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MIDDLE SOUTH UTILITIES SYSTEM

July 21, 1983

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Director of Nuclear Reactor Regulation
Attention: Mr. G. W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUBJECT: Waterford SES Unit 3
Docket No. 50-382
Engineered Safety Features Actuation System (ESFAS)
Surveillance Requirements

Reference: Letter dated May 10, 1983, from G. W. Knighton to L. V. Maurin

Enclosure: (1) ESF subgroup Relays not testable during reactor operation
(2) ESF subgroup Relays testable during reactor operation

Dear Sir:

In your referenced letter you requested LP&L to review the Waterford 3 ESFAS testing commitments against the provisions of IEEE-338 and Regulatory Guide 1.22. Specifically, you asked that we provide a list of any ESFAS actuation devices, and actuated equipment associated with each, that cannot be tested during plant operation.

The ESFAS at Waterford 3 is essentially the same as that used at San Onofre Units 2 and 3, however, the assignment and grouping of actuated equipment to specific subgroup relays varies. The system complies with General Design Criterion 21 in that the protection system as defined by IEEE Standard 279-1971 and Regulatory Guide 1.22 is designed to permit testing (up to the input to the actuation devices) with the reactor in operation. A few subgroup relays (actuation devices per Regulatory Guide 1.22) however, cannot be tested without adverse consequences for plant safety and/or operability, and therefore do not fully comply with the provisions of Regulatory Guide 1.22 and IEEE Standard 338. Sections 7.3.1.1.1.9 and 7.3.2.1.2 (item 4.10) of the Waterford FSAR will be revised to indicate the extent of compliance with the standards. FSAR section 7.3.2.13 currently specifies that these standards provide testing guidance and that actuated devices which are not tested during reactor operation will be tested during reactor shutdown.

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Enclosed please find two tables: 1) a listing of those ESF subgroup relays that are not testable during reactor operation, and 2) a listing of ESF subgroup relays which are testable during reactor operation. The actuated equipment listed in Enclosure (1) cannot be operated during reactor operation without adverse and unwarranted impact on plant safety and/or operability. However, the equipment can be tested when the reactor is shut down and, in this respect, is in compliance with Regulatory Guide 1.22 and IEEE Standard 338. Appropriate justification for inclusion of each actuation device (subgroup relay) in this listing is contained in Enclosure (1).

FSAR section 7.3.1.1.1.9.6 describes the normal method for subgroup relay testing during reactor operation. During shutdown, alternate methods of relay testing may be used in order to combine relay testing with other required testing such as system/component functional testing, manual ESF Trips, Response Time Testing, and Integrated Diesel Generator Testing.

During at power Channel Functional Tests required by Technical Specification Table 4.3-2 [subgroup relay test, note (2)], the subgroup relays listed in Enclosure (2) are tested. The actuated equipment associated with each relay is in accordance with the Regulatory Guide 1.22 definition of Actuated Equipment, i.e. "A component or assembly of components that performs or directly contributes to the performance of a protective function...". The operability of the subgroup relays is normally demonstrated by verifying that the actuated equipment performs its intended function when the relay is de-energized (ESF signal present). However, in a few instances, placing the actuated equipment in either the post accident condition or the opposite condition in order to verify its change of state poses adverse safety and/or operational impact on the plant. For these cases, the actuated equipment is either prevented from operating or remains in its post accident condition in order to support normal plant operation, while the subgroup relay is tested. This is permissible under the provisions of Regulatory Guide 1.22 and the remarks in Enclosure (2) indicate the actuated equipment to which this applies.

We request that the actuation devices listed in Enclosure (1) be exempted from testing at power as required by Regulatory Guide 1.22. Should you have any questions or comments in this matter please contact Dennis Buschbaum at (504) 464-3395 or Mike Meisner at (504) 363-8938.

