) Remove test leads from Terminals 11 and 12 of 27/7-5 relay. _____

Step 5) Place test switch 7TS in OFF position. _____

#Step 6) Place test switch 7TS in the 27/7-5 position. Place meter test leads across Terminals 14 and 15 and verify contact closure. _____

NOTE: Contact should close approximately five seconds after test switch 7TS is placed in 27/7-5 position.

Step 7) Remove test leads from Terminals 14 and 15 of of 27/7-5 relay. _____

Step 8) Place test switch 7TS in OFF position. _____

Step 9) Reset target on relay. _____

H. Restoration

Step 1) Obtain independent verification that test switch 7TS is in the OFF position.

Verified _____

Independent Verification _____

Step 2) Close Switchgear Cubicle door. _____

Step 3) Verify Annunciator P800-C1 Drop 2-4 is reset. _____

Step 4) Notify Control Room that testing is complete. _____

Step 5) Verify that "As Found" values on Attachment B are within the Administrative Values shown on Attachment E. If so, NA Step 6. If any value is outside the Administrative Value, NA this step. _____

NOTE: If dropout voltage is outside the allowable value of 103.8 ± 6 V, notify the Shift Manager and prepare a PDR/NCR as required.

Step 6) Notify your immediate supervisor that calibration of this relay must be performed per 7.4.3.3.1.75. Note in Comment section of cover sheet. _____

Step 7) Verify that "As Found" values on Attachment C are within the Administrative Values shown on Attachment E. If so, NA Step 8. If any value is outside the Administrative Value, NA this step. _____

NOTE: If dropout voltage is outside the allowable value of 103.8 ± 6 V, notify the Shift Manager and prepare a PDR/NCR as required.

Step 8) Notify your immediate supervisor that calibration of this relay must be performed per 7.4.3.3.1.66. Note in Comment section of cover sheet. _____

Step 9) Verify that "As Found" values on Attachment D are within the Administrative Values shown on Attachment E. If so, NA Step 10. If any value is outside the Administrative Value, NA this step. _____

NOTE: If dropout voltage is outside the allowable value of 103.8 ± 6 V, notify the Shift Manager and prepare a PDR/NCR as required.

Step 10) Notify your immediate supervisor that calibration of this relay must be performed per 7.4.3.3.1.74. Note in Comment section of cover sheet. _____

7.4.3.3.1.67.8 Acceptance Criteria

The acceptance criteria for this procedure is that all steps have been completed and initialed.

7.4.3.3.1.67.9 Documentation

This completed test procedure shall be placed in the permanent Plant file in accordance with the 1.6 Series of the Plant Administrative Procedures.