Very truly yours,

F. J. Drummond
Project Support Manager - Nuclear

FJD/DEB/MJM/ch

cc: W. M. Stevenson, E. L. Blake, J. Wilson (NRC), R. Stevens (NRC)
G. L. Constable (Resident Inspector)

ESF SUBGROUP RELAYS NOT TESTABLE

DURING REACTOR OPERATION

RELAY NO.	ACTUATED EQUIPMENT	REMARKS
Train A		
K 109 SIAS	Trip 3A32 Station Service Transformer feeder Breaker	This feature was provided to implement NUREG 0737 item II.E.3.1,Emergency Power Supply for pressurizer heaters. The feature sheds and locks out the heater bus on SIAS. The shedding feature is redundant to the under voltage trip of the breaker, and the lock out is an aid to the operator to avoid overloading the Diesel Generator by manually reloading the heaters on the Diesel Bus post LOCA. The 3A32 bus supplies the CEA Drive Motor Generator set in addition to the pressurizer heaters, and shut-down/restart of the MG requires realignment and synchronization of the redundant MG set. Operation with a single MG and the realignment unnecessarily increases the exposure to a reactor trip and subsequent transient.
K 202 CIAS	(a) Letdown Containment Isolation Valve 2CH-1518 A B	(a) Relay dropout causes isolation or securing of charging and letdown flow. This is considered an off-normal event due to the resulting thermal transient and stresses caused in the system piping, heat exchangers etc.

	Each stress cycle increases the probability of a letdown line break (analyzed LOCA) and also interrupts normal plant operation. Without charging and letdown, boration/dilution for reactivity control is not available; pressurizer level control to ensure proper plant pressure control is temporarily unavailable in the event of transients; chemistry control via the ion exchangers or chemical addition is unavailable; and the boronometer and process radition monitor are inoperable.
(b) RCP Bleedoff Containment Isolation Valve 2CH-F1512 A B and Component Cooling Water from RCP's Containment Isolation Valve 2CC-F243 A B	(b) Relay dropout produces detrimental affects to the RCP seals. Both CCW and bleedoff are necessary for proper seal cooling. In addition, bleedoff flow is necessary to ensure proper seal seating and staging to ensure the integrity of the Reactor Coolant Pressure Boundry. Industry experience indicates numerous seal failure or degradation problems; they should not be unnecessarily exposed to potentially damaging transients which raise the probability of RCS leakage or a LOCA, radioactivity release to containment then to the atmosphere and plant shutdowns.
(c) Instrument Air Containment Isolation Valve 2IA-F601 A B	(c) Relay dropout causes loss of instrument air inside containment which impacts the normal operation of numerous systems. Examples of systems impacted are the pressurizer spray valve, CCW cooling to the containment fan coolers, letdown

		and charging valves [see discussion in part (a)], and some containment isolation valves (fail shut on loss of air). Although many safety related applications are backed up by accumulators inside containment in the event of loss of instrument air, others necassary for normal plant operation are not and therefore cause a reduction in plant safety on loss of air.
	(d) Fire Water Containment Valve 2FP-F127	(d) Relay dropout causes unnecessary isolation of the fire water supply inside containment. This removes the protection of the sprinkler systems and hose stations inside containment.
K 305 MSIS	SG #1 Feedwater Isolation Valve 2FW-V823A SG #1 Main Steam Isolation Valve 2MS-V602A SG #1 Feedwater Control Valve 5FW-FM833 SG #1 Feedwater Control Bypass Valve 5FW-FM835	Relay dropout causes all valves to isolate and plant operation cannot continue. Severe plant transients and reactor trip would occur if these valves were isolated during power operation.
K 308 SIAS	Letdown Stop Valve 1 CH-F1516 A B	Same as K 202 (a)
K 313 MSIS	SG #2 Feedwater Isolation Valve 2FW-V824 B SG #2 Main Steam Isolation Valve 2MS-V604 B SG #2 Feedwater Control Valve 5FW-FM834 SG #2 Feedwater Control Bypass Valve 5FW-FM836	Same as K 305