7.4.3.3.1.67.10 Attachments

A. Undervoltage Relay Test Hookup

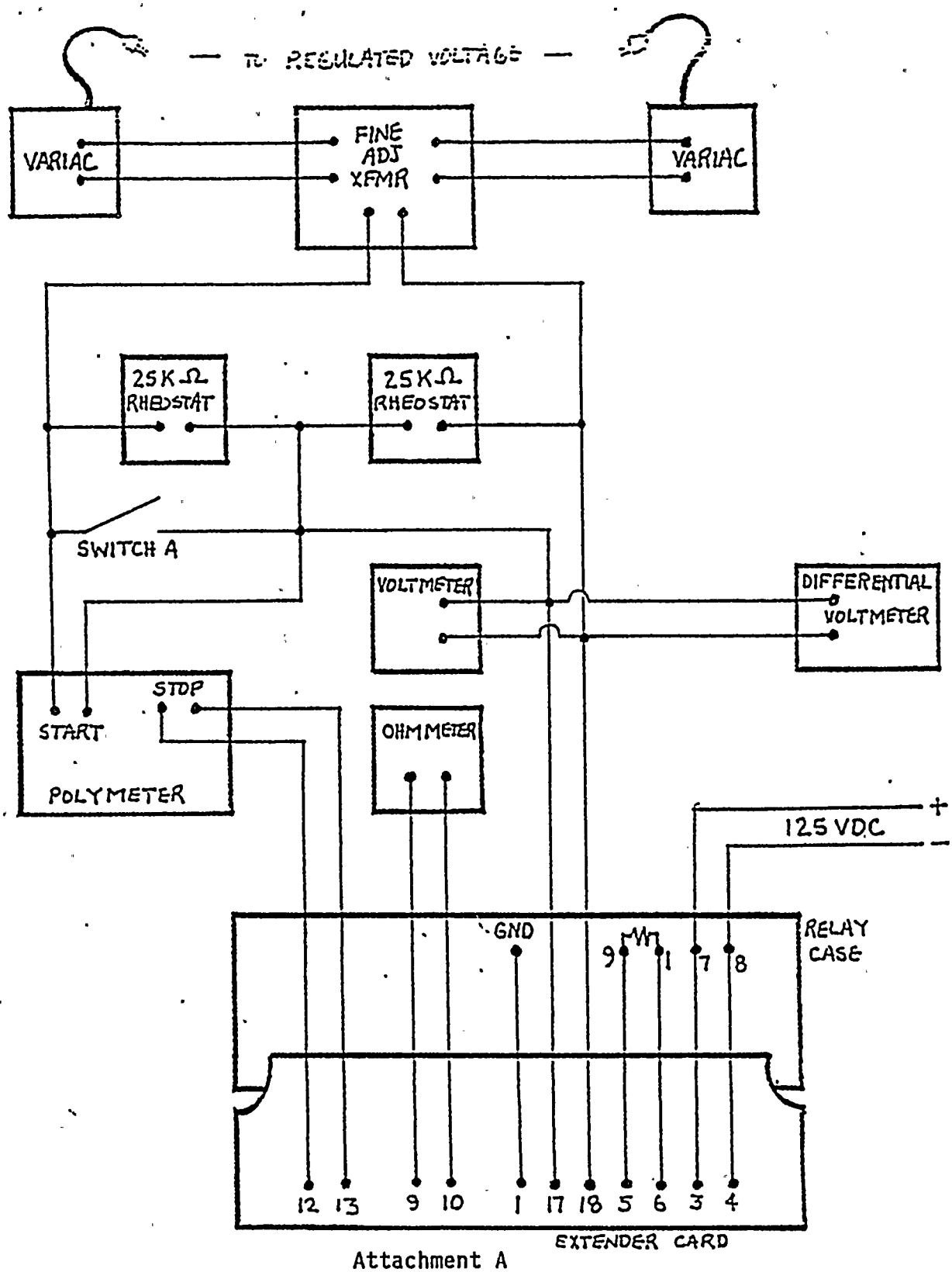
B. Data Sheet for E-RLY-27/7/3

C. Data Sheet for E-RLY-27/7/4

D. Data Sheet for E-RLY-27/7/5

E. Undervoltage Relay Setpoints

UNDERVOLTAGE RELAY TEST HOOKUP



Attachment A

DATA SHEET FOR E-RLY-27/7/3

EQUIPMENT	E-RLY-27/7/3	RELAY NO.	223

UNDERVOLTAGE

PICKUP TAP 110	DROPOUT TAP 99%		TIME TAP 4		
	REQUIRED		AS FOUND		
PICKUP	107.8 V				
DROPOUT	106.7 V				

INITIALS	DATE

TIME-VOLTAGE CHECK

CHECK	START VOLTAGE	FAULT VOLTAGE	REQUIRED TIME		AS FOUND		
1	120	60	5 SEC				
2							

INITIALS	DATE

TEST EQ NO.	CAL DUE DATE	COMMENTS

968-21682 PAGE 2

DATA SHEET FOR E-RLY-27/7/4

EQUIPMENT	E-RLY-27/7/4	RELAY NO.	407

UNDERVOLTAGE

PICKUP TAP 110	DROPOUT TAP 99%		TIME TAP 4		
	REQUIRED		AS FOUND		
PICKUP	107.8 V				
DROPOUT	106.7 V				

INITIALS	DATE

TIME-VOLTAGE CHECK

CHECK	START VOLTAGE	FAULT VOLTAGE	REQUIRED TIME		AS FOUND		
1	120	60	5 SEC.				
2							

INITIALS	DATE

TEST EQ NO.	CAL DUE DATE	COMMENTS

968-21662 PAGE 2

Attachment C

DATA SHEET FOR E-RLY-27/7/5

EQUIPMENT	E-RLY-27/7/5	RELAY NO.	408

UNDERVOLTAGE					
PICKUP TAP 110	DROPOUT TAP 99%		TIME TAP 4		
	REQUIRED		AS FOUND		
PICKUP	107.8 V				
DROPOUT	106.7 V				
			INITIALS	DATE	