ESF SUBGROUP RELAYS NOT TESTABLE

DURING REACTOR OPERATION

RELAY NO.	ACTUATED EQUPIPMENT	REMARKS
Train B		
K 109 SIAS	Trip 3B32 Station Service Transformer Feeder Breaker	Same as K 109 Train A for 3B32 Bus.
K 202 CIAS	Letdown Containment Isolation Valve 1CH-F2501 A B RCP Bleedoff Containment Isolation Valve 2CH-F1513 A B Component Cooling Water to RCP's containment Isolation Valve 2CC-F146 A B Component Cooling Water from RCP's Containment Isolation Valve 2CC-F146 A B Fire Water Containment Isolation Valve 2FP-F129	Same as K 202 Train A except item (c) does not apply.
K 301 SIAS	Boric Acid Tank A Gravity Feed Valve 3CH-V106 A (opens) Boric Acid Tank B Gravity Feed Valve 3CH-V107 B (opens) Volume Control Tank Discharge Valve 2CH-123 A B (shuts)	Relay dropout isolates the normal supply to the charging pumps (VCT) and aligns pump suction directly to the Boric Acid tanks. This would cause addition of concentrated boric acid to the Reactor Coolant System with severe reactor power transients resulting. The alternative is to secure charging and letdown but this also causes severe transients-see discussion for K 202 (a) Train A.

K 305 MSIS	Same as K 305 Train A	Same as K 305 Train A
K 308 SIAS	Letdown Containment Isolation Valve 1CH-F2501 A B	Same as K 202 (a) Train A
K 313 MSIS	Same as K 313 Train A	Same as K 313 Train A

A TRAIN SUBGROUP RELAYS TESTABLE DURING REACTOR OPERATION [B TRAIN]

RELAY NO.	ACTUATED EQUIPMENT	REMARKS
K 101 [K 101] SIAS	Containment Fan Cooler AH-1 (3A-SA) [3B-SB]	
	Containment Fan Cooler AH-1 (3C-SA) [3D-SD]	
	Containment Fan Cooler CCW Valves 2CC-F155A2 2CC-F159A2, 2CC-F154A1 2CC-F158A1, 3CC-TM148A [2CC-F157B2, 2CC-F161B2 2CC-F156B1, 2CC-F160B1 3CC-TM149B]	
	Containment Fan Cooler Discharge Damper D-69(SA) [D-70(SB)]	
K 102 [K 102] SIAS	HVAC Equipment Room Supply Fan AH-13(3A-SA) [3B-SB]	
	SBVS Fan E-17(3A-SA) [3B-SB]	
	CVAS Exhaust Fan E-23(3A-SA) [3B-SB]	
	CVAS Isolation Valve 3HV-B210A, 3HV-B216A 3HV-B218A, 3HV-B224A 3HV-B226A, [3HV-B215B 3HV-B217B, 3HV-B223B 3HV-B225B, 3HV-B227B]	
K 103 [K 103] SIAS	Control Room (CR) Emergency Filtration Fan S-8(3A-SA) [3B-SB]	
	Control Room Supply Fan AH-12(3A-SA) [3B-SB]	
	CR Toilet Exhaust Fan E-34(3A-SA) [3B-SB]	
	CR Toilet Exhaust Fan Isolation Valve 3HV-B177A [3HV-B178B]	

RELAY NO.	ACTUATED EQUIPMENT	REMARKS
	CR Toilet Exhaust Fan Bypass Damper D-18(SA) [SB]	
	CR Conference RM & Kitchen Exhaust Fan Isolation Valve 3HV-B171A [3HV-B172B]	
	CR Conference RM & Kitchen Exhaust Fan Bypass Damper D-19(SA) [SB]	
	CR Supply Fan Outside Intake Valve 3HV-B169A [3HV-B170B]	
K 104 [K 104] RAS	LPSI Pump A [B] (stops)	
K 105 [K 105] MSIS	Not Used	
K 106 [K 106] MSIS	Main Steam Sample Valve 2MS-F714 [2MS-F715]	
K 107 [K 107] CCAS	Not Used	
K 108 [K 108] SIAS	Charging Pump A [B]	
K 110 [K 110] SIAS	LPSI Pump A [B] RWSP Outlet Valve 2SI-L103A [2SI-L104B] SIS Sump Isol Valve 2SI-L101A [2SI-L102B] DG A Breaker [B] HPSI Pump A [B] HPSI Pump AB [Both] Charging Pump AB [Both]	2SI-L103A [2SI-L104B] will remain open, 2SI-L101A [2SI-L102B] will remain shut, in order to avoid removing water supply for HPSI, LPSI and containment Spray Pumps and risk possible introduction of air into the system with potential loss of pump suction when the LPSI Pump starts. These valves are normally aligned in the required accident position and checked periodically as required by Technical Specification Surveillance requirement. Only one HPSI Pump will start depending on system alignment. Since the subgroup relay actuates either pump through common circuitry, starting of either pump verifies subgroup relay operation.

RELAY NO.	ACTUATED EQUIPMENT	REMARKS
K 111 [K 111] CSAS	Containment Spray Pump A [B]	
K 112 [K 112] EFAS-2	EFW Pump A [B]	
K 113 [K 113] EFAS-1	EFW Pump A [B]	
K 114 [K 114] CSAS	Not Used	
K 201 [K 201] CIAS	Rx Drain Tk Cont Isol 2BM-F109AS [2BM-F108AB]	
	Waste Gas Cont Isol 2WM-F158AB [2WM-F157AB]	
K 203 [K 203] CIAS	Hydrogen Analyzer Cont Isol 2HA-E608A, 2HA-E609A 2HA-E610A, [2HA-E628B 2HA-E629B, 2HA-E630B]	
	Cont Atm RAD Monitor Cont Isol 2CA-E605A, 2CA-E606A [2CA-E604B]	
K 204 [K 204] CIAS	RCS Sample Cont Isol 2SL-F1504AB [2SL-F1501AB]	
	Surge Line Sample Cont Isol 2SL-1505AB [2SL-1502AB]	
	Pzr Steam Sample Cont Isol 2SL-1506AB [2SL-1503AB]	
	SG Blowdown Cont Isol 2BD-F604, 2BD-F606 [2BD-F603, 2BD-F605]	
	Steam Line Drain 2MS-V670, 2MS-V671 [2MS-V663, 2MS-V664]	
K 205 [K 205] CIAS	Not Used	
K 206 [K 206] CIAS	SG Sample Cont Isol 2SL-F602, 2SL-F604 [2SL-F601, 2SL-F603]	
	SIS Sump Sample Cont Isol 2SI-E655 [2SI-E654]	
K 207 [K 207]	No Relay	