TIME-VOLTAGE CHECK							
CHECK	START VOLTAGE	FAULT VOLTAGE	REQUIRED TIME		AS FOUND		
1	120	60	5 SEC				
2							
				INITIALS	DATE		

TEST EQ NO.	CAL DUE DATE	COMMENTS

968-21662 PAGE 2

UNDERVOLTAGE RELAY SETPOINTS

	SETPOINT	ADMINISTRATIVE VALUE	ALLOWABLE VALUE
PICKUP	107.8 ± .25 V	≥106.7 V ≤109.8 V	———
DROPOUT	106.7 ± .25 V	≥105.6 V ≤108.7 V	103.8 ± 6 V +
TIME	5 ± .1 SEC	5 ± .22 SEC	5 ± .3 SEC

+ NOTE: Current calculations indicate a minimum acceptable value of 105.6 V.

INTERNAL DISTRIBUTION

GK Afflerbach-927H
JP Cooper-913E
WP Gilles-994E
RE Green-994E
LT Harrold/LB-901A
BA Holmberg-994E
JD Martin-927H
TL Meade-927S
CR Noyes-994E
PL Powell-956B
PK Shen-580
JG Tellefson-901A
RJ Barbee-927S

WHP-2 Files-917Y
kt/file-994E
WPG/LB
CRN/LB
PLP/LB
TLM/LB

THIS LETTER SATISFIES COMMITMENT NO. _____

THIS LETTER (DOES) (DOES NOT) ESTABLISH A NEW COMMITMENT.

WPGE CORRESPONDENCE NO. _____

September 27, 1983
WPGE-2-83-425

Mr. F. A. MacLean
Project Manager
General Electric Company
Mail Code 394
175 Curtner Avenue
San Jose, CA 95125

Subject: NUCLEAR PROJECT NO. 2
SECOND LEVEL UNDERVOLTAGE PROTECTION
FOR DIVISION 3

Reference: BRGE-RO-2-82-589

The General Electric (GE) design (FDI-TCKZ) for second level undervoltage protection of the Division 3 (HPCS) Diesel Generator bus does not meet all the NRC requirements listed by Burns and Roe in the reference. The unacceptability of this design was further demonstrated when the Power Systems Branch Lead Reviewer rejected the design. Specifically, he reaffirmed the requirement for coincident logic detection of undervoltage.

Your Messrs. R. Nevala and R. Clark developed a design which overcame the deficiency. Our Mr. T. Meade concurred with the design. This design which provides two-out-of-two coincidence was reviewed over the phone with our Lead Reviewer and his verbal concurrence was given. A hard copy of the design was hand-delivered to NRC on August 30. Response from the Lead Reviewer indicates that both primary and second level undervoltage designs are acceptable from a coincidence and testability standpoint.

AUTHOR: WP Gilles			FOR SIGNATURE OF: LT Harrold		
SECTION					
FOR APPROVAL OF	CR Noyes	BA Holmberg	JG Tellefson	PL Powell	TL Meade
APPROVED					
DATE	9/16/83	9/15/83	9/16/83	9/19/83	9/19/83

Concurrent with the implementation of this new design, the Supply System will, in the interest of schedule, purchase the Agastat time delay relays.

If you have any questions on this matter, please contact Mr. W. P. Gilles, extension 2921.

L. T. Harrold (901A)
Assistant Director, WNP-2 Engineering

WPG:kjt

cc: Mr. W. S. Chin - BPA
Mr. A. I. Cygelman - B&R (981A)
Mr. H. H. Engelking - GE Site
Mr. J. A. Forrest - B&R RO
Mr. T. A. Mangelsdorf - BPC (982D)
Mr. N. Powell - BPC (906D)
Mr. J. J. Verderber - B&R NY