RELAY NO.	ACTUATED EQUIPMENT	REMARKS
K 208 [K 208] CIAS	Not Used	
K 209 [K 209] CIAS	Cont Sump Pump Cont Isol 2WM-F105AB [2WM-F104AB] SIT Drain to RWSP Cont Isol 2SI-F156lAB [Nitrogen Cont Isol 2NG-F604]	
K 210 [K 210] CIAS	CARS Supply Fan S3(3A-SA) [3B-SB] CARS Exhaust Fan E18(3A-SA) [3B-SB] Cont Purge Valves 2HV-B151A, 2HV-B152A 2HV-B155A, [2HV-B150B 2HV-B153B, 2HV-B154B Cont Vac Relief Instr Line Cont Isol 2HV-E634, [2HV-F633B]	Relay dropout trips S3 and E18; however, these fans are not run during plant operation and are interlocked with normally locked closed manual containment isolation valves. In order to run the fans, containment integrity would be breached. This is not warranted since the fans are not run anyway. Therefore, the relay is tested with the fans secured.
K 211 [K 211] EFAS - 1	SG #1 Blowdown Cont. Isol 2BD-F604 [2BD-F603] EFW Valve Logic 2FW-V848A [2FW-V847B]	EFAS signal does not actuate EFW valves without additional process signal inputs from SG level and EFW flow. Placing multiple instrumentation in test during reactor operation reduces plant safety. The relay will be tested without operation of the EFW valves.
K 212 [K 212] CIAS	Not Used	
K 213 [K 213] CIAS	Not Used	
K 301 SIAS	Boric Acid Pump A Boric Acid Pump B HPSI Flow Valve 2SI-V1546A2	
K 302 [K 401] SIAS	SIT Isol Valve 1SI-V1505TK1A [1SI-V1506TK1B] SIT Drain Valve 1SI-F1551TK1A [1SI-F15521B]	Relay dropout causes the SIT Isolation valve to open, however Technical Specification 3.5.1 requires the valve to be open with the power removed. It is verified at least once per 12 hours to be open. Shutting the valve (cont.)

RELAY NO.	ACTUATED EQUIPMENT	REMARKS
	LPSI Flow Valve 2SI-V1543B2 [2SI-V1539B1]	would decrease plant safety for no reason. The valve therefore will be left open and not verified during reactor operation, although the subgroup relay is tested.
	HPSI Flow Valve 2SI-V1548A4 [2SI-V1540B2]	
K 303 [K 303] EFAS - 2	EFW Pump Steam Inlet 2MS-V611A [2MS-V612B]	
K 304 [K 304] CSAS	Cont Spray Isol 2CS-F305A [2CS-F306B]	
K 306 [K 306] CCAS	Not Used	
K 307 [K 307]	Nc Relay	
K 309 [K 309] RAS	SI Min Flow Isol 2SI-V809A, 2SI-V810A [2SI-V801B, 2SI-V802B]	
	SIS Sump Isol 2SI-L101A [2SI-L102B]	
K 310 [K 310] EFAS - 2	SG Blowdown Cont. Isol 2BD-F606 [2BD-F605]	Same as K 211 for EFW Logic.
	EFW Valve Logic 2FW-V849A [2FW-V850B]	
K 311 [K 311] SIAS	Computer RM Air Handler AH-31(3) [Both]	
	ANP Exhaust Fan E-19(SA), E-19(SB) [Both]	
	Cable Vault Exhaust Fan E-49(3) [Both]	
	RAB Exhaust Fan E-22(3A) [3B]	
	Switchgear Area Air Handler AH-25(3A-SA) [3B-SB] AH-30(3A-SA) [3B-SB]	
	Battery RM Exhaust Fan E-29(3A-SA) [3B-SB] E-30(3A-SA) [3B-SB] E-31(3A-SA) [3B-SB]	

RELAY NO.	ACTUATED EQUIPMENT	REMARKS
	Computer Battery RM Exh Fan E-46(3A-SA) [3B-SB]	
	ANP Isol 3HV-175A [3HV-176B]	
	Switchgear Area Intake Damper D-65(SA) [SB]	
K 312 [K 312] RAS	Not Used	
K 401 SIAS	Boric Acid Pump Recirc 3CH-F170A, 3CH-F171B	
	Reactor Makeup Bypass 3CH-V112AB	
	Reactor Makup Stop 3CH-F117AB	
K 402 [K 402] EFAS - 1	EFW Pump Steam Supply 2MS-V611A [2MS-V612B]	
K 403 [K 403] SIAS	HPSI Flow Valve 2SI-V1550A1 [2SI-V1547B3]	
	Hot Leg Injection Drain 1SI-V2504 [1SI-V2505]	
K 404 [K 404] MSIS	Not Used	
K 405 [K 405] RAS	Not Used	
K 406 [K 406] MSIS	Not Used	
K 407	No Relay [Both]	

RELAY NO.	ACTUATED EQUIPMENT	REMARKS
K 408 [K 408] SIAS	Water Chiller Compressor WC-1(3A-SA) [3B-SB] Water Chiller Compressor WC-1(3C-SAB) [Both] Chilled Water Header Isolation Valves 3AC-F142A, 3AC-F149A 3AC-F144A, 3AC-F136A [3AC-F143B, 3AC-F150B 3AC-F135B, 3AC-F151B]	Only one water chiller will start depending on system alignment. Since the subgroup relay actuates either chiller through common circuitry, start of either chiller varifies the subgroup relay operation.
K 409 [K 403] SIAS	SIT Isolation 1SI-V1507TK2A [1SI-V1508TK2B] SIT Drain 1SI-F1553TK2A [1SI-F1554TK2B] LPSI Flow Valve 2SI-V1541A2 [2SI-V1549A1] HPSI Flow Valve 2SI-V1542A3 [2SI-V15451B]	SIT Isolation same as K 302.
K 410 [K 410] SIAS	CCW Pump A [B] CCW Pump AB [Both] CCW Train Isolation Valves 3CC-F109AB 3CC-F113AB, 3CC-F112AB 3CC-F116AB, [3CC-F110AB 3CC-F114AB, 3CC-F111AB 3CC-F115AB] ACCW Pump A [B] CCW From SDC HX 3CC-F130A [3CC-F131B] CCW NNS Isolation 3CC-F122A, 3CC-F120A 3CC-F133AB [3CC-F123B 3CC-F121B, 3CC-F132AB] CCW HX Temp Control 3CC-TM290A [3CC-TM291B] Diesel Generator A [B]	Under normal conditions, CCW supplies safety and non-safety loads and the system is operated with two pumps running and the trains cross connected to obtain sufficient flow for all loads. On SIAS two of the three pumps get start signals, the trains isolate and the non-safety loads isolate. To test pump starting would require running the system with only one pump which could lead to inadequate flow for all loads, jeopardizing the operating status of safety as well an non-safety equipment. Therefore, the subgroup relays are tested without an actual pump start. The operation of the CCW train isolation valves is dependent upon the assignment of CCW pump AB. If the pump is assigned to the A or B trains, the SIAS signal is blocked

RELAY NO.	ACTUATED EQUIPMENT	REMARKS
		to appropriate isolation valves to avoid isolating the pump from the assigned train piping. Also the AB pump starts in lieu of the A or B pump. During subgroup relay testing, the valves associated with the CCW pump alignment at the time of test will be checked for proper isolation. since all the valves receive the isolation signal through common circuitry, subgroup relay operation is verified.
K 411 [K 411] MSIS	Not Used	
K 412 [K 412] SIAS	Diesel Generator A [B] Sequencer A [B]	
K 413 [K 413] CCAS	Not Used	
K 623 [K 623] MSIS	SG #1 EFW 2FW-V848A [2FW-V847B]	
	SG #2 EFW 2FW-V849A [2FW-V850B] Trip Leg Dropout	
K 624 [K 624] EFAS - 1	Trip Leg Dropout	
K 625 [K 625] EFAS - 2	Trip Leg Dropout	
K 723 [K 723] MSIS	SG #1 EFW Valve 2FW-V852A [2FW-V851B]	
	SG #2 EFW Valve 2FW-V853A [2FW-V854B] Trip Leg Dropout	
K 724 [K 724] EFAS - 1	SG #1 EFW Valve Logic 2FW-V852A [2FW-V851B] Trip Leg Dropout	Same as K 211 for EFW Logic
K 725 [K 725] EFAS - 2	SG #2 EFW Valve Logic 2FW-V853A [2FW-V854B] Trip Leg Dropout	Same as K 211 for EFW Logic